

Courses/ Curricula/ Faculty

Contact individual departments for the most current information.

Courses numbered 1 through 99 are lower-division courses and are normally open to freshmen and sophomores. Courses numbered 87 are Freshman Seminars.

Courses numbered 100 through 199 are upper-division courses and are ordinarily open only to students who have completed at least one lower-division course in the given subject, or six quarters of college work.

Courses numbered 200 through 299 are graduate courses and are ordinarily open only to students who have completed at least eighteen upper-division units basic to the subject matter of the course.

Courses numbered 300 through 399 are professional courses for teachers, which are specifically designed for teachers or prospective teachers.

Courses numbered 400 through 499 are other professional courses.

A / B

Academic Internship Program
 African American Studies Minor
 African Studies Minor
 Anthropology
 Applied Mechanics and Engineering Sciences: See [Engineering, Jacobs School of](#). Program name changed to [Mechanical and Aerospace Engineering \(MAE\)](#).
 Applied Ocean Science
 Audiology
 Biochemistry
 Bioengineering: See [Engineering, Jacobs School of](#).
 Bioinformatics and Systems Biology
 Biological Sciences, Division of
 Biomedical Sciences
 Biophysics: See [Physics](#).

C / D

California Cultures in Comparative Perspective Minor
 Chemical Engineering. See NanoEngineering (Engineering, Jacobs School of).

Chemistry and Biochemistry
 Chicano/a—Latino/a Arts and Humanities Minor (CLAH)
 Chinese Studies
 Classical Studies
 Clinical Psychology
 Clinical Research
 Cognitive Science
 Communication
 Comparative Studies in Language, Society, and Culture
 Computer Science and Engineering: See Engineering, Jacobs School of.

Computing and the Arts: See Music and Visual Arts, Departments of.
 Contemporary Issues
 Critical Gender Studies
 Culture, Art, and Technology
 Dimensions of Culture

E

Earth Sciences: See Scripps Institution of Oceanography.
 Economics
 Education Abroad Program
 Education Studies
 Eleanor Roosevelt College
 Engineering, Jacobs School of
 Bioengineering
 Chemical Engineering: See NanoEngineering
 Computer Science and Engineering (CSE)
 Electrical and Computer Engineering (ECE)
 Mechanical and Aerospace Engineering (MAE)
 NanoEngineering (NANO)
 Structural Engineering
 English as a Second Language
 Entry Level Writing
 Environmental Studies
 Environmental Systems
 Ethnic Studies
 European Studies

F / G / H

Film Studies
 Freshman Seminar Program
 German Studies

UC San Diego Global Seminars (GS)
 Greek Literature: See Literature.
 Health Care—Leadership of Healthcare Organizations
 Health Care—Social Issues
 Health Law
 Hebrew Literature: See Literature.
 History
 Human Development Program
 Humanities

I / J

International Migration Studies Minor
 International Relations and Pacific Studies, Graduate School of (IR/PS)
 International Studies
 Italian Studies
 Japanese Studies
 Judaic Studies

L

Language and Communicative Disorders
 Languages
 Latin American Studies
 Latin Literature: See Literature.
 Law and Society
 Linguistics
 Literature

M

Making of the Modern World
 Management, Rady School of
 Marine Biodiversity and Conservation
 Materials Science and Engineering Program
 Mathematics
 Mathematics and Science Education
 Mechanical and Aerospace Engineering (MAE): See Engineering, Jacobs School of.
 Middle East Studies
 Molecular Pathology
 Muir College
 Music

N/O/P

NanoEngineering: See Engineering, Jacobs School of.

Neurosciences

UC San Diego Opportunities Abroad Program

Philosophy

Physics

Political Science

Psychology

Public Health

Public Service Minor

R/S

Rady School of Management: See Management, Rady School of.

Religion, Study of

Revelle College

Russian and Soviet Studies

Science Studies

Science, Technology, and Public Affairs

Scripps Institution of Oceanography

Senior Seminar Program

Sixth College

Sociology

Spanish Literature: See Literature.

Structural Engineering: See Engineering, Jacobs School of.

Subject A: See Entry Level Writing.

T/U/V/W

Theatre and Dance

Third World Studies

Thurgood Marshall College

UC San Diego Washington Program (UCDC)

Undergraduate Seminar Programs: See Freshman and Senior Seminar Programs

Urban Studies and Planning

Visual Arts

Warren College

Academic Internship Program

OFFICE: Literature Building, Second Floor
Warren College
<http://aip.ucsd.edu>

THE PROGRAM

The Academic Internship Program (AIP) offers qualified juniors and seniors an opportunity to earn credit for valuable work experience related to academic and career interests. Although most internships are in the San Diego area, the Academic Internship Program is national in scope, including the popular Washington, D.C. program, and international, including the PRIME program. The AIP database contains an impressive number of internships in diverse settings, including, but not limited to, television and radio stations; law offices; medical research labs and clinics; government agencies; high-tech, biotech, and engineering companies; advertising and public relations firms; and financial institutions. Students can also work with the internship office to develop their own internships.

The program operates all four quarters; students intern a minimum of ten hours per week and receive upper-division credit. Students may enroll for a maximum of three quarters (not to exceed sixteen units of internship credit) during the course of their junior and senior years. The number of units earned corresponds to the number of hours worked, level of internship responsibilities, and length of the research paper/project. The academic component of the program, which is directed by a faculty advisor, consists of a research paper/project and relevant readings. All students earn grades of P/NP and receive transcript notations.

AIP serves students from all six colleges and all undergraduate majors. Students interested in the Academic Internship Program must apply one quarter before they intend to enroll in the program.

To be eligible for the program students must have completed ninety units of credit and have a minimum 2.5 GPA at the time of application.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

197. Academic Internship Program (4, 8, 12)

Individual placements for field learning integrated with academic programs, developed /coordinated by AIP. Written contract received prior to internship includes learning objectives, project outline, means of supervision and evaluation. Consent of faculty advisor and program chair required for all. **Prerequisites:** ninety units minimum completed; 2.5 minimum cumulative GPA; at least two upper-division courses, preferably in a related field, completed by date of application; departmental stamp.

197F. Academic Internship Program—Foreign (4, 8, 12)

Individual placements for field learning outside U.S. or San Diego; integrated with academic programs. Written

contract received prior to internship includes learning objectives, project outline, means of supervision and evaluation. Consent of Faculty Advisor and Program Chair required for all. **Prerequisites:** ninety units minimum completed; 2.5 minimum cumulative GPA; at least two upper-division courses, preferably in a related field, completed by date of application; departmental stamp.

197P. Public Service Minor Internship (4)

Individual placements for field learning performed in nonprofit organizations dedicated to providing services in the areas of education, government, social research, and health. Yearlong written contract completed prior to start of internship will include intellectually unified expectations and means of supervision. Faculty member and student will meet regularly. **Prerequisites:** 2.5 GPA and completion of ninety units, prior declaration of public service minor, departmental stamp.

197PR. Academic Internship Program—PRIME Program (1)

Individual placements for field learning in Pacific Rim countries funded by NSF grant, integrated with academic programs. Grant to last five years; summers 2008–12. Written contract received prior to internship includes learning objectives, project outline, means of supervision and evaluation. **Prerequisites:** ninety units minimum completed, 2.5 minimum cumulative GPA, two upper-division courses completed by date of application, Students must go through a written application and interview selection process, department stamp.

African American Studies Minor

OFFICE: Thurgood Marshall College, Administration Building, Room 120

AFFILIATED FACULTY

Boatema Boateng, *Assistant Professor, Communication*

David Borgo, *Associate Professor, Music*

Robert Cancel, *Associate Professor, Literature*

Dennis Childs, *Assistant Professor, Literature*

Anthony Davis, *Professor, Music*

Zeinabu Davis, *Professor, Communication*

Fatima El-Tayeb, *Assistant Professor, Literature*

Ivan Evans, *Associate Professor, Sociology*

Camille F. Forbes, *Assistant Professor, Literature*

Nadine George, *Associate Professor, Theatre and Dance*

Michael Hanson, *Assistant Professor, Communication*

Sara Johnson, *Assistant Professor, Literature*

Bennetta Jules-Rosette, *Professor, Sociology*

Cecil Lytle, *Professor Emeritus, Music*

Gabriel Mendes, *Assistant Professor, Ethnic Studies*

Denise Ferreira da Silva, *Associate Professor, Ethnic Studies*

Cauleen Smith, *Acting Associate Professor, Visual Arts*

Pat Washington, *Lecturer, Ethnic Studies*

Megan Wesling, *Assistant Professor, Literature*

Daniel Widener, *Assistant Professor, History*

Winifred Woodhull, *Associate Professor, Literature*

THE MINOR

The African American Studies Minor is an interdisciplinary minor which is designed to lead to an understanding of the experiences of African Americans. The *Core Requirement* sets the stage for the formation and codification of an African American intellectual and political tradition into the twentieth century. The *History and Context* selection of courses focuses on the formation of identity through the lens of history and media. *Politics and Society* involves students in an investigation of the contest between that forming identity and the social systems of urbanization, politics, and class stratification. *Representation and Voice* courses provide for a selection of performing and fine arts experiences as representations of African American culture.

CORE COURSES

(Choose ONE COURSE from the list below)

HILD 7A: *Race and Ethnicity in the United States* (4)

LTEN 27: *Introduction to Afro-American Literature* (4)

HISTORY AND CONTEXT

(TWO COURSES selected from list below)

ETHN 105/USP 104: *Ethnic Diversity and the City* (4)

ETHN 140: *Language and American Ethnicity* (4)

ETHN 151: *Ethnic Politics in America* (4)

ETHN 152: *Law and Civil Rights* (4)

ETHN 163: *Leisure in Urban America* (4)

ETHN 164/MUS 153: *African Americans and the Mass Media* (4)

ETHN 165: *Sex and Gender in African American Communities* (4)

ETHN 166: *The Black Press and Social Change* (4)

ETHN 184: *Black Intellectuals in the Twentieth Century* (4)

ETHN 187: *Black Nationalism* (4)

HIUS 134: *From Be Bop to Hip Hop: African American Cultural History Since 1945* (4)

HIUS 135B/ETHN 170B: *Slavery and the Atlantic World* (4)

HIUS 138/ETHN 167: *African American History in War and Peace: 1917–Present* (4)

HIUS 139/ETHN 149: *African American History in the Twentieth Century* (4)

HIUS 164/ETHN 181: *Topics in Comparative History of Modern Slavery* (4)

HIUS 165/ETHN 182: *Segregation, Freedom Movements, and the Crisis of the Twentieth Century* (4)

HIUS 175: *Crime, Law, and Society in the United States, 1600-1900* (4)

HIUS 176: *Race and Sexual Politics* (4)

HIUS 183/ETHN 159: *Topics in African American History* (4)

POLITICS AND SOCIETY

(TWO COURSES selected from list below)

ANLD 23: *Debating Multiculturalism: Race, Ethnicity, and Class in American Society*

COCU 182: *Black Popular Music* (4)

COCU 123: *Black Women Filmmakers* (4)

COSF 124: *Black Women, Feminism, and Media* (4)

ETHN 141: *Language and Culture* (4)

ETHN 160: *Black Politics and Protest 1885–1941* (4)

ETHN 161: *Black Politics and Protest Since 1941* (4)

POLI 100H: *Race and Ethnicity in American Politics* (4)

POLI 100J: *Race in American Political Development* (4)

Soc/C 139: *Social Inequity: Class, Race, and Gender* (4)

Soc/D 187S: *The Sixties* (4)

USP 103/HIUS 148: *American Cities in the Twentieth Century* (4)

USP 104/ETHN 105: *Ethnic Diversity and the City* (4)

USP 132/ETHN 107: *African Americans, Religion, and the City* (4)

REPRESENTATIONS AND VOICE

(EIGHT UNITS selected from list below)

LTAM 111: *Comparative Caribbean Discourse* (4)

LTAM 130: *Reading North by South (Inter-American Prose)* (4)

LTEN 148: *Genres in English and American Literature* (4)

LTEN 183/ETHN 172: *African American Prose* (4)

LTEN 184/ETHN 173: *African American Poetry* (4)

LTEN 185/ETHN 174: *Themes in African American Literature* (4)

LTEN 186/ETHN 175: *Literature of the Harlem Renaissance* (4)

LTEN 187/ETHN 176/MUS 154: *Black Music / Black Texts: Communication and Cultural Expression* (4)

LTEN 188: *Contemporary Caribbean Literature* (4)

MUS 95: *Ensemble Performance* (2)

Section G: *Gospel Choir** (Except for the two-unit performing arts courses in Mus which may be repeated for credit)

Section JC: *Jazz Chamber Ensemble*** [formerly MUS 95: *Jazz Ensemble* (2)]

Section JL: *Large Jazz Ensemble***

MUS 126/ETHN 178: *Blues: An Oral Tradition* (4)

MUS 127A/ETHN 179A: *Jazz Roots and Early Development* (4)

MUS 127B/ETHN 179B: *Jazz Since 1946: Freedom and Form* (4)

MUS 131: *Advanced Improvisation Performance* (4)

TDHT 109: *African American Theatre* (4)

TDAC 120: *Ensemble* (4) [formerly THAC 120: *Ensemble* (4)]

VIS 1: *Introduction to Art Making: Two Dimensional Practices* (4)

VIS 126DN: *African and Afro-American Art* (4)

Students interested in either taking African American Studies courses or completing the minor are encouraged to discuss their interests and develop a course of study with an affiliated faculty member of the program at their earliest convenience. See the Marshall College Academic Advising Office for further information or contact the minor program's coordinator in the Office of the Provost.

African Studies Minor

PARTICIPATING FACULTY

PROFESSORS

Zeinabu Davis, M.F.A., *Communication*
Clark Gibson, Ph.D., *Political Science*
Robert Horwitz, Ph.D., *Communication*
Bennetta Jules-Rosette, Ph. D., *Sociology, Director*
Thomas E. Levy, Ph. D., *Anthropology*
Edward Reynolds, Ph. D., *History, Emeritus*
Marc J. Swartz, Ph. D., *Anthropology, Emeritus*

ASSOCIATE PROFESSORS

Robert Cancel, Ph. D., *Literature*
Ivan Evans, Ph. D., *Sociology*
Sharon Rose, Ph.D., *Linguistics*

ASSISTANT PROFESSORS

Boatema Boateng, Ph. D., *Communication*
Karen Ferree, Ph.D., *Political Science*
Jeremy Prestholt, Ph.D., *History*

OFFICE: 135 Social Science Building
Thurgood Marshall Campus
(858) 822-0265

African studies is an interdisciplinary minor that covers African topics and issues through a coordinated set of courses offered in the Departments of Anthropology, Communication, Ethnic Studies, History, Literature, Music, Political Science, Sociology, Theatre and Dance, and Visual Arts. In addition to the offerings at UC San Diego, opportunities for further study in Africa and Europe are available through the University of California Education Abroad Program, with programs in Ghana and South Africa as well as at the National University of Côte d'Ivoire, the Université de Paris V, the Université de Bordeaux II, and study abroad programs offered through other U.S. universities.

A number of African languages are available through the UCSD Department of Linguistics. Students may take independent study units and tutorials with faculty in the program to learn the languages of their respective areas of interest. In addition, students are encouraged to participate in special seminars and presentations offered annually by the African and African-American Studies Research Project. Students may take the seminars for credit by signing up for a 198/199 with a qualified African studies professor. A minor in African studies consists of seven total courses. Students may take no more than four courses in any one department. Also, a minimum of one course each from of the following three groups is required: Group A—Traditional Cultures and Premodern Africa, Group B—African Society and Politics, and Group C—African Expressive Culture.

The African studies minor provides students with a broad background in African history, societies, culture, and politics. Please contact Professor Bennetta Jules-Rosette in the Department of Sociology (Social Science Building, Rm. 471), (858) 534-4790 or the African Studies Office at (858) 822-0265 for more information. Quarterly course offerings are subject to change. Interested students should consult the program faculty for an up-to-date list.

COURSES

GROUP A: TRADITIONAL CULTURES AND PREMODERN AFRICA

ANRG 104. Traditional African Societies and Cultures (4)
Com/Cul 118. Oral History (4)
Ethnic Studies 142. Languages of Africa (4)
HIAF 110. History of Africa to 1880 (4)
HIAF 120. History of South Africa (4)
HIUS 135. Slavery and the Atlantic World (4)

GROUP B: AFRICAN SOCIETY AND POLITICS

ANGN 183. Chiefdoms, States, and the Emergence of Civilizations (4)
Com/Cul 179. Colonialism and Culture (4)
Ethnic Studies 157. Ethnic Conflict in the Third World (4)
HIAF 111. Modern Africa since 1880 (4)
HIAF 130. African Society and the Slave Trade (4)
HIAF 140. Economic History of Africa (4)
HIUS 136. Slavery and Freedom in Nineteenth-Century U.S.: Images and Realities (4)
Political Science 132A. Political Modernization Theory (4)
Political Science 135A. Ethnic Conflict in the Third World (4)
Political Science 136B. Comparative Politics and Political Culture (4)
Soc I/148E. Inequality and Jobs (4)
Soc I/157. Religion in Contemporary Society (4)
Soc I/158. Islam in the Modern World (4)
Soc I/188E. Community and Social Change in Africa (4)
Soc I/188J. Change in Modern South Africa (4)

GROUP C: AFRICAN EXPRESSIVE CULTURE

Com/Cul 127. Folklore and Communication (4)
Com/Cul 146. Culture and Thought (4)
Com/Cul 179. Colonialism and Culture (4)
Ethnic Studies 176. Black Music/Black Text: Communication and Cultural Expression (4)
LTGN 130. Novel and History in the Third World (4)
LTGN 132. African Oral Literature (4)
LTGN 133. Introduction to Literature and Film of Modern Africa (4)
LTGN 185. Literature and Ideas (4)
LTGN 186A-B-C. Modernity and Literature (4-4-4)
LTEN 187. Black Music/Black Text: Communication and Cultural Expression (4)
LTEN 188. Contemporary Caribbean Literature (4)

MUS 13AF. World Music/Africa (4)
MUS 111. World Music Traditions (4)
MUS 126. Introduction to Oral Music (4)
MUS 127A-B. Music of Black Americans (4-4)
Soc I/105. Ethnographic Film and Media Methods (6)
Soc I/187. African Societies Through Film (4)
TH/HS 109. Modern Black Drama (4)
TH/HS 153. Dance History-Jazz Dance & Related Ethnic Studies (4)
Visual Arts 126A. African and Afro-American Art (4)
Visual Arts 127B. Western & Non-Western Rituals & Ceremonies (4)
Visual Arts 127D. Primitivism and Exoticism in Modern Art (4)
Visual Arts 128E. Topics in Non-Western Art (4)

Anthropology

PROFESSORS

Guillermo Algaze, Ph.D.
Thomas J. Csordas, Ph.D.
Jonathan Friedman, Ph.D.
John B. Haviland, Ph.D.
Janis H. Jenkins, Ph.D.
Thomas E. Levy, Ph.D.
Steven M. Parish, Ph.D.
Joel Robbins, Ph.D., *Chair*
Margaret J. Schoeninger, Ph.D.
Shirley C. Strum, Ph.D.
Kathryn A. Woolard, Ph.D.

ASSOCIATE PROFESSORS

Geoffrey Braswell, Ph.D.
Suzanne A. Brenner, Ph.D.
Paul S. Goldstein, Ph.D.
Jim Moore, Ph.D.
Esra Özyürek, Ph.D.
Nancy G. Postero, Ph.D.
Katerina Semendeferi, Ph.D.
Rupert Stasch, Ph.D.

ASSISTANT PROFESSORS

Keith E. McNeal, Ph.D.
David E. Pedersen, Ph.D.

PROFESSORS EMERITI

F. G. Bailey, Ph.D., *Academic Senate Career Distinguished Teaching Award*
Roy G. D'Andrade, Ph.D. (*No longer in San Diego*)
David K. Jordan, Ph.D.
Michael E. Meeker, Ph.D. (*No longer in San Diego*)
T. Schwartz, Ph.D. (*Retired, not available*)
Melford E. Spiro, Ph.D.
Marc J. Swartz, Ph.D.

ADJUNCT PROFESSORS

Robert McC. Adams, Ph.D.
Fred Bercovitch, Ph.D.

ASSOCIATED FACULTY

Edwin L. Hutchins, Ph.D., *Professor, Cognitive Science*
Martha Lampland, Ph.D., *Associate Professor, Sociology*
Paula F. Levin, Ph.D., *Senior Lecturer S.O.E., Education Studies*
Christena Turner, Ph.D., *Associate Professor, Sociology*
Lisa Yoneyama, Ph.D., *Associate Professor, Literature*

OFFICE: Social Science Building
<http://anthro.ucsd.edu>

Anthropology stands at the nexus between the social sciences, biological sciences, and humanities. It is dedicated to understanding the worldwide diversity of social institutions and cultural traditions, past and present, as well as to studying our nearest nonhuman relatives. Because there is increasing awareness of the importance of anthropological factors in domestic and international relations, as well as in a number of health-related fields, a bachelor's degree in anthropology has become accepted as a valuable

preparation for careers in law, medicine, business, government, education, and various areas of public service. Anthropology majors can qualify for a California teaching credential from UC San Diego through the Education Studies program. The department offers a full range of courses in archaeology, as well as in biological, social, cultural, psychological, political, and linguistic anthropology. Courses include offerings that focus on specific societies or regions of the world—especially Latin America, Asia, and Oceania—as well as more theoretically oriented topics. The department offers undergraduate major and minor programs, a senior thesis program, an undergraduate internship program, and a graduate program leading to the doctoral degree. Students also may enroll in archaeological field school and study-abroad programs in the Middle East and Latin America.

THE UNDERGRADUATE PROGRAM

LOWER-DIVISION

Lower-division offerings in anthropology are concentrated in the core series: ANTH 1, 2, 3. These courses are designed to provide a comprehensive orientation to the ideas and methods of anthropological investigation and a familiarity with case materials from a number of different societies (ANTH 1), prehistoric eras (ANTH 2 and ANTH 3), and historical periods (ANTH 3).

Students who intend to major or minor in anthropological archaeology are advised to take ANTH 3.

Students who intend to major or minor in biological anthropology must take ANTH 2 (or the equivalent), which is prerequisite for most upper-division biological anthropology courses.

ANTH 23, which may not be offered every year, satisfies the campuswide requirement for a course in American Cultures.

Students who have already completed ANTH 103 (or the older sequence ANPR 105, 106, and 107) may not receive academic credit for ANTH 1.

Other lower-division courses are offered from time to time and will vary from year to year.

UPPER-DIVISION

The Department of Anthropology offers many general interest and specialized courses at the upper-division level. In addition to satisfying the requirements of the anthropology major, many of these may satisfy the requirements of other majors.

THE MINOR

Students may choose a minor in anthropological archaeology, biological anthropology, or sociocultural anthropology. Each consists of seven anthropology courses. At least five of these courses must be upper-division, and at least four should be taken at UCSD. Transfer credits from other anthropology departments are usually accepted. Education Abroad Program credits are acceptable at the discretion of the undergraduate advisor.

THE MAJOR

To receive a B.A. degree with a major in anthropology, the student must meet the requirements of Revelle, John Muir, Thurgood Marshall, Earl Warren, Eleanor Roosevelt College, or Sixth College.

Additionally, the student must meet the following requirements of the Department of Anthropology:

1. A minimum of twelve four-unit upper-division courses in the Department of Anthropology must be completed.
2. The undergraduate core ANTH 101, 102, and 103 (or the now defunct sequence ANPR 105, 106, and 107) must be completed (included as three of the twelve courses required under #1, above). All or some of the courses in this sequence are prerequisites for some other upper-division courses. This sequence consists of
 - 101 Foundations of Social Complexity
 - 102 Humans Are Cultural Animals
 - 103 Sociocultural Anthropology
3. No courses taken in fulfillment of the above requirements may be taken on a Pass/Not Pass (P/NP) basis. [An exception is made for some courses accepted from other schools and for **one** independent study course (199), **or one** directed group study course (198), **and a** combination of one internship seminar (ANBI 187A, C or ANTH 187B) with the corresponding academic internship project (AIP 197). However, this exception does not extend to ANTH 101, 102, or 103, or to transfer credits accepted in lieu of them. These must be taken for a letter grade.]
4. For the B.A. degree, a minimum average of 2.0 is required, both as an overall average in all anthropology courses and in the ANTH 101, 102, and 103 sequence (or the defunct ANPR 105, 106, and 107 sequence) considered separately.
5. At least seven of the upper-division courses submitted for the major must be taken at UCSD. The seven normally must include ANTH 101, 102, and 103 (or the older sequence ANPR 105, 106, and 107). A transfer course may be accepted in lieu of one of these core courses if, in the opinion of the director of Undergraduate Studies, the content is substantially the same. In no case will transfer credit be accepted in lieu of more than one of these courses.
6. All undergraduate majors in anthropology must satisfy the requirements of at least one of the three concentrations—anthropological archaeology, biological anthropology, and sociocultural anthropology—described below.

The Major in Anthropology with Concentration in Archaeology

The department offers a B.A. degree in anthropology with concentration in archaeology. A minimum of at least twelve upper-division courses in anthropology are required. Specifically, this degree requires

1. The Anthropology Core Sequence: ANTH 101, 102 and 103 (or the now defunct ANPR 105, 106, and 107 sequence)
2. The Archaeology Concentration Requirement: ANAR 111 (previously ANGN 181)
3. Three additional four-unit upper-division courses with the prefix ANAR

4. Five additional four-unit, upper-division elective courses within the Department of Anthropology

Some students may elect to take field-school courses such as ANAR 194 or study-abroad courses in archaeology that are more than four units. In these cases, the total number of units for such courses will be applied to the satisfaction of archaeology requirements #3 and #4. For example, a twelve-unit field-school course with the ANAR prefix may be used to satisfy requirement #3 or to partially satisfy requirement #4.

Students majoring in anthropological archaeology are encouraged to take the field-school ANAR 194.

The Major in Anthropology with Concentration in Biological Anthropology

The department offers a B.A. degree in anthropology with concentration in biological anthropology. A minimum of at least twelve upper-division courses within and beyond anthropology are required. Specifically, this degree requires

1. The Anthropology Core Sequence: ANTH 101, 102, 103 (or the now defunct ANPR 105, 106, and 107 sequence).
2. The Biological Anthropology Concentration Requirement: ANBI 111.
3. Three additional four-unit upper-division courses with the prefix ANBI.
4. Five additional four-unit, upper-division elective courses. At least one of these five electives must be taken from an approved list of biology courses. This list is available from the undergraduate coordinator in the Department of Anthropology. Each of the remaining four electives is to be drawn from that list or must be an upper-division anthropology course.

The Major in Anthropology with Concentration in Sociocultural Anthropology

The department offers a B.A. degree in anthropology with concentration in sociocultural anthropology. A minimum of at least twelve upper-division courses in anthropology are required. Specifically, this degree requires

1. The Anthropology Core Sequence: ANTH 101, 102, 103 (or the now defunct ANPR 105, 106, and 107 sequence)
2. The Sociocultural Concentration Requirements: Any three of the following six course options:
 - ANSC 120. Anthropology of Religion (previously ANGN 120)
 - ANSC 121. Psychological Anthropology (previously ANPR 107)
 - ANSC 122. Language in Society (previously ANGN 149) or ANSC 118. Language and Culture
 - ANSC 123. Political Anthropology (previously ANGN 151)
 - ANSC 124. Cultural Anthropology (previously ANPR 106)

- ANSC 125. Gender, Sexuality, and Society (previously ANGN 125)
3. One additional ANSC course focusing on a particular region, country, or religion (e.g., Indigenous Peoples of Latin America, Modernity in Brazil, Global Islam)
 4. Five additional four-unit upper-division elective courses within the Department of Anthropology

Senior Thesis Program

The senior thesis is prepared during two successive quarters of ANTH196, senior thesis research, and is counted as two of the twelve upper-division courses required for a major. Students are admitted to the program by invitation of the faculty. Under normal circumstances, eligibility for the program requires the student (1) to have completed eight upper-division courses, including the core sequence, and (2) to have achieved grade point averages of at least 3.6 both overall and in the anthropology major by the end of the junior year. Some of these requirements may be waived by vote of the faculty. During the first quarter of the program (fall quarter), students select their research topic and write a preliminary paper. Those who receive a B+ or better will be invited to continue in the program and complete a thesis on the chosen topic by the end of the winter quarter. The thesis will be evaluated by a committee consisting of the thesis advisor and one other faculty member appointed by the department chair in consultation with the thesis coordinator. The thesis advisor has the sole responsibility for the grade the student receives in the winter quarter. The reading committee advises the faculty on the merit of the thesis for departmental honors. A senior thesis is required in order to be considered for department honors at commencement.

Students who wish to be considered for the Senior Thesis Program should notify the department's undergraduate advisor by the second week of the spring quarter prior to the senior year.

Internship Program

The department sponsors an internship program that allows students to gain academic credit for supervised work in the Museum of Man, the San Diego Zoo, or the Wild Animal Park. The three tracks of the program allow internship experience in (1) biological anthropology, (2) ethnology and archaeology at the museum, or (3) primate behavior and conservation at the Zoo or Wild Animal Park. A combination of on-campus and on-site supervision makes these courses intellectually provocative but practical and applied. They are an especially valuable complement to a major or minor in anthropology. One four-unit internship (AIP 197) taken with the corresponding two-unit internship seminar (ANBI 187A, C and ANTH 187B) can be counted as one of the twelve upper-division courses for the anthropology major or minor. Applications to these programs are accepted during the first seven weeks of the quarter before the one in which the internship is to be done.

ACADEMIC ENRICHMENT PROGRAMS

FACULTY MENTOR PROGRAM

The program offers research experience to any junior or senior with a GPA of 2.7 or higher who wants to prepare for graduate or professional school. Participants work as research assistants to UCSD faculty members during the winter and spring quarters. Students present their research papers at the Faculty Mentor Research Symposium at the conclusion of the program in the spring.

SUMMER RESEARCH PROGRAM

The program offers full-time research experience to underrepresented (i.e., minorities, women, and low-income, first-generation college) students who are interested in preparing for careers in research or university teaching. Juniors and seniors who have a 3.0 GPA or above and plan to attend graduate or professional school are eligible to participate.

EDUCATION ABROAD PROGRAM

One of the best ways to understand the concept of *culture* is to live in a different culture for a time. Anthropology majors are encouraged to participate in the UC Education Abroad Program (EAP) or UCSD's Opportunities Abroad Program (OAP). Students considering this option should discuss their plans with the faculty undergraduate advisor before going abroad, and courses taken abroad must be approved for credit to the major by the advisor upon return. More information on EAP and OAP is provided under "[Education Abroad Program](#)" in the *UC San Diego General Catalog*. Interested students should contact the EAP staff in the International Center.

THE GRADUATE PROGRAM

The Department of Anthropology offers graduate training in sociocultural (including psychological and linguistic) anthropology, anthropological archaeology, and biological anthropology. The graduate program is designed to provide the theoretical background and the methodological skills necessary for a career in research and teaching anthropology at the university level, and for the application of anthropological knowledge to contemporary problems. It is assumed that all students enter with the goal of proceeding to the doctoral degree.

Admission to the graduate program occurs in the fall quarter only.

Any decision to waive a requirement for either the master's degree or the Ph.D. must be made by a majority of the faculty.

Graduate Advising

One member of the departmental faculty functions as the graduate advisor and is referred to as the director of graduate studies. The role of graduate advisor is to inform students about the graduate program, to approve individual registration forms, and to give assistance with respect to administrative matters.

First-Year Mentors

Each first-year student is assigned a faculty mentor in the student's subdiscipline. Students are encouraged to meet regularly with their mentors for course planning and guidance in meeting specific requirements and recommendations for their subdiscipline.

After completion of the requirements for the master's degree, the chair of the student's doctoral committee serves as the student's major advisor.

Evaluation

In the spring of each year, the faculty evaluate each student's overall performance in course work, apprentice teaching, and research progress. A written assessment is given to the student after the evaluation. If a student's work is found to be inadequate, the faculty may determine that the student should not continue in the graduate program.

THE MASTER OF ARTS DEGREE

Students entering the doctoral program must complete a master's degree before continuing toward the doctorate. Entering students who already have a master's degree in anthropology are not permitted by university regulations to receive a second social science or related-field master's degree, but are required by the department to complete the requirements for the master's degree. Rare exceptions may be made on a case-by-case basis by the consent of the majority of the faculty and approval of the Office of Graduate Studies.

REQUIREMENTS FOR MASTER'S DEGREE

Required Courses

- ANTH 230. Departmental Colloquium (4 quarters, 1 unit each)
- ANTH 281A-B. Introductory Seminars (1 unit each)
- ANTH 295. Master's Thesis Preparation (1–12 units)
- Four core courses, as specified in the following sections.

Core Course Offerings

Six core courses are offered in the graduate program in anthropology:

- ANTH 280A. Core Seminar in Social Anthropology (4 units)
- ANTH 280B. Core Seminar in Cultural Anthropology (4 units)
- ANTH 280C. Core Seminar in Psychological Anthropology (4 units)
- ANTH 280D. Core Seminar in Anthropological Archaeology (4 units)
- ANTH 280E. Core Seminar in Biological Anthropology (4 units)
- ANTH 263. The Anthropology of Language and Discourse (4 units)

Note: Although not in the 280 series, ANTH 263 is a core seminar. It is also open to graduate students from other departments, with instructor's permission. It may be offered in alternate years.

ANTH 280A, 280B, 280C, and 263 are all core courses within the Sociocultural track. ANTH

280D and 280E are core courses in, respectively, the anthropological archaeology and biological anthropology tracks.

All students must take at least four of these six core courses by the end of their second year in the program (and preferably during the first year) as a requirement for receiving the master's degree or for equivalent advancement in the program. The subfields specify particular choices among these core offerings for the students admitted to their respective tracks, as detailed below. The department strongly encourages all students in all subfields to take additional core courses as elective seminars to complete their program.

Anthropological Archaeology core requirements:

- 280D (Anthropological Archaeology); and
- 280E (Biological Anthropology); and
- Two of the remaining four core courses in anthropology, selected in consultation with the student's assigned mentor.

Biological Anthropology core requirements:

- 280E (Biological Anthropology); and
- 280D (Anthropological Archaeology); and
- Two of the remaining four core courses in anthropology, selected in consultation with the student's assigned mentor.

Sociocultural Anthropology, Psychological Anthropology, and Linguistic Anthropology

All students in sociocultural anthropology and its allied fields of psychological and linguistic anthropology will take at least four core courses, selected as follows and with the consent of the individual student's faculty mentor. Students identifying two or more areas of concentration must satisfy the requirements of each of these areas.

Core requirements for students in the General Sociocultural track:

- 280A (Social Anthropology); and
- 280B (Cultural Anthropology); and
- 280C (Psychological Anthropology) or 263 (The Anthropology of Language and Discourse);
- and 280D (Anthropological Archaeology) or 280E (Biological Anthropology).

Core requirements for students in the Psychological Anthropology track:

- 280C (Psychological Anthropology); and
- 280D (Anthropological Archaeology) or 280E (Biological Anthropology); and

Two of the following:

- 280A (Social Anthropology),
- 280B (Cultural Anthropology),
- 263 (Anthropology of Language and Discourse).

Core requirements for students in the Linguistic Anthropology track:

- 263 (Anthropology of Language and Discourse); and
- 280D (Anthropological Archaeology) or 280E (Biological Anthropology); and

Two of the following:

- 280A (Social Anthropology),
- 280B (Cultural Anthropology),
- 280C (Psychological Anthropology).

Master's Thesis

Students must complete a master's thesis or master's thesis equivalency project of a length, format, and scope to be approved by the student's M.A. committee and the director of graduate studies. The M.A. thesis must be at least 8,000 words in length and generally should not exceed 10,000 words. Students must have completed three quarters of course work in order to begin writing a master's thesis. By the end of the spring quarter of the student's first year, he or she will form a master's committee in consultation with the director of graduate studies and first-year faculty mentor.

Students will submit a draft of the master's thesis or master's thesis equivalency project by the first day of winter quarter of their second year. Students may revise the master's thesis or master's thesis equivalency project in the winter quarter. Students will register for four credit hours of ANTH 295 (master's thesis preparation) in the fall quarter of their second year. Upon consultation with the M.A. committee and director of graduate studies, an additional four credits of ANTH 295 may be taken in winter for revisions. Successful completion of the master's thesis or master's thesis equivalency will determine whether an M.A. degree is awarded, where applicable, and weigh significantly in second-year student evaluations.

Elective Courses

Four elective, letter-grade courses are required. These courses can be undergraduate or graduate seminars. At least two of these elective courses must be within the anthropology department. Other electives may be taken outside of the department with the approval of the department chair or the graduate advisor.

THE DOCTORAL DEGREE

Continuation in the doctoral program is granted to students who have satisfactorily completed the master's program and who have completed courses and the master's thesis at a level of excellence that indicates promise of professional achievement in anthropology.

REQUIREMENTS FOR DOCTORAL DEGREE

1. Required Courses

In order to achieve candidacy, students must complete two additional letter-grade electives beyond the four required for the master's degree.

2. Research Methods

Students are required to develop a plan for their training in research methods and present it to the anthropology department faculty on their proposed dissertation committee in the spring quarter of their second year.

3. Apprentice Teaching

In order to acquire teaching experience, each student is required to serve as a teaching assistant for at least one quarter anytime during the first four years of residency. This experience may take place either in our department or in any teaching program on campus. The relevant course in the anthropology department is ANTH 500: Apprentice Teaching, taken for four units and S/U grade. Upon petition, this requirement may be waived by the anthropology faculty.

4. Foreign Language

Unless a student is planning on fieldwork in English-speaking areas, knowledge of one or more foreign languages may be essential for the successful completion of a Ph.D. in anthropology at UCSD. Students will determine specific language requirements for their degree in consultation with the faculty and their doctoral committee.

5. Formation of the Doctoral Committee

All students must choose the chair of their doctoral committee by the end of their second year. They must choose two more internal members of the doctoral committee by the end of the fall quarter of their third year. In consultation with the chair of the doctoral committee, two faculty members from outside the department (one of whom must be tenured) should be added to the committee by the end of the winter quarter of the third year.

Anthropologists in other departments who are identified by the faculty may serve as either inside members or outside members of the committee. However, there must be at least two inside members from within the department, and only one outside member may be an anthropologist. The final composition of the committee is approved by the Office of Graduate Studies.

The chair of the doctoral committee serves as the student's advisor for the remainder of the student's program.

6. The Fieldwork Proposal

Advancement to candidacy will be based on the submission of two to three position papers and a research proposal. The position papers are intended as a way for students to demonstrate competence in particular areas of theory, methods, and/or regional studies that are significant to the dissertation research project. The number of the position papers and the specific topics they address are to be formulated in consultation with the student's committee chair and, as appropriate, with other members of the student's dissertation committee. It is expected that the position papers will amount to some fifty to sixty pages and that the research proposal will be in the twenty- to thirty-page range. Students should enroll in directed reading courses (ANTH 298) during the quarters in which they are writing the position papers. Additionally, students should also enroll in ANTH 296 during the quarters in which they are writing their dissertation research proposal. A maximum of three quarters is allowed for the preparation of both the position papers and proposal. The position

papers, research proposal, and oral examination for advancement to candidacy must be completed no later than the end of the spring quarter of the student's fourth year.

7. Advancement to Candidacy

Advancement to doctoral candidacy must take place no later than the end of the spring quarter of the fourth year. This requires the successful completion of all course work requirements, the position papers, the dissertation research proposal, and an oral qualifying examination administered by the student's committee. The proposal and position papers must be turned into the student's committee at least three weeks prior to the examination.

Upon petition, students may advance to candidacy as early as the spring quarter of the third year, if all candidacy requirements noted earlier have been satisfied by that time. This requires the agreement of the graduate advisor, the student's dissertation advisor, and other members of his or her committee.

Successful completion of this examination marks the student's advancement to doctoral candidacy. These exams will be open to the extent that university regulations allow.

8. Dissertation and Dissertation Defense

Upon completion of the dissertation research project, the student writes a dissertation that must be successfully defended in an oral examination conducted by the doctoral committee and open to the public. This examination may not be conducted earlier than three quarters after the date of advancement to doctoral candidacy. A full copy of the student's dissertation must be in the hands of each of the student's doctoral committee members four weeks before the dissertation hearing. An abstract of the student's dissertation must be in the hands of all faculty members ten days before the dissertation defense. It is understood that the edition of the dissertation given to committee members will not be the final form, and that the committee members may suggest changes in the text at the defense. Revisions may be indicated, requiring this examination to be taken more than once. Acceptance of the dissertation by the university librarian represents the final step in completion of all requirements for the Ph.D.

9. Time Limits

Precandidacy status is limited to four years. Candidates for the doctorate remain eligible for university support for eight years. Instructional support (teaching assistantships, readerships, and tutors) is limited to six years (eighteen quarters). The doctoral dissertation must be submitted and defended within nine years. This is in accordance with university policy. *Normative time, which is the expected time to complete all requirements for the Ph.D., is six years for anthropology students.*

10. Additional Requirements for the Ph.D. in Anthropological Archaeology

Prior to receiving the Ph.D., anthropological archaeology students must complete a minimum

total of fifty-six units (the equivalent of fourteen four-unit courses) of formal classroom/seminar courses. Students must choose all courses in consultation with their faculty advisor, who will be assigned during the first quarter. Archaeology students must take at least two sociocultural area or topical courses (upper-division or graduate) or two advisor-approved courses in other social science or humanities departments that are relevant to their regional or theoretical focus of study. Each archaeology student must take at least one 200-level course focusing on cultures of the Old World and one 200-level course focusing on cultures of the New World. Students of anthropological archaeology are required to take at least one course in a modern or ancient language, **or** at least one course in linguistics. If offered, students must take ANTH 286 (Topics in Anthropological Archaeology). Anthropological archaeology students are required to take at least one course in quantitative methods (statistics or GIS). Because archaeology is closely allied to various earth and biological sciences, students are required to take at least one course in either of these fields that is relevant to their interests. Finally, graduate students in anthropological archaeology are expected to seek and obtain archaeology field and laboratory training. This requirement may be fulfilled by working with the anthropological archaeology track faculty in the Department of Anthropology or with archaeologists at other institutions.

INTRODUCTION TO REQUIRED CORE COURSES

ANTH 280A. Core Seminar in Social Anthropology. Core seminar focuses on individual action and social institutions.

ANTH 280B. Core Seminar in Cultural Anthropology. Core seminar focuses on personal consciousness and cultural experience.

ANTH 280C. Core Seminar in Psychological Anthropology. Core seminar focuses on motives, values, cognition, and qualities of personal experience.

ANTH 280D. Core Seminar in Anthropological Archaeology. Integral part of the training for graduate students focusing on anthropological archaeology. It is one of a set of core anthropology courses available to graduate students; required of anthropological archaeology students but open for students in other subfields.

ANTH 280E. Core Seminar in Biological Anthropology. This seminar will examine the central problems and concepts of biological anthropology, laying the foundation for first-year graduate students in biological anthropology as well as providing an overview of the field for graduate students in other areas of anthropology.

ANTH 281A-B. Introductory Seminars. These seminars are held in the first two quarters of the first year of graduate study. Faculty members will present an account of their current research and interests. When appropriate, a short preliminary reading list will be given for the particular lecture.

ANTH 263. Anthropology of Language and Discourse. Examines the theoretical and methodological foundations and principal research questions of linguistic anthropology, providing the fundamentals for graduate study in this area. Required

for students specializing in linguistic anthropology, and open to other students. **Prerequisite:** *graduate standing in anthropology or consent of instructor.*

NOTE: Not all anthropology courses are offered every year. Please check the quarterly UCSD Schedule of Classes issued each fall, winter, and spring, for specific courses.

THE MELANESIAN STUDIES RESOURCE CENTER AND ARCHIVE

These facilities embody the substantial interests in the Pacific Basin that are represented on the UCSD campus and the special prominence of the UCSD Department of Anthropology in the study of cultures and societies of Oceania and especially of Melanesia. In cooperation with the UCSD libraries, the Melanesian Studies Resource Center and Archive has two major projects. First, there is an ongoing effort to sustain a library collection of monographs, dissertations, government documents, and journals on Melanesia that make UCSD the premier center for such materials in the United States. Second, there is an endeavor to collect the extremely valuable unpublished literature on Melanesia, to catalog such materials systematically, to produce topical bibliographies on these holdings, and to provide microfiche copies of archival papers to interested scholars and to the academic institutions of Melanesia. This innovative archival project is intended to be a model for establishing special collections on the traditional life of tribal peoples as dramatic social change overtakes them. In the near future, anthropological research on tribal peoples will take place largely in archives of this kind. These complementary collections will support a variety of research and teaching activities and are already attracting students of Melanesia to this campus.

The Melanesian Studies Resource Center and Archive are directed by members of the Department of Anthropology faculty, in collaboration with Geisel Library.

THE ARCHAEOLOGICAL RESEARCH LABORATORY

Archaeology laboratories were established at UCSD in 1995. The present facilities are geared to the study of lithics, ceramics, biological remains, and other small finds retrieved on faculty expeditions in the old and new worlds, including Belize, Israel, Jordan, and Peru. Multimedia research, AutoCAD, and other computer-based studies are carried out in the lab. Undergraduate and graduate students are encouraged to participate in lab studies.

THE BIOLOGICAL ANTHROPOLOGY LABORATORY

The biological anthropology laboratories have twin missions in teaching research. They house collections of modern skeletal material and fossil hominid casts used for teaching both at the lab and in local outreach presentations. The primary research focus involves a large collection of histological sections and computerized images of living and postmortem human and nonhuman primate brains that were obtained through magnetic resonance scans. These are reconstructed in 3-D using state-of-the-art equipment for comparative analysis and study of the evolution of the human brain.

Undergraduate and graduate student involvement in the lab is welcomed.

THE ANTHROPOLOGY OF MODERN SOCIETY FACULTY RESEARCH GROUP

The Anthropology of Modern Society is a project of graduate training and research dedicated to the critical study of modernity and its counterpoints. The group is concerned with the changing nature of membership in modern society. Its participants focus on issues of citizenship and democracy; social formations in tension with the nation-state; modern subjectivities; social and religious movements; governmental rationalities and public works, transnational markets and migrations; relations of local to global processes within the current realignments of regional, national, and transnational sovereignties; and the social life of cities as making manifest these kinds of concerns. Participants are committed to reorienting anthropological theory and ethnographic practice toward such contemporary social and political problems. Guiding this project is the group's interest in combining critical theory with a comparative and empirically grounded study of cases to constitute an anthropology of modernity.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Note: Not all courses are offered every year. Please check the quarterly Schedule of Classes for specific courses issued fall 2009, winter 2010, and spring 2010.

ANTHROPOLOGY: LOWER-DIVISION

ANTH 1. Introduction to Culture (4)

An introduction to the anthropological approach to understanding human behavior, with an examination of data from a selection of societies and cultures. [Formerly known as ANLD 1.] Credit not allowed for both ANLD 1 and ANTH 1.

ANTH 2. Human Origins (4)

An introduction to human evolution from the perspective of physical anthropology, including evolutionary theory and the evolution of the primates, hominids, and modern humans. Emphasis is placed on evidence from fossil remains and behavioral studies of living primates. *Prerequisite for upper-division biological anthropology courses.* [Formerly known as ANLD 2.] Credit not allowed for both ANLD 2 and ANTH 2.

ANTH 3. World Prehistory (4)

This course examines theories and methods used by archaeologists to investigate the origins of human culture. A variety of case studies from around the world are examined. *(Recommended for many upper-division archaeology courses.)* [Formerly known as ANLD 3.] Credit not allowed for both ANLD 3 and ANTH 3.

ANTH 23. Debating Multiculturalism: Race, Ethnicity, and Class in American Societies (4)

This course focuses on the debate about multiculturalism in American society. It examines the interaction of race, ethnicity, and class, historically and comparatively, and considers the problem of citizenship in relation to the growing polarization of multiple social identities. [Formerly known as ANLD 23.] Credit not allowed for both ANLD 23 and ANTH 23.

ANTH 42. The Study of Primates in Nature (4)

Major primate field studies will be studied to illustrate common features of primate behavior and behavioral diversity.

Topics will include communication, female hierarchies, protocultural behavior, social learning and tool use, play, cognition, and self-awareness. *(Prerequisite for several upper-division biological anthropology courses.)* [Formerly known as ANLD 42.] Credit not allowed for both ANLD 42 and ANTH 42.

ANTH 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges. Topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen. **Prerequisites:** *none.* [Formerly known as ANLD 87.]

ANTHROPOLOGY: UPPER-DIVISION

ANTH 101. Foundations of Social Complexity (4)

Course examines archaeological evidence for three key "tipping points" in the human career: (1) the origins of modern human social behaviors, (2) the beginnings of agriculture and village life, and (3) the emergence of cities and states. **Prerequisite:** *upper-division standing. (Required for all majors in anthropology.)*

ANTH 102. Humans Are Cultural Animals (4)

This class examines humans from a comparative perspective; if we ignore culture, what's left? How do culture and biology interact? And how does biology inform cultural debates over race, sex, marriage, war, peace, etc.? (**Note:** This is a core course for all anthropology majors. Students may not receive credit for ANTH 102 and ANBI 161.) **Prerequisite:** ANTH 2 or consent of instructor.

ANTH 103. Sociocultural Anthropology (4)

A systematic analysis of social anthropology and of the concepts and constructs required for cross-cultural and comparative study of human societies. **Prerequisite:** *upper-division standing. (Required for all majors in anthropology.)* [Formerly known as ANPR 105.] Credit not allowed for both ANPR 105 and ANTH 103.

ANTH 187B. Intern Seminar in Ethnography and Archaeology (2)

Seminar complements students' research in the Academic Internship Program in ethnography and archaeology at the Museum of Man. Readings and discussions focus on problems in the analysis of material culture and classifications of artifacts and site excavations. Research paper required. **Prerequisites:** *ANSC 124 and simultaneous enrollment in Warren 197: Ethnography Archaeology-Museum of Man. (P/ NP grades only.)* Department approval required.

ANTH 192. Senior Seminar in AThe Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in anthropology (at the upper-division level). Senior Seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior Seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors.

ANTH 195. Instructional Apprenticeship in Anthropology (4)

Course gives students experience in teaching of anthropology at the lower-division level. Students, under direction of instructor, lead discussion sections, attend lectures, review course readings, and meet regularly to prepare course materials and to evaluate examinations and papers. Course not counted toward minor or major. **Prerequisites:** *upper-division standing and consent of instructor and department stamp. Received grade of A in course to be taught or equivalent.* [Formerly known as ANPR 195.] Credit not allowed for both ANPR 195 and ANTH 195.

ANTH 196A. Thesis Research (4)

Independent preparation of a senior thesis under the supervision of a faculty member. Completion of this course with a grade of at least B+ is a prerequisite to ANTH 196B. **Prerequisites:** *students will be admitted by invitation of the department. Department approval required.* [Formerly

known as ANPR 196A.] Credit not allowed for both ANPR 196A and ANTH 196A.

ANTH 196B. Thesis Research (4)

Independent preparation of a senior thesis under the supervision of a faculty member. Students begin two-quarter sequence in fall quarter. **Prerequisite:** completion of ANTH 196A with grade of B+ or better. [Formerly known as ANPR 196B.] Credit not allowed for both ANPR 196B and ANTH 196B.

ANTH 197. Field Studies (4)

Individually arranged field studies giving practical experience outside the university. **Prerequisites:** consent of instructor and department approval required. (P/NP grades only.)

ANTH 198. Directed Group Study (2–4)

Directed group study on a topic or in a field not included in the regular departmental curriculum by special arrangement with a faculty member. **Prerequisites:** consent of instructor and upper-division standing. (P/NP grades only.) Department approval required.

ANTH 199. Independent Study (2–4)

Independent study and research under the direction of a member of the faculty. **Prerequisites:** consent of instructor. (P/NP grades only.) Department approval required.

ANTHROPOLOGY: ARCHAEOLOGY

ANAR 100. Special Topics in Anthropological Archaeology (4)

Course usually taught by visiting faculty in anthropological archaeology. Course will vary in title and content. When offered, the current description and title is found in the current Schedule of Classes and the anthropology department Web site. (Can be taken a total of four times as topics vary.) **Prerequisite:** upper-division standing or consent of instructor.

ANAR 103. Archaeology in the Holy Land (4)

The Holy Land (Israel, Jordan, Palestinian territories) represents a land bridge between Africa and Southwest Asia. Here we explore human foundations from the Paleolithic (ca. 2 million years BP) to the rise of Early Bronze Age cities (ca. 3000 BCE). **Prerequisite:** upper-division standing or consent of instructor.

ANAR 111. Foundations of Archaeology (4)

(Formerly Anthropological Archaeology) As part of the broad discipline of anthropology, archaeology provides the long chronological record needed for investigating human and social evolution. The theories and methods used in this field are examined. (Archaeology core sequence course.) ANTH 3 is recommended. [Formerly known as ANGN 181.] Credit not allowed for both ANGN 181 and ANAR 111. **Prerequisite:** upper-division standing.

ANAR 112. Ancient Urbanism (4)

The origins and development of early cities in the Old and New Worlds are compared and contrasted from an archaeological anthropological perspective. **Prerequisite:** upper-division standing.

ANAR 118. Archaeology of the UCSD Campus (4)

Our campus houses some of the earliest human settlements in North America. This course reviews the archaeology, climate, and environment of the sites and outlines research aimed at understanding the lives of these early peoples. [Formerly known as ANGN 108.] **Prerequisites:** upper-division standing. Consent of instructors. Credit not allowed for both ANGN 108 and ANAR 118.

ANAR 119S. Archaeological Field and Lab Class (8)

The archaeological field and laboratory class will take place at Moquegua, Peru. It is an introduction to the research design of interdisciplinary projects, the technique of data collections, the methods of excavation and post-excavation lab work. Course materials fee is required. [Formerly known as ANGN 119.] **Prerequisites:** upper-division standing. Consent of instructor. Credit not allowed for both ANGN 119 and ANAR 119S.

ANAR 121A. Digital Archaeology: GIS Foundations (4)

Concerns modern archaeological data with Geographic Information Systems (GIS) and performing spatial analysis. Lectures and lab exercises—learn spatio-temporal analysis techniques with interactive online computer mapping. Hands-on skills with ArcView, GIS, and several ArcView extensions. [Formerly known as ANGN 121.] Credit not allowed for both ANGN 121 and ANAR 121A. **Prerequisite:** upper-division standing.

ANAR 140: The Foundation for Social Complexity in the Near East (4)

This course critically examines the theoretical models and archaeological evidence of nascent social complexity and inequality in the Near East. The time period under consideration encompasses the shift from generalized hunting and gathering through complex hunter-gatherers to large-scale agricultural communities. [Formerly known as ANRG 115.] Credit not allowed for both ANRG 115 and ANAR 140. **Prerequisite:** upper-division standing.

ANAR 141. Prehistory of the Holy Land (4)

(Formerly The Archaeology of Society in Syro-Palestine) Israel is a land-bridge between Africa and Asia. Course highlights the prehistory of the Levant and its interconnections from the Paleolithic to the rise of the earliest cities in anthropological perspective. [Formerly known as ANRG 116.] Credit not allowed for both ANRG 116 and ANAR 141. **Prerequisite:** upper-division standing.

ANAR 142. The Rise and Fall of Ancient Israel (4)

(Formerly The Archaeology of Israel in the Iron Age) The emergence and consolidation of the state in ancient Israel is explored by using archaeological data, biblical texts, and anthropological theories. The social and economic processes responsible for the rise and collapse of ancient Israel are investigated. ANTH 3 is recommended. [Formerly known as ANRG 150.] Credit not allowed for both ANRG 150 and ANAR 142. **Prerequisite:** upper-division standing.

ANAR 143. Archaeology, Anthropology, and the Bible (4)

The relationship between archaeological data, historical research, the Hebrew Bible, and anthropological theory are explored along with new methods and current debates in Levantine archaeology. [Formerly known as ANGN 184.] Credit not allowed for both ANGN 184 and ANAR 143. **Prerequisite:** upper-division standing.

ANAR 144. Pharaohs, Mummies, and Pyramids: Introduction to Egyptology (4)

An introductory survey of the archaeology, history, art, and architecture of ancient Egypt that focuses on the men and women who shaped western civilization. [Formerly known as ANRG 120.] Credit not allowed for both ANRG 120 and ANAR 144. **Prerequisites:** upper-division standing, and ANTH 3 may be taken concurrently.

ANAR 153. The Mysterious Maya (4)

The archaeology, anthropology, and history of the Maya civilization, which thrived in Mexico and Central America from 1000 BC, until the Spanish conquest. [Formerly known as ANRG 113.] Credit not allowed for ANLD 13, ANRG 113 and ANAR 153. **Prerequisite:** upper-division standing.

ANAR 154. The Aztecs and their Ancestors (4)

Introduction to the archaeology of the ancient culture of Mexico from the early Olmec culture through the Postclassic Aztec, Tarascan, Zapotec, and Mixtec states. Agriculture; trade and exchange; political and social organization; kinship networks; religious system, ideology, and worldviews. [Formerly known as ANRG 125.] Credit not allowed for both ANRG 125 and ANAR 154. **Prerequisite:** upper-division standing.

ANAR 155S. Study Abroad: Ancient Mesoamerica (4)

Introduction to archaeology of Mesoamerica, taught through visits to important ancient cities and museums of Mexico and Central America. Complementary to ANAR 154. Itinerary and subject will vary, so course may be taken more than once. Course/program fee may apply. [Formerly known as ANRG 106.] Credit not allowed for both ANRG 106 and ANAR 155S. **Prerequisite:** Consent of instructor only.

ANAR 156. The Archaeology of South America (4)

This course will examine archaeological evidence for the development of societies in the South American continent.

From the initial arrival of populations through to the Inca period and the arrival of the Spaniards. [Formerly known as ANRG 121.] Credit not allowed for both ANRG 121 and ANAR 156. **Prerequisite:** upper-division standing.

ANAR 156-XL. The Archaeology of South America (FLD) (1)

Foreign Language Discussion. Students will exercise Spanish foreign language skills to discuss topics related to the prehistoric archaeology of South America. A basic knowledge of written and conversational Spanish is required. [Formerly known as ANRG 121XL.] Credit not allowed for both ANRG 121XL and ANAR 156XL. **Prerequisites:** ANAR 156 (corequisite). Upper-division standing or consent of instructor.

ANAR 157. Early Empires of the Andes: The Middle Horizon (4)

The civilizations of Wari and Tiwanaku built the first empires of Andean South America long before the Inca. Middle Horizon (AD 500–1000) mythohistory, urbanism, state origins, art, technology, agriculture, colonization, trade, and conquest are explored using ethnohistory and archaeological sources. [Formerly known as ANRG 127.] Credit not allowed for both ANRG 127 and ANAR 157. **Prerequisite:** upper-division standing or consent of instructor.

ANAR 157S. Early Empires of the Andes: The Middle Horizon (4)

The civilizations of Wari and Tiwanaku built the first empires of Andean South America long before the Inca. Middle Horizon (AD 500–1000) mythohistory, urbanism, state origins, art, technology, agriculture, colonization, trade, and conquest are explored using ethnohistory and archaeological sources. Credit not allowed for ANAR 157, ANAR 157S, and ANRG 127. **Prerequisite:** upper-division standing or consent of instructor.

ANAR 157-XL. The Andean Middle Horizon (FLD) (1)

Foreign Language Discussion. Students will exercise Spanish foreign-language skills to discuss topics related to the Wari and Tiwanaku civilizations of South America. A basic knowledge of written and conversational Spanish is required. [Formerly known as ANRG 127XL.] Credit not allowed for both ANRG 127XL and ANAR 157XL. **Prerequisites:** ANAR 157 (corequisite). Upper-division standing or consent of instructor.

ANAR 158. The Inca: Empire of the Andes (4)

The history and culture of the Inca Empire of South America and its fatal encounter with the West. Archaeological excavations, accounts from the sixteenth and seventeenth centuries, and ethnographies of present-day peoples of the Andes are explored. [Formerly known as ANRG 128.] Credit not allowed for both ANRG 128 and ANAR 158. **Prerequisite:** upper-division standing or consent of instructor.

ANAR 158-XL. The Inca: Empire of the Andes (FLD) (1)

Foreign Language Discussion. Students will exercise Spanish foreign-language skills to discuss topics related to the Inca. This is a corequisite of ANAR 158. [Formerly known as ANRG 128XL.] Credit not allowed for both ANRG 128XL and ANAR 158XL. **Prerequisite:** ANAR 158 (corequisite).

ANAR 163. Evolution of Technology (4)

(Formerly Technological Revolutions and Evolution) While not really existing outside the social order, technological systems are basic to civilization. This course examines their growth across six millennia—complex, largely indeterminate, and marked by irregular spurts of acceleration. While comparative, it concentrates on England and America. [Formerly known as ANGN 163.] Credit not allowed for both ANGN 163 and ANAR 163. **Prerequisite:** upper-division standing.

ANAR 170. Research Design in Anthropological Archaeology (4)

This course trains students to design, implement, and conduct research in anthropological archaeology. Writing and presenting work in progress will take place in a seminar-like forum. **Prerequisite:** junior/senior standing.

ANAR 181. The Archaeology of Hunters-Gatherers (4)

Course examines current theoretical issues in the field of hunter-gatherer archaeology. Considerable emphasis is given to ethnographic and ethno-archaeological sources

for understanding such topics as prehistoric hunter-gatherer adaptations, culture change, social organization, and intergroup interaction. [Formerly known as ANGN 103.] ANTH 3 recommended. Credit not allowed for both ANGN 103 and ANAR 181. **Prerequisite:** *upper-division standing.*

ANAR 182. Origins of Agriculture and Sedentism (4)
Varying theoretical models and available archaeological evidence are examined to illuminate the socio-evolutionary transition from nomadic hunter-gathering groups to fully sedentary agricultural societies in the Old and New Worlds. (Archaeology core sequence course.) [Formerly known as ANGN 182.] ANTH 3 recommended. Credit not allowed for both ANGN 182 and ANAR 182. **Prerequisite:** *upper-division standing.*

ANAR 183. Chiefdoms, States, and the Emergence of Civilizations (4)

The course focuses on theoretical models for the evolution of complex societies and on archaeological evidence for the development of various pre- and protohistoric states in selected areas of the Old and New Worlds. (Archaeology core sequence course.) [Formerly known as ANGN 183.] ANTH 3 recommended. Credit not allowed for both ANGN 183 and ANAR 183. **Prerequisite:** *upper-division standing.*

ANAR 184. The Political Economy of Early Empires (4)
Archaeological and textual evidence for selected early empires of pre-Columbian America and the Ancient Near East will be used to illuminate cross-cultural similarities and differences in the ways complex pre-capitalistic societies acquired, produced, exchanged, and distributed wealth. [Formerly known as ANGN 130.] ANTH 3: World Prehistory is recommended. Credit not allowed for both ANGN 130 and ANAR 184. **Prerequisite:** *upper-division standing.*

ANAR 190. Middle East Archaeological Field School (12)

The archaeological field school will take place in Jordan. It is an introduction to the design of research projects, the techniques of data collection, and the methods of excavation. Includes post-excavation lab work, study trips, and field journal. [Formerly known as ANPR 190.] Credit not allowed for both ANPR 190 and ANAR 190. **Prerequisite:** *upper-division standing or consent of instructor.*

ANAR 194S. Summer Middle East Archaeological Field School (12)

The archaeological field school will take place in Jordan. It is an introduction to the design of research projects, the techniques of data collection, and the methods of excavation. Includes post-excavation lab work, study trips, and field journal. **Prerequisite:** *upper-division standing or consent of instructor.*

ANTHROPOLOGY: BIOLOGICAL ANTHROPOLOGY

These courses can be counted for the biological anthropology minor or concentration.

ANBI 100. Special Topics in Biological Anthropology (4)

Course usually taught by visiting faculty in biological anthropology. Course will vary in title and content. When offered, the current description and title is found in the current Schedule of Classes and the anthropology department Web site. (Can be taken a total of four times as topics vary.)

ANBI 103. Darwin's Legacy (1 or 4)

Course explores modern legacy of Darwin's ideas in light of his 2009 bicentennial. It provides an accessible forum to current knowledge of evolution. This one-time offer is structured around a series of lectures by experts from UCSD and beyond. Students taking the course for one unit must take it P/NP. **Prerequisite:** *upper-division standing.*

ANBI 111. Advanced Principles of Human Evolution (4)

Major stages of human evolution including the fossil evidence for biological and cultural changes through time. **Prerequisites:** *upper-division standing, ANTH 2 (or equivalent).*

ANBI 116. The Evolution of Primate Reproduction (4)

This course examines reproductive biology and its evolution among the Order Primates. Lectures cover the hormonal control of sexual and parental behavior, the evolution of mating systems, mating tactics, and sexual selection. Human reproduction is considered in the comparative perspective. **Prerequisites:** *upper-division standing, ANTH 2: Human Origins or comparable, or consent of instructor.*

ANBI 132. Conservation and the Human Predicament (4)

(Same as BIEB 176.) Interdisciplinary discussion of the human predicament, biodiversity crisis, and importance of biological conservation. Examines issues from biological, cultural, historical, economic, social, political, and ethical perspectives emphasizing new approaches and new techniques for safeguarding the future of humans and other biosphere inhabitants. **Prerequisites:** *upper-division standing, ANTH 2, or consent of instructor.*

ANBI 140. The Evolution of the Human Brain (4)

Introduction to the organization of the brain of humans and apes. Overview of the theoretical perspectives on the evolution of the primate cortex and limbic system. Exposure to contemporary techniques applied to the comparative study of the hominoid brain.

ANBI 141. The Evolution of Human Diet (4)

The genotype of our ancestors had no agriculture or animal domestication, or rudimentary technology. Our modern diet contributes to heart disease, cancers, and diabetes. This course will outline the Natural Diet of Primates and compare it with early human diets. **Prerequisite:** *upper-division standing.*

ANBI 142. The Primate Skeleton (4)

This course will compare long bones, head, and torso shape in tree-living and ground-living primates. The emphasis is on correlating locomotion with bone shapes. **Prerequisite:** *ANTH 42: The Study of Primates in Nature.*

ANBI 143. The Human Skeleton (4)

Learn the bones of your body; how bone pairs differ even within the body, between men, women, ethnic groups; and how nutrition and disease affect them. Course examines each bone and its relation with other bones and muscles that allow your movements. **Prerequisite:** *upper-division standing.*

ANBI 144. Human Anatomy (4)

This course will introduce students to the internal structure of the human body through dissection tutorials on CD ROM. **Prerequisite:** *upper-division standing.*

ANBI 145. Bioarchaeology (4)

How are skeletal remains used to reconstruct human livelihoods throughout prehistory? The effects of growth, use, and pathology on morphology and the ways that skeletal remains are understood and interpreted by contemporary schools of thought. Recommend related course in human anatomy. **Prerequisite:** *consent of instructor.*

ANBI 146. Stable Isotopes in Ecology (4)

The stable isotopes of carbon, nitrogen, oxygen, and hydrogen in animal tissues, plant tissues, and soils indicate aspects of diet and ecology. The course will introduce students to this approach for reconstructing paleo-diet, paleo-ecology, and paleo-climate.

ANBI 148. Primate Behavioral Ecology (4)

The course examines various behaviors (e.g., group formation, dispersal, parenting, coalition formation) from a comparative and evolutionary perspective. Observational methodology and analytical methods will also be discussed. Lab sections are required. Strongly recommended: BIEB 100, Biometry or comparable statistics course, and BIEB 164, Sociobiology. **Prerequisites:** *upper-division standing, ANTH 42.*

ANBI 159. Biological and Cultural Perspectives on Intelligence (4)

Attitudes toward other individuals (and species) are often shaped by their apparent "intelligence." This course discusses the significance of brain size/complexity, I.Q. tests, communication in marine mammals and apes, complex behavioral tactics, and the evolution of intelligence. **Prerequisites:** *upper-division standing, any one*

of the following: ANTH 2, or ANTH 42, or BILD 3 or consent of instructor.

ANBI 173. Cognition in Animals and Humans (4)

The last divide between humans and other animals is in the area of cognition. A comparative perspective to explore recent radical reinterpretations of the cognitive abilities of different primate species, including humans and their implications for the construction of evolutionary scenarios. **Prerequisites:** *upper-division standing, ANTH 2 or equivalent introductory course in evolution/animal behavior, or consent of instructor.*

ANBI 175. Modeling the Behavior of our Early Ancestors (4)

Models of human evolution combine science and myth. This course examines methods used in reconstructions of human evolution. Models such as "man the hunter" and "woman the gatherer" are examined in light of underlying assumptions, and cultural ideals. **Prerequisites:** *upper-division standing, ANTH 2 or equivalent.*

ANBI 187A. Intern Seminar in Physical Anthropology (2)

Seminar complements students' research in the Academic Internship Program in physical anthropology at the Museum of Man. Readings and discussions focus on anatomy, pathology, and classification and X-ray analysis of skeletal remains. Research paper required. **Prerequisites:** *ANTH 2 and simultaneous enrollment in Warren 197: Physical Anthropology-Museum of Man. (P/NP grades only.) Department approval required.*

ANBI 187C. Intern Seminar in Ethology (2)

Seminar complements students' research in the Academic Internship Program at the San Diego Wild Animal Park and/or Zoo. Focus on problems of analysis in observational study of animal behavior and conservation in relation to ethological studies. Research paper required. **Prerequisites:** *ANTH 2 and one upper-division course in animal behavior, either in anthropology or biology. To qualify, must be last-quarter junior or senior with a 3.3 GPA. Simultaneous enrollment in Warren 197: Ethology Zoo. (P/NP grades only.) Department approval required.*

ANTHROPOLOGY: SOCIOCULTURAL

ANSC 100. Special Topics in Socio-Cultural Anthropology (4)

Course usually taught by visiting faculty in socio-cultural anthropology. Course will vary in title and content. When offered, the current description and title is found in the current Schedule of Classes and the anthropology department Web site. (Can be taken a total of four times as topics vary.) [Formerly known as ANGN 100.] **Prerequisite:** *upper-division standing or consent of instructor.*

ANSC 104. Anthropology of Fantasy (4)

A theoretical examination of the sources and relationships of public and private fantasy, based on cross-cultural studies of dreams, myths, and ritual. [Formerly known as ANGN 104.] Credit not allowed for both ANGN 104 and ANSC 104. **Prerequisite:** *upper-division standing.*

ANSC 108. Tourism and Global Culture (4)

This course examines structures of interaction between tourists and communities they visit. Topics addressed include authenticity, commodification, primitivism, photography, travel writing, television, stereotypes that tourists and visited peoples hold about each other, and tourism's links to sociocultural conditions of modernity. **Prerequisite:** *upper-division standing or consent of instructor.*

ANSC 110. Societies and Cultures of the Caribbean (4)

This course examines societies and cultures of the Caribbean in anthropological and historical perspective. Topics include slavery, emancipation, indentureship, kinship, race, ethnicity, class, gender, politics, multiculturalism, religion, music, festivals, popular culture, migration, globalization, and tourism. [Formerly known as ANRG 110.] Credit not allowed for both ANRG 110 and ANSC 110. **Prerequisite:** *upper-division standing.*

ANSC 112. Linguistic Anthropology Workshop (2)

A weekly forum for presentation and discussion of work in linguistic anthropology by faculty, students, and guest speakers. **Note:** Majors may only apply eight units of approved P/NP credit toward the major, and minors may only apply four units of P/NP credit toward the minor. **Prerequisite:** upper-division standing.

ANSC 116. Languages of the Americas: Mayan (4)

An introduction to the languages and cultures of speakers of the Mayan family of languages, with emphasis on linguistic structures, ethnography, and the social history of the region. The course will concentrate on linguistic and ethnographic literature of a single language or sub-branch, emphasizing commonalities with the family and region as a whole. **Prerequisite:** upper-division standing.

ANSC 117GS. Language and (Multi)Culture (4)

A critical introduction to the study of cultural patterns of thought, action, and expression, in relation to language. Topics include semiotics and structuralism, cognition and categorization, universal vs. particulars, and ethnopoetics. **Prerequisite:** upper-division standing or consent of instructor.

ANSC 118. Language and Culture (4)

An introduction to the study of cultural patterns of thought, action, and expression, in relation to language. We consider comparatively semiotics and structuralism, cognition and categorization, universals vs. particulars, ideologies of stasis and change, cultural reconstruction, and ethnopoetics. **Prerequisite:** upper-division standing.

ANSC 119. Gesture, Communication, and the Body (4)

The course is an introduction to a flourishing area of research that connects linguistic communication to alternate and complementary modalities—manual gesticulation, the face, the body, and aspects of the “lived environment” (spaces, tools, artifacts). [Credit not allowed for both ANSC 119GS and ANSC 119.] **Prerequisite:** upper-division standing.

ANSC 119GS. Gesture, Communication, and the Body (4)

A critical examination of research on gesture and “body language” in comparative perspective, considering cognitive, interactive, and ethnographic bases of “body language” as communication, and the relationship of gesture to speech. **Prerequisite:** upper-division standing or consent of instructor.

ANSC 120. Anthropology of Religion (4)

Explores religious life in various cultures. Topics addressed include the problem of religious meaning, psychocultural aspects of religious experience, religious conversion and revitalization, contrasts between traditional and world religions, religion and social change. [Formerly known as ANGN 120.] Credit not allowed for both ANGN 120 and ANSC 120. **Prerequisite:** upper-division standing.

ANSC 121. Psychological Anthropology (4)

Interrelationships of aspects of individual personality and various aspects of sociocultural systems are considered. Relations of sociocultural contexts to motives, values, cognition, personal adjustment, stress and pathology, and qualities of personal experience are emphasized. [Formerly known as ANPR 107.] Credit not allowed for both ANPR 107 and ANSC 121. **Prerequisite:** upper-division standing.

ANSC 122. Language in Society (4)

After a brief introduction to linguistic concepts, the course covers the relations between culture and language, how languages reflect culture, how languages change, language and social life, language and political policy. [Formerly known as ANGN 149.] Credit not allowed for both ANGN 149 and ANSC 122. **Prerequisite:** upper-division standing.

ANSC 123. Political Anthropology (4)

Humans are goal seekers, some with public goals. Course considers ways goals are pursued, which are desirable, and how this pursuit is carried out at the local level with attention to the parts played by legitimacy and coercion. [Formerly known as ANGN 151.] Credit not allowed for both ANGN 151 and ANSC 123. **Prerequisite:** upper-division standing.

ANSC 124. Cultural Anthropology (4)

A web of problematic meanings lies behind social relationships and institutional frameworks. This perspective plays an important role in the discussion of human affairs. Course considers the concept of culture in anthropology as a particularly forceful statement of such a perspective. [Formerly known as ANPR 106.] Credit not allowed for both ANPR 106 and ANSC 124. **Prerequisite:** upper-division standing.

ANSC 125. Gender, Sexuality, and Society (4)

How are gender and sexuality shaped by cultural ideologies, social institutions, and social change? We explore their connections to such dimensions of society as kinship and family, the state, religion, and popular culture. We also examine alternative genders/sexualities cross-culturally. [Formerly known as ANGN 125.] Credit not allowed for both ANGN 125 and ANSC 125. **Prerequisite:** upper-division standing.

ANSC 126. Childhood and Adolescence (4)

This course examines the diversity of practices of child-rearing, socialization, and enculturation across cultures, and the role of culture in the development of personality, morality, spirituality, sexuality, emotion, and cognition. **Prerequisite:** upper-division standing.

ANSC 127. Discourse, Interaction, and Social Life (4)

The course considers how social life is constituted and negotiated through language and interaction. How do people establish, maintain, and alter social relationships through face-to-face talk, and how do different modalities of interaction (including discourse and gesture) affect social life? **Prerequisite:** upper-division standing or consent of instructor.

ANSC 128. Culture and Emotion (4)

This course examines the diversity of emotional experience in human societies and the contribution of the study of emotion to understanding culture and human nature. **Prerequisite:** upper-division standing or consent of instructor.

ANSC 129. Meaning and Healing (4)

This course examines the nature of healing across cultures, with special emphasis on religious and ritual healing. **Prerequisite:** upper-division standing or consent of instructor.

ANSC 130. Hinduism (4)

An anthropological introduction to Hinduism, focusing on basic religious concepts and practices. Topics include myth, ritual, and symbolism; forms of worship; gods and goddesses; the roles of priest and renouncer; pilgrimages and festivals; the life cycle; popular Hinduism, Tantrism. [Formerly known as ANRG 108.] Credit not allowed for both ANRG 108 and ANSC 130. **Prerequisite:** upper-division standing.

ANSC 131. Urban Cultures in Latin America (4)

This course examines four interrelated and historically structured themes of urban culture in Latin America: the role of cities in organizing national space and society; immigration and race; modernism; and popular culture as new religion, music, and film. [Formerly known as ANRG 114.] Credit not allowed for both ANRG 114 and ANSC 131. **Prerequisite:** upper-division standing.

ANSC 132. Modernity in Brazil (4)

Construction of Brazilian modernity through four perspectives: Liberalism among slave-owning elites compared with democratic citizenship among contemporary poor, millenarian religions; construction of the urban periphery by residents; and a modernist theory (antropofagia) about authentic versus imported culture. [Formerly known as ANRG 132.] Credit not allowed for both ANRG 132 and ANSC 132. **Prerequisite:** upper-division standing.

ANSC 133. Peoples and Cultures of the Middle East (4)

This course explores the living structures, family and gender relations, economy, and religion in the Middle East. We will especially focus on how people come to terms with recent transformations such as nationalism, literacy, globalism, and Islamism. [Formerly known as ANRG 122.] Credit not allowed for both ANRG 122 and ANSC 133. **Prerequisite:** upper-division standing.

ANSC 134. Global Islam (4)

Course aims to understand the diverse ways in which Muslims give meaning to their religion and use it as a framework to understand the world. [Formerly known as ANRG 118.] Credit not allowed for both ANRG 118 and ANSC 134. **Prerequisite:** upper-division standing.

ANSC 135. Indigenous Peoples of Latin America (4)

Indigenous peoples in the Americas have long been dominated and exploited. They have also resisted and reworked the powerful forces affecting them. This course will trace this centuries-long contestation, focusing on ways anthropological representations have affected those struggles. [Formerly known as ANRG 143.] Credit not allowed for both ANRG 143 and ANSC 135. **Prerequisite:** upper-division standing.

ANSC 136. Traditional Chinese Society (4)

Course examines major institutions and culture patterns of traditional China, especially as studied through ethnographic sources. Topics include familism, religion, agriculture, social mobility, and personality. [Formerly known as ANRG 170.] Credit not allowed for both ANRG 170 and ANSC 136. **Prerequisite:** upper-division standing.

ANSC 137. Chinese Popular Religion (4)

The religious world of ordinary precommunist times, with some reference to major Chinese religious traditions. Background in premodern Chinese history is recommended. [Formerly known as ANRG 173.] Credit not allowed for both ANRG 173 and ANSC 137. **Prerequisite:** upper-division standing.

ANSC 139. Freud, Psychoanalysis, and Culture (4)

This course examines the work of Sigmund Freud and its relevance to analysis of culture and experience in contemporary society, as well as influential works in the field of psychoanalytic anthropology. **Prerequisite:** upper-division standing or consent of instructor.

ANSC 140. Human Rights II: Contemporary Issues (4)

[Same as HMNR 101.] Interdisciplinary discussion that outlines the structure and functioning of the contemporary human rights regime, and then delves into the relationship between selected human rights protections—against genocide, torture, enslavement, political persecution, etc.—and their violation, from the early Cold War to the present. **Prerequisite:** Anthropology: upper-division or graduate standing or consent of instructor. HMNR: upper-division standing or consent of instructor.

ANSC 142. Anthropology of Latin America (4)

[This course is conjoined with ANTH 242.] This course will examine the overarching legacies of colonialism, the persistence of indigenous peoples and cultures, the importance of class and land reform, the effects of neoliberalism, and citizens' efforts to promote social change in contemporary democracies. Undergraduates will be evaluated on the basis of a midterm and final; graduates will do additional reading and will write a twenty-page research paper. [Formerly known as ANRG 142.] Credit not allowed for both ANRG 142 and ANSC 142. **Prerequisites:** undergraduates: upper-division standing; graduates: graduate standing.

ANSC 160. Nature, Culture, and Environmentalism (4)

Course examines theories concerning the relation of nature and culture. Particular attention is paid to explanations of differing ways cultures conceptualize nature. Along with examples from non-Western societies, the course examines the Western environmental ideas embedded in contemporary environmentalism. [Formerly known as ANGN 160.] Credit not allowed for both ANGN 160 and ANSC 160. **Prerequisite:** upper-division standing.

ANSC 161. Psychoanalysis and Religion (4)

With special attention to the relationship between theory and data, this course deals with the psychoanalytic approaches to the study of religion through a close examination of key ethnographic and historical studies of religious systems and experience. [Formerly known as ANGN 111.] Credit not allowed for both ANGN 111 and ANSC 161. **Prerequisite:** upper-division standing.

ANSC 162. Language, Identity, and Community (4)

This course examines the use of language difference in negotiating identity in bilingual and bidialectal communities, and in structuring interethnic relations. It addresses social

tensions around language variation and the social significance of language choices in several societies. [Formerly known as ANGN 112.] Credit not allowed for both ANGN 112 and ANSC 162. **Prerequisite:** *upper-division standing.*

ANSC 163. Culture and Communication in Education (4)

(Previously titled Anthropology of Education.) The ways in which language and culture influence educational goals and processes. Cultural and sociolinguistic explanations of school successes and failures are examined. [Formerly known as ANGN 117.] Credit not allowed for both ANGN 117 and ANSC 163. **Prerequisite:** *upper-division standing.*

ANSC 164. The Anthropology of Medicine (4)

We examine the medical profession, the sick and the healers, and culture as communication in the medical event through aspects of medical practice and medical research of medicine as well as primitive and peasant systems. **Prerequisite:** *upper-division standing.*

ANSC 165. Contemporary South Asia (4)

This course explores contemporary cultural life in South Asia by examining selected works of literature, film, and ethnography. **Prerequisite:** *upper-division standing.*

ANSC 167. Rituals and Celebrations (4)

Explores the nature and significance of ritual. The course will examine religious rituals, civic festivals, and popular celebrations. Topics include ritual symbolism, social and psychological aspects of ritual, life cycle rites, urban festivals, ritual theory. [Formerly known as ANGN 167.] Credit not allowed for both ANGN 167 and ANSC 167. **Prerequisite:** *upper-division standing.*

ANSC 169. Culture and Environment: Research Seminar and Practicum (4)

Examines the role of culture in the way people perceive and interact with the natural environment. Combines reading of select anthropological studies with training in ethnographic research methods. Students develop a research project and analyze data. Limit: fifteen students. **Prerequisite:** *upper-division standing or consent of instructor.*

ANSC 172. Life-History Seminar and Practicum (4)

Examines life-history research as a method for understanding the cultural and psychological experience of people. Combines reading of life-histories with training in life-history research methods. Students develop a life-history project, conduct interviews, and analyze data. [Formerly known as ANGN 172.] Credit not allowed for both ANGN 172 and ANSC 172. **Prerequisites:** *upper-division standing, ANSC121 or concurrent enrollment in ANSC121 and consent of instructor.*

ANSC 189. The Anthropology of the End of the World: Millenarian Movements Across Cultures (4)

Course focuses on historical and contemporary millenarian movements in the Western and non-Western world. Topics addressed include origins, role of prophets, conceptions of time, relation to politics, and influence on social change. Examples include Christian and non-Christian movements. [Formerly known as ANGN 189.] Credit not allowed for both ANGN 189 and ANSC 189. **Prerequisite:** *upper-division standing.*

ANTHROPOLOGY: GRADUATE

ANTH 201. Special Topics in Anthropological Archaeology (4)

Course usually taught by visiting faculty in anthropological archaeology. Course will vary in title and content. When offered, the current description and title is found in the current Schedule of Classes on TritonLink, and the anthropology department Web site. (Can be taken a total of four times as topics vary.) [Formerly known as ANGR 201.]

ANTH 202. Olmec and Maya Archaeology (4)

Course examines the birth of Olmec and Maya civilizations in the Formative period, the rise of city states during the Early Classic, the decline of the Classic Maya, and the resurgence of the Postclassic period. [Formerly known as ANGR 202.] **Prerequisite:** *graduate standing in anthropology.*

ANTH 203. Four-Campus Video Conference Seminar (1)

Weekly or bimonthly talks by a variety of scholars on varying analytical approaches to social sciences problems. Talks originate either at UCSD, UCLA, UCR, or UCI. Participants include graduate students and faculty from those four campuses. **Prerequisite:** *graduate standing.*

ANTH 205. Third World Cities: Comparative Urbanization and Social Theory (4)

This course examines explosive Third World urbanization as a collision between state-sponsored development projects and insurgent practices of the poor, such as illegal housing, social movements, violence, and new citizenships. Beijing, Calcutta, and São Paulo provide comparative ethnographic and theoretical perspectives. [Formerly known as ANGR 205.] Credit not allowed for both ANGR 205 and ANTH 205. **Prerequisite:** *graduate standing.*

ANTH 210. Religion and Globalization (4)

Examines the worldwide resurgence of religion in the context of migration, missionization, the media, postcolonialism, and personal mobility in contemporary global culture. **Prerequisite:** *graduate standing.*

ANTH 211. Psychoanalysis and Religion (4)

With special attention to the relationship between theory and data, this course deals with psychoanalytic approaches to the study of religion through a close examination of key ethnographic and historical studies of religious systems and experience. [Formerly known as ANGR 211.] **Prerequisite:** *graduate standing.*

ANTH 212. Advanced Topics in Biological Anthropology (4)

A critical exploration of timely and/or controversial topics in biological anthropology. Course will vary in title and content. [Formerly known as ANGR 212.] **Prerequisite:** *graduate standing in anthropology.*

ANTH 215. Advanced Topics in Sociocultural Anthropology (4)

A critical exploration of timely and/or controversial topics in sociocultural anthropology. Course will vary in title and content. **Prerequisite:** *graduate standing.*

ANTH 216. Global Pentecostalism (4)

Pentecostal and charismatic Christianity have recently expanded around the globe. This course explores the cultural and social processes facilitating their spread and examines how these kinds of Christianity shape social life, politics, gender relations, and economic practices in convert societies. [Formerly known as ANGR 216.] Credit not allowed for both ANGR 216 and ANTH 216. **Prerequisite:** *graduate standing.*

ANTH 219. Seminar in Political Anthropology (4)

The focus here is "politics," broadly constructed, in various societies. Analysis is from the perspective of the resources deployed by all involved, including but not limited to power, with emphasis on the role of culture and social structure. [Formerly known as ANGR 219.] **Prerequisite:** *graduate standing.*

ANTH 220. The Human Body in Discourse and Experience (4)

This is an interdisciplinary seminar examining the place of the body and embodiment in contemporary culture and culture theory. **Prerequisite:** *graduate standing.*

ANTH 221. Phenomenology of Perception (4)

This seminar will focus on a close and intensive reading of Maurice Merleau-Ponty's masterwork, *The Phenomenology of Perception*. Emphasis will be placed on the relevance of this work for theory, method, and practice in the social sciences. [Formerly known as ANGR 221.] Credit not allowed for both ANGR 221 and ANTH 221. **Prerequisite:** *graduate standing.*

ANTH 223. Anthropological Interviewing (4)

The course teaches techniques of long-term, intensive interviewing in fieldwork settings with an emphasis on psychodynamic inference and its usefulness in different cultural settings. [Formerly known as ANGR 223.] **Prerequisite:** *graduate standing in anthropology.*

ANTH 224. Advanced Topics in the Anthropology of Gender (4)

A critical analysis of ethnographic and theoretical texts focusing on the sociocultural study of gender. We will also draw on studies of gender and feminist theory from other disciplines (e.g., history, philosophy) to illuminate issues relevant to anthropology. [Formerly known as ANGR 224.] **Prerequisite:** *graduate standing in anthropology or consent of instructor.*

ANTH 225. Andean Prehistory: Rise of Complexity (4)

This course examines the rise of complex societies in the Andean region from the Preceramic through the rise of chiefdoms, states, and empires. Readings focus on archaeological and some ethnohistoric and ethnographic sources. **Prerequisite:** *graduate standing.*

ANTH 226. Ethnography of Christianity (4)

Directed to graduate students planning ethnographic work in Christian societies, this course explores variations in the interpretation and expression of Christianity using historical and ethnographic sources. [Formerly known as ANGR 226.] **Prerequisite:** *graduate standing or consent of instructor.*

ANTH 228. Inca Empire: Society and Statecraft (4)

This course examines the Inca's Andean empire from its origins through the Spanish invasion. Readings include archaeological sources, ethnohistoric colonial accounts, and present-day Quechua and Aymara ethnographies. **Prerequisite:** *graduate standing.*

ANTH 229. Religion and Healing (4)

This seminar is an in-depth analysis of cultural meaning, personal experience, and therapeutic process in ritual healing, emphasizing performative/persuasive aspects of the relation between religion and health in comparative, cross-cultural perspective. **Prerequisite:** *graduate standing.*

ANTH 230. Department Colloquium (1)

A forum to present work by faculty, students, and guests. Course will be offered quarterly. [Formerly known as ANGR 230.] **Prerequisite:** *graduate standing in anthropology. (S/U grades only.)*

ANTH 234. Dynamics of Culture (4)

Examination of the actual operation of culture with attention to the importance of cultural products and social structures. Course goal is to develop skill in understanding the influence, direct and indirect, of culture and behavior. [Formerly known as ANGR 234.] **Prerequisite:** *graduate standing.*

ANTH 238. Citizenship and the Nation State (4)

This course examines various conceptions of citizenship, nation, and state and considers their historical development as fundamental to the organization of most contemporary societies. It covers a range of theoretical readings, recent debates, and case studies. [Formerly known as ANGR 238.] **Prerequisite:** *graduate standing.*

ANTH 239. Contemporary Religious Movements (4)

Recent decades have witnessed the dramatic rise of religious movements worldwide, posing challenges to secular models of modernity. We will study the sociocultural and political implications of this phenomenon comparatively, focusing especially on new forms of Islamic and Christian practice. **Prerequisite:** *graduate standing.*

ANTH 240. Culture and Politics in Southeast Asia (4)

This seminar will focus on classic and contemporary studies of Southeast Asia, concentrating on Thailand, Indonesia, and the Philippines. Particular attention will be paid to the impact of the state and global forces on Southeast Asian cultural and social dynamics. [Formerly known as ANGR 240.] Credit not allowed for both ANGR 240 and ANTH 240. **Prerequisites:** *graduate standing or consent of instructor.*

ANTH 241. Religion and Morality in South Asia (4)

Examines religion and morality in South Asia from an anthropological perspective. The seminar explores the role of religion in social life and the formation of religious and ethical subjectivity by reading selected ethnographic studies of Islam, Hinduism, Jainism, and Buddhism. **Prerequisite:** *graduate standing.*

ANTH 242. Anthropology of Latin America (4)

[This course is conjoined with ANSC 142.] This course will examine the overarching legacies of colonialism, the persistence of indigenous peoples and cultures, the importance of class and land reform, the effects of neoliberalism, and citizens' efforts to promote social change in contemporary democracies. Undergraduates will be evaluated on the basis of a midterm and final; graduates will do additional reading and will write a twenty-page research paper. [Formerly known as ANRG 142.] Credit not allowed for both ANRG 142 and ANSC 142. **Prerequisite:** undergraduates: upper-division standing; graduates: graduate standing.

ANTH 244. Andean Prehistory: Origins of Chiefdoms and States (4)

This seminar examines the prehistory of the Andean region from the peopling of the New World through the formation of Archaic, Preceramic, and Initial periods; the Chavin Horizon; and the Nasca and Moche States of the Early Intermediate Period. [Formerly known as ANGR 244.] Credit not allowed for both ANGR 244 and ANTH 244. **Prerequisite:** graduate standing.

ANTH 245. The Middle Horizon (4)

This seminar compares the distinct urban and expansive state phenomena of the highland Wari and Tiwanaku cultures (AD 500–1000) with emphasis on their formative origins and the ideological, agrarian, and technological foundations of Middle Horizon political development. [Formerly known as ANGR 245.] Credit not allowed for both ANGR 245 and ANTH 245. **Prerequisite:** graduate standing.

ANTH 246. The Inca and the Late Horizon (4)

This seminar considers the ethnohistory, ethnography, and archaeology of the Inca Empire Tawantinsuyu, with emphasis on the economic, social, and ideological foundations of the Cusco Inca state and the dynamics of Inca imperial expansion throughout Andean South America. [Formerly known as ANGR 246.] Credit not allowed for both ANGR 246 and ANTH 246. **Prerequisite:** graduate standing.

ANTH 247. Multimodal Interaction (4)

Human society evolved in the context of face-to-face interaction. The course will examine methods and theoretical approaches to different modalities of interaction—especially speech, gesture, and gaze—their mutual integration, and their relevance to ethnography. [Formerly known as ANGR 247.] Credit not allowed for both ANPR 247 and ANTH 247. **Prerequisites:** graduate standing in anthropology or consent of instructor.

ANTH 251. Ethnographies of Modern Society (4)

This seminar explores the experience and representation of modernity through ethnography. Readings will highlight such issues as: the social dynamics of the city; postcoloniality; globalization and transnationalism; the politics of culture; contemporary religious movements; and gender and modernity. [Formerly known as ANGR 251.] **Prerequisite:** graduate standing or consent of instructor.

ANTH 252. Interrogating Neoliberalism (4)

This seminar will consider the theoretical constructions and deployments of neoliberalism, which has produced an assemblage of capitalist restructuring, transformed governance, and newly produced subjectivities. **Prerequisite:** graduate standing.

ANTH 257. Mind, Self, and Identity (4)

This seminar critically examines social, cultural, and psychological theories of the person, and their relationship to conceptions of the person found in moral political and religious discourses. It explores the role of concepts of the person in ethnographic research. [Formerly known as ANGR 257.] **Prerequisite:** graduate standing in anthropology.

ANTH 258. Analytical Methods in Archaeology (4)

Specialized scientific techniques are increasingly important to archaeology. This seminar examines chronometric date techniques, site-formation processes, and geoarchaeology and pedology, chemical analyses of soils, zooarchaeology, palaeoethnobotany, and how land-use strategies can be inferred from archaeological remains. [Formerly known as ANGR 258.] **Prerequisite:** graduate standing.

ANTH 259. Gender and Mental Health (4)

This seminar in psychological/psychiatric anthropology takes a comparative approach to the study of gender and

mental health. Culture and feminist theory is employed to address questions of gender in relation to various problems, such as depression, anxiety, and eating disorders. **Prerequisite:** graduate standing.

ANTH 260. Psychodynamic Anthropology (4)

The focus of the seminar will be on the relation between psychodynamic models and culture and society. Readings and discussion. [Formerly known as ANGR 260.] **Prerequisite:** graduate standing.

ANTH 261. Audio and Video Methods in Ethnography (4)

A seminar/laboratory exploration, both theoretical and practical, of iconic recording tools in ethnography, focusing on graphic images, photography, and audio and video recording in both natural and semi-experimental settings, with special critical attention to epistemological and theoretical bases of ethnographic representations. **Prerequisites:** graduate standing in anthropology (AN 75, AN 77) or consent of instructor.

ANTH 262. New Directions in Culture, Politics, and History (4)

Anthropology has long analyzed the relations between culture, economics, and politics. This seminar will examine these issues through ethnographic and historical accounts, engaging contemporary theory and debates. **Prerequisite:** graduate standing.

ANTH 263. Anthropology of Language and Discourse (4)

Examines the theoretical and methodological foundations and principal research questions of Linguistic Anthropology, providing the fundamentals for graduate study in this area. Required for students specializing in Linguistic Anthropology and open to other students. [Formerly known as ANGR 263.] **Prerequisite:** graduate standing in anthropology or consent of instructor.

ANTH 265. Cultures of Late Capitalism (4)

Radical transformations shifted the boundaries between what is considered political and apolitical, public and private, and legitimate at the turn of the twenty-first century. This class studies how these developments shape and are shaped by local political structures. [Formerly known as ANGR 265.] **Prerequisite:** graduate standing.

ANTH 267. The Anthropology of Ethics (4)

This course examines ethical and moral ideas and their relation to other aspects of culture. It also considers how attention to the ethical dogma can provide a foundation for rethinking social scientific theories of culture and practice. [Formerly known as ANGR 267.] **Prerequisite:** graduate standing.

ANTH 268. Anthropology of Cities (4)

Although cities are fundamental sites of emergent social relations and cultural forms, the anthropological study of modern urban society remains problematic. This seminar aims to develop an anthropological understanding of cities, focusing on recent ethnographies, methodological problems, and theoretical debates. [Formerly known as ANGR 268.] **Prerequisite:** graduate standing.

ANTH 269. Current Readings on Latin America (4)

This is a graduate reading seminar focusing on new anthropological works about Latin America. We will cover a wide range of critical current issues, including poverty, the state, gender, race/ethnicity, indigenous politics, memory, and violence. [Formerly known as ANGR 269.] **Prerequisite:** graduate standing.

ANTH 274. Debates in Anthropology (4)

This seminar will review a series of current or recent significant debates in anthropology. The debates will be examined in the light of their substantive, theoretical, and epistemological implications, with some attention to the rhetorical elements of the arguments themselves. [Formerly known as ANGR 274.] **Prerequisite:** graduate standing in anthropology.

ANTH 279. Special Topics in Language and Society (4)

Selected topics in the anthropology of language, such as linguistic ideology, language and identity, multilingualism, discourse analysis. Topics will vary from year to year, and

the course may be repeated with instructor's permission. [Formerly known as ANGR 279.] **Prerequisite:** graduate standing.

ANTH 280A. Core Seminar in Social Anthropology (4)

Core seminar focuses on individual action and social institutions. [Formerly known as ANGR 280A.] **Prerequisite:** graduate standing in anthropology or consent of instructor.

ANTH 280B. Core Seminar in Cultural Anthropology (4)

Core seminar focuses on personal consciousness and cultural experience. [Formerly known as ANGR 280B.] **Prerequisite:** graduate standing in anthropology or consent of instructor.

ANTH 280C. Core Seminar in Psychological Anthropology (4)

Core seminar focuses on motives, values, cognition, and qualities of personal experience. [Formerly known as ANGR 280C.] **Prerequisite:** graduate standing in anthropology or consent of instructor.

ANTH 280D. Core Seminar in Anthropological Archaeology (4)

Seminar focuses on the development of archaeological theory. Required of archaeological and biological anthropology graduate students, sociocultural students may take this course to fulfill core distribution requirement. [Formerly known as ANGR 280D.] **Prerequisites:** graduate standing in anthropology or consent of instructor.

ANTH 280E. Core Seminar in Biological Anthropology (4)

This seminar will examine the central problems and concepts of biological anthropology, laying the foundation for first-year graduate students in Biological Anthropology as well as providing an overview of the field for graduate students in other areas of anthropology. [Formerly known as ANGR 280E.] **Prerequisite:** graduate standing in anthropology or consent of instructor.

ANTH 281A. Introductory Seminar (1)

These seminars are held in the first two quarters of the first year of graduate study. Faculty members will present an account of their current research and interests. When appropriate a short preliminary reading list will be given for the particular lecture. [Formerly known as ANGR 281A.] **Prerequisite:** first-year graduate standing in anthropology.

ANTH 281B. Introductory Seminar (1)

Continuation of seminars held in the first two quarters of the first year of graduate study. Faculty members will present an account of their current research and interests. When appropriate a short preliminary reading list will be given for the particular lecture. [Formerly known as ANGR 281B.] **Prerequisite:** first-year graduate standing in anthropology.

ANTH 283A. Fieldwork Seminar (4)

A seminar given to acquaint students with the techniques and problems of fieldwork. Students carry out ethnographic field research in a local community group under faculty supervision. [Formerly known as ANGR 283A.] **Prerequisite:** anthropology graduate students or consent of instructor.

ANTH 286. Topics in Anthropological Archaeology (4)

Seminar examines the central problems and concepts of archaeological anthropology, laying the foundation for first-year graduate students. Also provides an overview of the field in other areas of archaeology. Entire anthropological archaeology faculty and graduate students participate. [Formerly known as ANGR 286.] **Prerequisite:** graduate standing in anthropology.

ANTH 288. Archaeology Practicum (12)

Field and laboratory training for graduate students in archaeology. Students will design and implement archaeological fieldwork or analyze data collected in the field. [Formerly known as ANGR 288.] **Prerequisite:** consent of the instructor.

ANTH 290. Primate Social Behavior/ Neural Correlates (4)

Explores the interplay between the primate brain and primate social behavior from the perspectives of

neuropsychology, cognitive ethology, and primate field studies. Issues in social cognition will include attention and gaze, working memory, emotions, awareness, and theory of mind. [Formerly known as ANGR 290.] **Prerequisite:** *graduate standing or consent of instructor.*

ANTH 291. Archaeology of Highland Mexico (4)

Survey of Mesoamerican archaeology focusing on highland Mexico. Topics covered: settling of Mesoamerica, agricultural origins, development of social complexity, rise of cities, emergence of large-scale states. [Formerly known as ANGR 291.] **Prerequisite:** *graduate standing.*

ANTH 292. Social Evolution/Iron Age Levant (4)

The Iron Age (ca. 1200–586 BCE) represents the rise of small secondary states throughout the southern Levant. Seminar explores these archaic states through ideology, technology, subsistence, trade and social organization based on archaeological data, historical texts, and anthropological models. [Formerly known as ANGR 292.] **Prerequisite:** *graduate standing.*

ANTH 293. Primate Socioecology (4)

Course examines theories for the causes of sociality in primates. Implications for our understanding of human evolution are considered. [Formerly known as ANGR 293.] **Prerequisite:** *graduate standing or consent of instructor.*

ANTH 295. Master's Thesis Preparation (1–12)

The student will work on the master's thesis under the direction of the departmental committee chair. The course will be taken in the student's second year. [Formerly known as ANGR 295.] **Prerequisites:** *graduate student in anthropology and consent of master's thesis chair. (S/U grades only.)*

ANTH 296. Dissertation Fieldwork Proposal Preparation (4)

The student will work in cooperation with his or her departmental committee to develop a research proposal for the doctoral research project. [Formerly known as ANGR 296A/296B.] **Prerequisites:** *graduate standing in anthropology and consent of departmental committee chair. (S/U grades only.)*

ANTH 297. Research Practicum (1–4)

Supervised advanced research studies with individual topics to be selected according to the student's special interests. [Formerly known as ANGR 297.] **Prerequisites:** *for anthropology graduate students who have returned from their field research. (S/U grades permitted.)*

ANTH 298. Independent Study (1–4)

Supervised study of individually selected anthropological topics under the direction of a member of the faculty. [Formerly known as ANGR 298.] **Prerequisite:** *graduate standing. (S/U grades only.)*

ANTH 299. Dissertation Research (1–12)

[Formerly known as ANGR 299.] **Prerequisite:** *Ph.D. candidacy in anthropology. (S/U grades only.)*

ANTH 500. Apprentice Teaching (4)

Anthropology graduate students participate in the undergraduate teaching program during one quarter anytime in the first four years of residence. Teaching may be in the anthropology department or other departments or programs on campus. Equivalent to duties expected of a 50 percent T.A. Enrollment in four units documents the Ph.D. requirement. (S/U grades only.) [Formerly known as ANGR 500.] **Prerequisite:** *graduate student in anthropology.*

ANTH 501. T.A.ing in Sixth College/C.A.T. (4 or 6)

Consideration and development of pedagogical methods appropriate to undergraduate teaching in the interdisciplinary Sixth College Core Sequence, Culture, Art, and Technology under supervision of Core Program faculty, with assistance of the Core Program director, associate director for the Writing Program, and the associate director of the Thematic program. (S/U grades only.) [Formerly known as ANGR 501.] **Prerequisites:** *anthropology graduate student teaching for the C.A.T./Sixth College Writing Program.*

Applied Ocean Science

ASSOCIATED FACULTY

Professors

Laurence Armi, Ph.D., *SIO; IGPP*
Michael J. Buckingham, Ph.D., *SIO; MPL*
LeRoy M. Dorman, Ph.D., *SIO; GRD*
Carl H. Gibson, Ph.D., *MAE; SIO*
Sarah T. Gille, Ph.D., *SIO; MAE*
Robert T. Guza, Ph.D., *SIO; IOD*
John A. Hildebrand, Ph.D., *SIO; GRD; MPL; ECE*
William S. Hodgkiss, Ph.D., *SIO; MPL; ECE*
William A. Kuperman, Ph.D., *SIO; MPL*
Juan C. Lasheras, Ph.D., *MAE*
Paul F. Linden, Ph.D., *MAE*
W. Kendall Melville, Ph.D., *SIO; MPL*
Robert Pinkel, Ph.D., *SIO; MPL*
Sutanu Sarkar, Ph.D., *MAE*
Dariusz Stramski, Ph.D., *SIO; MPL*
Bradley T. Werner, Ph.D., *SIO; IGPP*
Clinton D. Winant, Ph.D., *SIO; IOD*

Professors Emeriti

Douglas L. Inman, Ph.D., *SIO; IOD*
Richard C.J. Somerville, Ph.D., *SIO; CRD*
Kenneth M. Watson, Ph.D., *SIO; MPL*

Acting Associate Professor

Jennifer A. MacKinnon, Ph.D., *SIO*

Associate Professors

Stefan Llewellyn-Smith, Ph.D., *MAE*
Keiko K. Nomura, Ph.D., *MAE*
Joel R. Norris, Ph.D., *SIO*

Assistant Professor

Todd R. Martz, Ph.D., *SIO*

Lecturers

C. David Chadwell, Ph.D., *SIO; MPL*
Grant B. Deane, Ph.D., *SIO; MPL*
Gerald D'Spain, Ph.D., *SIO; MPL*
Peter Gerstoft, Ph.D., *SIO; MPL*
Jules S. Jaffe, Ph.D., *SIO; MPL*
Jerome A. Smith, Ph.D., *SIO; MPL*
Hee Chun Song, Ph.D., *SIO; MPL*
Eric Terrill, Ph.D., *SIO; MPL*
Aaron Thode, Ph.D., *SIO; MPL*

Associated Research Groups

Marine Physical Laboratory, MPL
Institute of Geophysics and Planetary Physics, IGPP
Geosciences Research Division, GRD
Integrative Oceanography Division, IOD
Climate Research Division, CRD
Physical Oceanography Research Division, PORD

OFFICE: Old Scripps Building, Room 22, Scripps Institution of Oceanography

THE GRADUATE PROGRAM

Applied Ocean Science (AOS) is an interdepartmental Ph.D. program with a focus on the interface between ocean exploration and technology. It is administered by an interdepartmental group composed of members of the faculties of cooperating departments: the Department of the Scripps Institution of Oceanography (SIO), the Department of Mechanical and Aerospace Engineering (MAE), and the Department of Electrical and Computer Engineering (ECE).

This interdepartmental curriculum combines the resources of these departments to produce oceanographers who are knowledgeable about modern engineering and instrumentation, as well as marine oriented engineering scientists who are familiar with the oceans. Since physical, chemical, geological, and biological aspects of the oceans and all forms of engineering may be involved, the curriculum provides maximum flexibility in meeting the needs of each individual student.

Candidates for admission should apply directly to one of the departments participating in the Applied Ocean Science program, listing Applied Ocean Science as an area of specialization. The choice of department should be based on the individual student's planned area of major emphasis. Applicants will be expected to meet the admission requirements of the department to which they have applied.

The program is primarily directed toward the Ph.D. degree. However, both the candidate of philosophy and master of science degree (either Plan I, thesis, or Plan II, comprehensive examination) also will be offered under special circumstances. Students applying for a terminal master's program should be aware of any special requirements for the department to which they apply.

The degrees completed under this program in the Department of SIO will carry the title "Oceanography." Those degrees completed in the other cooperating departments will have the parenthetical title "(Applied Ocean Science)" appended to the appropriate authorized title.

The students are expected to enroll in the Applied Ocean Science Seminar (SIO 208) throughout their period of residency. This seminar will make use of outside speakers, faculty members, and students in presenting various topics on applied ocean science and related fields. It provides a central forum in which all AOS students can participate. In addition to these basic requirements, the student will be subject to whatever additional requirements are prescribed by his or her department.

Course work occupies much of the first one and one-half to two years of graduate study. During this period there are numerous opportunities for students to investigate the research programs of the various research groups on the campus, and cultivate associations with professors and research groups which can provide support and guidance for thesis research in their selected field of specialization. In consultation with an adviser, students will plan a curricular path of courses which will adequately prepare them in their field of specialization. The courses may be selected from the entire catalog of courses available on the UC San Diego campus or where appropriate from other UC campuses and other universities.

COURSES

All students enrolled in the program are required to take or demonstrate proficiency in the following core courses or their equivalent:

SIO 202A-B. (Fundamentals of Wave Physics)

SIO 203A-B-C. (Introduction to Applied Mathematics) or

MAE 294A-B-C. (Introduction to Applied Mathematics) or

Math. 210A-B-C. (Mathematical Methods in Physics and Engineering)

SIO 210. (Physical Oceanography)

SIO 214A. (Introduction to Fluid Mechanics)

SIO 240. (Marine Geology)

SIO 260. (Marine Chemistry)

SIO 280. (Biological Oceanography)

Audiology

Directors:

Steven J. Kramer, Ph.D., San Diego State University
Erika M. Zettner, Ph.D., University of California,
San Diego

Faculty

San Diego State University
Arthur Boothroyd, Ph.D.
Laura Dreisbach, Ph.D.
Jacque Georgeson, Au.D.
Steven J. Kramer, Ph.D.
Carol Mackersie, Ph.D.
Peter Torre III, Ph.D.
Derin Wester, Ph.D.
Carol Branch, M.A.
Carren Sticka, Ph.D.
University of California, San Diego
Luis D. Benitez, M.D.
Jeffrey P. Harris M.D., Ph.D.
Elizabeth M. Keithley, Ph.D.
Allen F. Ryan, Ph.D.
Erik Viirre, M.D., Ph.D.
Erika M. Zettner, Ph.D.
Joni Doherty, M.D., Ph.D.
Quyen Nguyen, M.D., Ph.D.
Shuh-Yow Lin, Ph.D.
Alain Dabdoub, Ph.D.

Joint Doctoral Program between San Diego State University and the University of California, San Diego

<http://chhs.sdsu.edu/slhs/audmain.php>

PROFESSIONAL DOCTORATE IN AUDIOLOGY (AU.D.)

A professional doctorate in audiology (Au.D.) is offered jointly by San Diego State University (SDSU) and the University of California, San Diego (UCSD). The joint doctoral program in audiology is accredited by the American Speech-Language-Hearing Association (ASHA). The Au.D. program is a four-year graduate degree program designed for individuals who intend to specialize in clinical practice and to meet professional standards requiring a clinical doctorate as the entry-level degree for a certified audiologist. Graduates of this program will have the knowledge base, research exposure, and advanced clinical skills to enter the workforce in any setting, and will be prepared to function as independent audiology professionals in the expanding health-care arena. The program encompasses academic, clinic, and research experiences in audiology and otology, through the combined resources from the School of Speech, Language, and Hearing Sciences at SDSU and the Department of Surgery (Otolaryngology) in the School of Medicine at UCSD. More information <http://chhs.sdsu.edu/slhs/audmain.php>.

Faculty members of the cooperating institutions teach courses, provide clinic instruction and research experiences, and are available as members of joint doctoral committees and advisors for student doctoral projects.

ADMISSIONS

Students will apply to the Au.D. Joint Doctoral Program through SDSU. It is expected that students will come into this program from a variety of different science backgrounds, including communicative disorders, biological and physical sciences, engineering, psychology, nursing, or a premed curriculum. Applicants for admission to the Au.D. program must meet the general requirements for admission to both universities with classified graduate standing as outlined in the respective catalogs. Applicants must also meet the special requirements of this program. These include (a) overall grade-point average of 3.20 or better in undergraduate courses and in any graduate courses completed; (b) submission of scores on the GRE with satisfactory performance on both quantitative and verbal portions of the examination; (c) prerequisite completion of at least one course in statistics, one course in biological sciences, one course in physical sciences, and one additional course in either biological or physical sciences, two courses in behavioral/social sciences, and one course in American Sign Language. Deficiencies in these areas may be completed after admission to the program if approved by the admissions committee.

Applicants must submit transcripts of all post-secondary course work, three letters of recommendation from former or current professors, supervisors, or other appropriate persons able to judge their academic potential, and an applicant essay (statement of purpose) indicating their interests and strengths relative to their career objectives. Details of these requirements are available on the SDSU school's Web site. Assuming that students meet the requirements for admission outlined above, each student admitted to the program will have a program advisor evaluate their preparation in view of their needs and career goals, as well as professional certification requirements.

Applicant files are reviewed as a group by an admissions committee composed of Au.D. program faculty from each campus. Other Au.D. program faculty may review files and make recommendations to the admissions committee. Given the limited number of spaces available (ten new admissions each year are anticipated, subject to available facilities), the Admissions Committee will select the best-qualified applicants to fill the available spaces. No minimum set of qualifications will guarantee an applicant admission to the program. The Admissions Committee will make recommendations for admission to the graduate deans from each campus.

APPLICATION

Students seeking admission to the Au.D. program should consult the SDSU school's Web site and *Graduate Bulletin*. For additional information, write directly to the Au.D. Program Directors, School of Speech, Language, and Hearing Sciences (mail code 1518), San Diego State University, 5500 Campanile Dr., San Diego, CA 92182.

Students will be admitted to the Au.D. program only in the fall semester (first year is at SDSU). Complete applications must be received by January 20 to be considered for the program beginning in the following fall semester.

Post Master's Degree Admissions: Students admitted to the Au.D. program with a master's

degree in audiology will be expected to complete the four-year Au.D. curriculum. However, some students may have had a master's preparation in audiology in which some of the course work was similar to some of the foundation courses in the Au.D. program. Upon entering the program, each individual will be assessed to determine competencies/knowledge in material that would put them on par with expectations for the Au.D. program. For some of the foundation core courses offered the first year at SDSU, e.g., Audiology 705, 710, 725, students may be given credit for the courses or be required to substitute a Doctoral Special Study (Audiology 798) course for one or more of these courses to ensure competencies or remediate deficiencies if approved by the program faculty. Credit for some of the first year clinic units may also be approved based on work experience; however, a full complement of expected clinical skills must be demonstrated.

Specific Requirements for the Au.D. Degree

Upon admission to the program, each student will be assigned a faculty advisor. The faculty advisor will help the student select a program of study to meet all program requirements. The Au.D. program is a four-year program, including summer semesters after year one through three. An exact unit minimum is not specified due to the mixing of semester units (SDSU) and quarter units (UCSD) and differences in clinical hours at different settings; however, the program is approximately 134 semester-equivalent course units. All students in the Au.D. program will fulfill the following requirements. Any alternative method of fulfilling these requirements requires advanced written permission from the program directors.

Residency Requirements

After formal admission to the Au.D. program, the student must complete a minimum of course hours equivalent to one year's full-time enrollment at each campus. The definition of residence must be in accord with the regulations of San Diego State University and the University of California, San Diego. The program is designed to be shared, as equally as possible, between the two campuses. The first year is entirely at SDSU, the second year is entirely at UCSD, and the third year will have options from both campuses. The fourth year of the program will be a full-time clinical externship at a program-approved clinic agency or site. Both campuses will share equally in the academic, clinic, and research components of the program.

Course Requirements

The program for each student will consist of prescribed set of courses, with the first year of courses entirely at SDSU and the second year of courses entirely at UCSD. The student's faculty advisor will approve any changes to the standard curriculum.

Clinic Requirements

Each student will progress through a variety of clinical experiences involving patient assessment and management throughout their program of

study. Clinic experiences will require concurrent enrollment in clinic courses appropriate for the campus in which they are doing the clinical work. These supervised clinical experiences are completed in the SDSU Audiology Clinic, UCSD Otolaryngology Clinics, and in community field sites. Clinic courses may be repeated as needed and require advisor approval prior to enrollment. Prior to the fourth year externship, each student will obtain approximately 500 hours of clinic experience. A minimum of 2,000 clinical hours is required by the end of the program.

Preceptorship in Otolaryngology. All students will have at least one quarter of a clinical rotation with otology staff associated with UCSD. Students will accompany otology faculty during their clinics and surgeries, and receive training in one or more of the following areas: clinical otology, pre- and post-operative assessment of patients, pharmacology related to otology, design and implementation of clinical trials with balance disorders, and pediatric otology.

Clinical Staffings. In addition, all students will be required to regularly participate in formal clinical case study/staffing experiences. At SDSU, these clinical staffings include student and faculty presentations and discussions of interesting cases seen in their clinics. At UCSD, these staffings include the Chairman's Conference and Grand Rounds, where Au.D. students/residents and medical staff discuss otological problem cases and disorders, and the Neurotology Conference, where UCSD and community physicians, and students/residents discuss cases dealing with neurological diseases and vestibular disorders.

Fourth-Year Externship. The fourth-year externship is a full-time clinical experience in an approved agency/site. These externships may require a competitive interview process by the agency. Externship sites may be in other parts of the country. All students in their fourth-year externship must also enroll in the online clinical seminar at SDSU each semester.

Research Practicum

Each student will spend at least two semesters or quarters participating in research being done by program faculty. Students will not be conducting independent research, but will actively participate in data collection and analysis at the discretion of the lab director. Students must enroll in the research practicum course for the appropriate campus.

Examinations

All students in the program will be evaluated at the following levels:

First Year Evaluation. Students must have achieved a 3.0 grade point average on all core and elective courses during the first year, and have appropriate clinical skills as determined by the student's clinic supervisors. The student's ability to integrate the academic material and clinic procedures appropriate for the end of the first year will be assessed through a first year qualifying exam. This examination will be a written and practical examination to be taken at the end of the spring semester. The First Year Qualifying Exam may be repeated once following additional directed study by the student's advisor.

Students must pass the first year evaluation in order to enroll in second year courses.

Second Year Evaluation. Students must have achieved a cumulative grade point average of 3.0 on all core and elective courses, and have appropriate clinical skills as determined by the student's clinic supervisors. The student's ability to integrate the academic and clinic procedures appropriate for the end of the second year will be assessed through a Second Year Qualifying Examination. This examination will be a written examination to be taken at the end of the spring quarter. The Second Year Qualifying Examination may be repeated once following additional directed study by the student's advisor. Students must pass the second year evaluation in order to enroll in third year courses.

Comprehensive Examination. At the end of the third year, and after Advancement to Candidacy (see below), the student will take a Comprehensive Examination, which has an integrative written component and a practical component involving clinical procedures. The comprehensive examination must be passed before a student can be registered for the externship.

Advancement to Candidacy

Candidates will be recommended for advancement to candidacy after successfully completing all course, laboratory rotation, and clinic requirements for Year 1 and Year 2 (with a minimum grade point average of 3.0), satisfactory performance on the first and second year evaluations, and approval of the doctoral project proposal. Students cannot enroll in the doctoral project course, take the comprehensive examination, or register for their externship until advanced to candidacy. The program's Executive Committee recommends students eligible for advancement to candidacy to the graduate deans of both institutions

Doctoral Project

Each student will complete an innovative doctoral project. The doctoral project can take the form of a number of different options, e.g., a research-based investigation, survey, meta-analysis, development of a clinical protocol based on published research findings, or other projects proposed by the student that are accepted by the committee. The project should be designed to allow an opportunity to demonstrate critical thinking on clinical issues. Each student will select a Doctoral Project Committee of two Au.D. program faculty (one from each campus) and a faculty member external to the program. The chair of the committee can be from either campus. The executive committee will approve each student's Doctoral Project Committee. All doctoral projects will be written in a format approved by the student's doctoral project committee. The student's final written document will be approved by the student's Doctoral Project Committee. Each student will enroll in the appropriate doctoral project course depending on the campus in which their committee chair resides.

The Doctor of Audiology (Au.D.) degree will be awarded jointly by the Regents of the University of California and the Trustees of the California

State University in the names of both cooperating institutions.

Financial Support

Funding for graduate students cannot be guaranteed, although every effort will be made to provide some financial support for as many students as possible, through graduate/teaching assistantships, research grants, clinical traineeships, and/or scholarships. Financial support will be awarded consistent with the policies of the two universities. Tuition and fees will be charged in accordance with the extant policies at the campus in which the student is matriculated in a given year.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010-11, please contact the department for more information.

AUD 236. Preceptorship in Neuro-Otology (2)

Observations in UCSD Otolaryngology clinic. Learn about procedures for taking histories and performing clinical examinations, patient treatment, and patient education from otologists. **Prerequisite:** second-year Au.D. student or consent of instructor.

AUD 255. Anatomy and Physiology of the Auditory and Vestibular Systems (4)

Detailed anatomy of the auditory and vestibular systems, including the ultra-structure, histology, and neuronal connections of the systems. In addition, physiological responses that underlie the actions of each system are described, from the cellular to the systems levels. **Prerequisite:** second-year Au.D. student or consent of instructor.

AUD 256. Pathophysiology of the Auditory and Vestibular Systems (4)

Physiological and anatomical substrates of auditory and vestibular disorders including influences of neurological disorders. Topics include peripheral and central disorders, congenital disorders due to infections, as well as acquired ototoxic, noise-induced, infective, autoimmune, age-associated disorders, and traumatic disorders. **Prerequisite:** AUD 255 or consent of instructor.

AUD 257. Ear Diseases and Treatment (3)

Differential diagnosis and treatment of auditory and vestibular disorders, audiological components of neuro-otology, as well as interactions between the audiologist and neuro-otologist in a clinical setting. **Prerequisite:** second-year Au.D. student or consent of instructor.

AUD 263. Physiological and Behavioral Tests of Vestibular Function (4)

Clinical evaluation of vestibular function, using techniques such as caloric and rotational electronystagmography and posturography. The interpretation of clinical findings and implications for rehabilitative strategies will be covered. The course will include observation of testing in otology clinic settings. **Prerequisite:** second-year Au.D. student or consent of instructor.

AUD 264. Auditory and Vestibular Development and Genetics (3)

Embryology and functional development of the auditory and vestibular systems, from their initial appearance to adult function. Inherited disorders of these two sensory systems are also addressed, including phenotypic description and genetic basis. Genetic counseling and the potential for gene therapy are also discussed. **Prerequisite:** second- or third-year Au.D. student or consent of instructor.

AUD 270. Newborn Hearing Screening and Management (3)

This course describes procedures and requirements for newborn hearing screening, and the detection and clinical management of congenital auditory disorders.

Observations of newborn screening in a neonatal ICU environment. **Prerequisite:** second- or third-year Au.D. student or consent of instructor.

AUD 271. Temporal Bone Anatomy (4)

Detailed anatomy of the temporal bone, including surgical approaches. Participation in dissecting a human cadaver temporal bone specimen, and observation of medical residents/staff learning to perform surgical drilling of temporal bone under the supervision of experienced otologic surgeons. Radiographic and magnetic resonance imaging of the temporal bone will be described and discussed. **Prerequisite:** second- or third-year Au.D. student or consent of instructor.

AUD 275. Intraoperative Monitoring (3)

Methods and procedures required for monitoring of evoked auditory responses in the operating room. The indications for the use of intraoperative monitoring and difficulties unique to this setting. The course will include the opportunity to observe auditory potential monitoring in the operating room. **Prerequisite:** second- or third-year Au.D. student or consent of instructor.

AUD 276. Cochlear Implants and Other Implantable Sensory Aids (3)

Theory and practice of cochlear implantation with focus on audiological management of patients after implantation. Current concepts regarding the activation of primary auditory neurons by electrical stimulation and indications for cochlear implantation and surgical procedures are described. **Prerequisite:** second- or third-year Au.D. student or consent of instructor.

AUD 284. Clinical Practice in Audiology II (1-4)

Applications of clinical procedures to patient assessment. Includes clinical observation, interaction with otologists, and supervised patient care involving diagnostics and hearing-aid evaluations in the UCSD audiology clinics. This course may be taken more than once. **Prerequisites:** open to second- or third-year doctoral students or consent of instructor. One quarter unit represents 3 to 4 hours per week. Must also be concurrently enrolled in AUD 291.

AUD 291. Clinical Case Studies/Staffing (1)

Presentations and discussion of clinical cases and issues related to clinical practice. Students' clinical experiences are discussed relative to medical and audiological assessment and management. This course may be taken more than once. **Prerequisite:** second- or third-year Au.D. student or consent of instructor. Must be taken more than once.

AUD 296. Research Practicum (3)

Participation in specific faculty research activities. Become familiar with research methods and objectives of a faculty's research project. Participate in data collection and analysis at the discretion of the faculty investigator. **Prerequisites:** second- or third-year Au.D. student and consent of instructor.

AUD 298. Independent Research (3)

Independent research on topics relevant to audiology, consisting of literature review, data collection. Faculty supervision and mentoring on practical elements of research design and methodology. The course will consist of laboratory experience, focused on practical elements of research and design and methodology. **Prerequisites:** consent of Au.D. program advisor and consent of faculty mentor.

AUD 299. Doctoral Project (3)

Individual investigation and preparation of the doctoral project for the Au.D. degree will be performed under the supervision of an experienced research mentor. **Prerequisite:** advancement to candidacy in the Au.D. program.

Biochemistry

Students wishing to major in biochemistry should refer to programs offered by the Division of Biological Sciences, which has an undergraduate major in biochemistry and cell biology, or the Department of Chemistry and Biochemistry, which has an undergraduate major in biochemistry/chemistry.

Both the Division of Biological Sciences and the Department of Chemistry and Biochemistry offer graduate programs with specialization in biochemistry. Those programs are described in the biological sciences and chemistry and biochemistry sections of this catalog.

Bioinformatics and Systems Biology

Participating Faculty

DEPARTMENT OF BIOENGINEERING

Gaurav Arya, *Assistant Professor, Nanoengineering*
Jeffrey Hasty, *Associate Professor*
Xiaohua Huang, *Assistant Professor*
Trey Ideker, *Associate Professor*
Andrew McCulloch, *Professor*
Bernhard Palsson, *Professor*
Shankar Subramaniam, *Professor*
Kun Zhang, *Assistant Professor*

DIVISION OF BIOLOGICAL SCIENCES

Steven Briggs, *Professor, Cell and Developmental Biology*
Steve Kay, *Dean, Biological Sciences, Professor, Cell and Developmental Biology*
Amy Kiger, *Assistant Professor, Cell and Developmental Biology*
William Loomis, *Professor, Cell and Developmental Biology*
Eduardo Macagno, *Atkinson Chair, Professor, Cell and Developmental Biology, Cognizant Dean of Program*
James Posakony, *Professor, Cell and Developmental Biology*
Milton Saier, *Professor, Molecular Biology*
Julian Schroeder, *Professor, Cell and Developmental Biology*
Inder Verma, *Adjunct Professor*

BIOMEDICAL SCIENCES PROGRAM

Philip Bourne, *Professor, Pharmacology*
Christopher Glass, *Professor, Cellular and Molecular Medicine*
Lawrence Goldstein, *Professor, Cellular and Molecular Medicine/Pharmacology*
Vivian Hook, *Professor, Pharmacology*
Richard Kolodner, *Medicine*
Sanjay Nigam, *Professor, Pediatrics*
Jerrold Olefsky, *Medicine*
Bing Ren, *Associate Professor, Cellular and Molecular Medicine*
Douglas Richman, *Professor in Residence, Pathology*
Michael Rosenfeld, *Professor, Medicine*
Palmer Taylor, *Professor/Dean, School of Pharmacy and Pharmaceutical Sciences*
Ronghui (Lily) Xu, *Associate Professor, Family and Preventive Medicine*
Gene Yeo, *Assistant Professor, Cellular and Molecular Medicine*

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

Alexander Hoffmann, *Associate Professor, Program Co-Director*
Patricia Jennings, *Associate Professor*
Simpson Joseph, *Professor*
Andrew McCammon, *Professor*
Susan Taylor, *Professor*
Roger Tsien, *Professor*
Wei Wang, *Assistant Professor*
Leor Weinberger, *Assistant Professor*
Peter Wolynes, *Professor*
John Wooley, *Adjunct Professor*

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Scott B. Baden, *Professor*
Vineet Bafna, *Associate Professor*
Sanjoy Dasgupta, *Assistant Professor*
Charles Elkan, *Professor*
Pavel Pevzner, *Ronald R. Taylor Chair, Professor, Program Director*

MARINE BIOLOGY RESEARCH DIVISION

Terry Gaasterland, *Professor, Marine Biology Research Division*

DEPARTMENT OF MATHEMATICS

Michael Holst, *Professor*
Glenn Tesler, *Assistant Professor*
Ruth Williams, *Professor*

DEPARTMENT OF PHYSICS

Terence Hwa, *Professor*
José Onuchic, *Professor*

BIOINFORMATICS UNDERGRADUATE PROGRAM

Advances in biotechnology allow us to probe thousands of molecules simultaneously. The wealth of information produced must be analyzed using computation, creating a demand for computational biologists, who are trained in biology, mathematics, chemistry, and computer sciences. Bioinformatics will have a tremendous impact upon our understanding of cellular functions, protein structure and design, evolutionary biology, regulatory networks, and the molecular basis of disease.

An interdisciplinary undergraduate major leading to B.S. degrees with a major or specialization in bioinformatics was created in fall 2001. This major is designed to provide career opportunities for B.S. graduates, as well as opportunities for future advanced training at the graduate level. Students graduating from this program have been in great demand in top graduate schools, in medical schools, and in industry.

ADMISSIONS

Students wishing to pursue a study in bioinformatics may select from majors offered by the Division of Biological Sciences, or the Departments of Bioengineering, Chemistry and Biochemistry,

and Computer Science and Engineering. A major in bioinformatics is available within each of the listed departments and divisions. All participating departments have a substantially common curriculum, but each has its own emphasis through its electives, and there are some differences in the core requirements.

BIOINFORMATICS AND SYSTEMS BIOLOGY GRADUATE PROGRAM

PROGRAM DIRECTOR:

Pavel Pevzner, *Professor in Computer Science and Engineering*

ASSOCIATE DIRECTOR:

Alexander Hoffmann, *Professor in Chemistry and Biochemistry*

STUDENT AFFAIRS: (858) 822-4948

bioinfo@ucsd.edu

<http://www.bioinformatics.ucsd.edu>

PROGRAM FOCUS

The Bioinformatics and Systems Biology Graduate Program draws upon the expertise of affiliated faculty from the Division of Biological Sciences; Departments of Bioengineering, Chemistry and Biochemistry, Computer Science and Engineering, Mathematics, Physics, and the Biomedical Sciences Graduate Program.

The University of California, San Diego is a premier research institution that has fostered interdisciplinary research since its inception. Specifically, bioengineering (at the interface of biology, medicine, and engineering), neuroscience (at the interface of biology and medicine), biophysics (at the interface of chemistry, biology, and physics), and cognitive science (at the interface of medicine and computer science) are all nationally ranked interdisciplinary graduate research programs. This has led to growth and innovation in many new areas of science and engineering research and the training of an exceptionally high caliber of graduate and postdoctoral students.

In recent years, bioinformatics and systems biology have been identified by the UCSD administration as two of the most important growth areas for the campus. With several recent new faculty hires, UCSD has seen a significant increase in the research activity associated with bioinformatics and systems biology—these transcend traditional disciplines.

DEVELOPMENT OF A FIELD

We are witnessing the birth of a new era in biology. The ability to decipher the genetic code of living organisms is dramatically changing our understanding of the natural world and promises to improve substantially the quality of human life. Understanding how genomes work requires sophisticated computer-based information handling tools (*bioinformatics*), and new high throughput technologies for understanding the function of genes on a genome-wide scale (*functional genomics*). The combination of experimental and modeling

approaches to understand the functioning of genomes and cellular systems is often called systems biology.

The most pressing problem in the systems biology era will be to understand the integrated functions of thousands of genes. Dealing with this problem will require an interdisciplinary research structure dedicated to developing intellectual and human capital in bioinformatics and genome science. Due to the complexity of this new paradigm in biology, entirely new sets of tools and human resources will be necessary. Thus, future developments will be dependent upon the scientific progress at the interface of three major disciplines—biology, engineering, and computer science. The accelerated growth of modern biology warrants revolutionary changes in academic curricula.

PARTICIPATING DEPARTMENTS

Each department represented in this program participates in various interdisciplinary graduate programs in addition to providing very strong intradisciplinary graduate training. One example is the La Jolla Interfaces in Science program (LJIS), a campus- and mesa-wide fellowship opportunity sponsored by the Burroughs Wellcome Fund. LJIS supports exploration of interfaces between the biological and biomedical sciences and the physical, computer, and mathematical sciences at UCSD, The Scripps Research Institute (TSRI), the Salk Institute, and the San Diego Supercomputer Center.

Bioengineering, consistently ranked among the top three programs nationally by U.S. News and World Report, has several new faculty hires in the area of bioinformatics and computational biology and has identified bioinformatics as a major area of focus.

Biological Sciences, a premier division at UCSD, will spearhead the interdisciplinary, undergraduate specialization in bioinformatics and is planning to hire new faculty in bioinformatics fields.

Biomedical Sciences, is an interdisciplinary Ph.D. program, based in the School of Medicine, with tracks in pharmacology, physiology, and cellular and molecular medicine. It will be closely linked to the planned new School of Pharmacy and Pharmaceutical Sciences. In addition to a strong computational biology presence amongst its faculty, there are plans to hire more faculty whose main interests are in computational pharmacogenomics and bioinformatics.

Chemistry and Biochemistry, the home of the Molecular Biophysics Training Grant, is highly recognized for its strong computational biology program with plans to further expand in chemo and bioinformatics areas.

Computer Science and Engineering is unique in having a critical mass of faculty whose research interests focus on biology. These faculty have very strong collaborative research interactions with biology, chemistry, and engineering researchers. CSE is currently recruiting for a senior faculty member with computational biology expertise.

Mathematics has expressed strong interest in building in the area of bioinformatics with emphasis on statistics and probability. This focus is one of fundamental importance for the future of bioinformatics, and the department is committed to

both hiring new faculty and launching new courses in statistics pertinent to bioinformatics.

Physics is the home of leaders in the field of computational statistical mechanics applied to biology and provides the foundation for sophisticated modeling of complex biological systems. Physics also plans to recruit new faculty members whose research focus will be on development of information/theory-based models of biological systems.

ADMISSIONS REQUIREMENTS

Admission is in accordance with the general requirements of the graduate division. Candidates will have an interdisciplinary persuasion to work across computers, biology, medicine, and engineering; with an undergraduate degree majoring in any of the disciplines in biological science, physical science, computer science, mathematics, or engineering with a strong background in quantitative sciences and biology.

Admission review will be on a competitive basis based on the applicants' undergraduate track record, Graduate Record Examination General Test (GRE) scores, and other scholastic achievements. Attention will also be given to the motivation and career plans of the applicant candidates. Special attention will be given to the quantitative and analytical section scores of the GRE. The applications will be screened and evaluated by the Admissions Committee with input from all program faculty. In addition, applicants must submit a completed *UCSD Application for Graduate Admission* (use major code BF75), official transcripts (English translation must accompany official transcript written in other languages), TOEFL scores (required ONLY for all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English), and three letters of recommendation from individuals who can attest to the academic competence and to the depth of the candidates' interest in pursuing graduate study.

For further admission information, students should contact the bioinformatics graduate coordinator via e-mail at bioinfo@ucsd.edu or at (858) 822-4948. You may also visit our Web site at <http://www.bioinformatics.ucsd.edu>.

Curriculum

The Bioinformatics and Systems Biology Graduate Program is organized around a formal course requirement consisting of three quarters of course work, with enrollment in four four-unit courses each quarter. One four-unit course in each quarter will be a research rotation in the laboratory of a program faculty mentor. The remaining nine courses will include four compulsory core courses and five courses to be chosen from a list of electives approved by the Course Committee.

The electives are intended to maximize the flexibility of the program, but at least one course must be chosen from the biology field and one from the computer science and engineering field. The faculty advisor(s) will pay particular attention to deficits in the background of each student and will assist in making appropriate course choices from the elective fields. Students electing to take any of the undergraduate courses listed in these fields will receive an additional course component in order

to make it equivalent to a graduate level course. Students have the option to test out of a field by passing an exam designed by the faculty committee. This exam will fulfill one of the breadth requirements of the program.

It is the general policy of the program to be as adaptable as possible to the needs of the individual student. The faculty advisory committee will work closely with students to identify what might be lacking in a particular curriculum program.

Core Training Courses

- Bioinformatics I: Biological Data and Analysis Tools (Pharm 201)
- Bioinformatics II: Sequence and Structure Analysis—Methods and Applications (BENG 202/CSE 257A)
- Bioinformatics III: Genomic Analysis (BENG 203)
- Bioinformatics IV: Statistical Methods in Bioinformatics (Math 283)

Program Electives

(Each student will select from five of the eight elective fields below. One must be from the biology field and one from the computer science field. For each elective, multiple course options currently available are listed).

Elective 1: Biochemistry

- BENG 230: Biochemistry
- BIBC 100: Structural Biochemistry
- CHEM 114A: Biochemical Structure and Function
- CHEM 213: Chemistry of Macromolecules
- CHEM 218: Macromolecular Biochemistry

Elective 2: Data Structures

- CSE 100: Data Structures
- CSE 200: Computability and Complexity
- Math 176A: Computer Implementation of Data Structures

Elective 3: Algorithms

- CSE 101: (also Math 188) Design and Analysis of Algorithms
- Math 173: Mathematical Software Scientific Programming

Elective 4: Information Retrieval, Databases and Data Mining

- CSE 132A: Database System Principles
- CSE 133: Information Retrieval
- CSE 254: Machine Learning

Elective 5: Molecular Genetics

- BICD 100: Genetics
- BIMM 100: Molecular Biology
- BIBC 116: Evolution of Genes and Proteins
- BGGN 220: Advanced Molecular Biology

- BGGN 223: Advanced Genetics

Elective 6: Cell Biology

- BICD 110: Cell Biology
- BICD 130: Embryos, Genes, and Development
- BIOMED 210: Cellular Biology
- BIOMED 212: Cellular and Molecular Pharmacology
- BGGN 222: Advanced Cell Biology

Elective 7: Physics and Engineering

- BENG 253: Biomedical Transport Phenomena
- BENG 275: Computational Biomechanics
- PHYS 210A: Equilibrium Statistical Mechanics or higher

Elective 8: Mathematics and Statistics

- Math 174: Numerical Methods in Science and Engineering
- Math 181E: Mathematical Statistics
- Math 280A: Probability Theory

Example 1—Sample Program (Year 1)

A student with an undergraduate background in biology might make the following course selections:

Year 1

FALL	WINTER	SPRING
Bioinformatics I	Bioinformatics II	Bioinformatics III Bioinformatics IV
	CSE 100	CSE 101
Test out—Chem. 114A	Test out—BENG 275	Test out—BICD 110
Elective	Elective Research Rotation	Elective Research Rotation

Example 2—Sample Program (Year 1)

A sample program for a student with an undergraduate degree in computer science and engineering might be structured as follows:

Year 1

FALL	WINTER	SPRING
Bioinformatics I	Bioinformatics II	Bioinformatics III Bioinformatics IV
	BIOMED 210	Chem. 213
Test out—CSE 101	Math. 280A	Elective
Elective	Elective Research Rotation	Test out—CSE 132A Research Rotation

Year 2

All students, regardless of their background and elective track, will be expected to begin working in the laboratory of their choice by the second year. Additionally in Year 2, students will begin preparing for their qualifying examination and will participate

in advanced seminar courses and journal clubs identified by program faculty.

End of Year 2 through 5

Spring of Year 2: Qualifying Examination

Spring of Year 3: Advance to Candidacy

End of Year 5: Ph.D.

In summary, in addition to three quarters of research rotations, students must complete the four compulsory bioinformatics core courses; and, either test out of, or select at least five courses from the eight elective areas.

Research Rotations

Each student in the graduate program will participate in three research rotations, at least two of which will be in the laboratory of mentors other than the thesis directors. The purpose of the research rotation will be to train the students in research methodology in specific bioinformatics areas. At the end of the research rotation period, the student will submit a written report that will be evaluated by the faculty mentor in whose laboratory the project was carried out. The report will also be sent to the Qualifying Examination Committee who will take this into consideration in the assessment of the student for admission to candidacy.

Seminars, Informal Courses, Group Meetings, and Symposia

Students are expected to attend the weekly *Bioinformatics and Systems Biology Seminars* hosted by the program. As well as formally structured courses and research rotations, graduate students will have access to seminars, group meetings, and informal sessions during which they will have frequent opportunities to interact closely with faculty mentors and to present their research plans, problems, and findings. In addition to weekly bioinformatics seminars, the graduate program will launch monthly student/faculty meetings at which students can present their research findings and discuss their progress. Graduate students will also be expected to organize an annual symposium where they will invite leading researchers to UCSD for one-day talks and discussions.

Besides the activities noted above, UCSD as a premier research institution has many excellent seminar programs sponsored by each research department and organized research group. Several interdisciplinary programs facilitate research meetings. Notable ones include the La Jolla Interfaces in Sciences (LJIS) Program, the Neurosciences Program, the Molecular Biophysics Program, the Whitaker Institute for Biomedical Engineering, the San Diego Supercomputer Center, and the Structural Genomics Program. LJIS, for example, is an extremely successful interdisciplinary program sponsoring stimulating and state-of-the-art seminars. LJIS recently sponsored a well-received symposium on Post-Genomic Bioinformatics. Many program faculty are involved in several of the areas mentioned above, and the bioinformatics graduate program benefits from all of these additional programs and symposia.

Research Training

Students, upon completion of the appropriate course work, will be given research orientation lectures by the bioinformatics program faculty. Each graduate student will participate in a research experience in the laboratory he or she selects to carry out the research rotation. During this period students will become acquainted with scientific methodology for designing experiments, analyzing the results, organizing the data, conducting research in a responsible manner, preparing oral and poster presentations of research results, and writing scientific papers.

Upon successful completion of the Qualifying Examination (described in the following section), graduate students will choose their research project from the many possibilities offered in the program and begin to work on a research problem with their faculty advisors. In consultation with their mentors, students will formulate the research activity that will lead to their dissertation. Graduate students will have the opportunity to do internships in the local bioinformatics/ biotechnology industry if the thesis project is of mutual interest to a corporate sponsor and the thesis advisors. The research program is designed with two key objectives in mind: (1) to provide a truly interdisciplinary research training at the interface area between biology and computer science and engineering; and (2) to address fundamentally strong research problems that will lead to the advancement of the field of bioinformatics. We anticipate that every graduating student will emerge as a highly trained bioinformatician who can either pursue an academic career by choosing optimal postdoctoral research positions or enter the next generation biotechnology/biopharmaceutical industry.

It is our belief that active research under proper tutelage is the best means of training and that the foundations of a good graduate training program rest on an outstanding faculty group, an excellent student body, and a strong and well-coordinated research program. Each of the faculty members in this program has expertise and interests that will contribute importantly to the Interdisciplinary Bioinformatics Graduate Program. Participating faculty have pooled their resources in terms of laboratories, and the knowledge and experience to ensure the success of the program. Through daily contact with faculty and other research colleagues, students will learn to develop critical and creative thinking skills, scientific methodology, and a sound knowledge of research problems.

Second-Year Qualifying Examination

The Bioinformatics and Systems Biology Second-Year Qualifying Examination (BQE) is designed in an innovative manner to test the ability of students to think analytically and in an interdisciplinary manner. This method was suggested by students of the program during the first two years after inception.

Students are expected to come up with a research problem different from the one he or she may have been working on with a faculty advisor and write a proposal that can be defended at the oral examination to a faculty committee appointed by the chair of BQE. The written document is

expected to be in the form of a proposal to NSF or NIH, where the student provides the specific aims of the project, the background for and significance of the problem chosen, some preliminary results and/or observations and specific details on the design of the research. The student is tested on his or her ability to formulate and design the problem as well as on the interdisciplinary nature of the approach. Once the student passes the oral portion of the exam, the student is deemed to be qualified for advancing into Ph.D. thesis research in bioinformatics. The student can schedule this examination at any time of the year, but with two provisions. First, the student should have completed all the required and most of the elective courses assigned, and second, the examination should be taken before the student completes his or her second year in the program. At the time of BQE, the student should have decided on his or her two mentors/research advisors, and should have discussed with them about joining their laboratories and obtaining guaranteed funding for the duration of research as long as he or she is in good academic standing. The BQE Oral Examination Committee will discuss these specifics and other program requirements with the students at the oral examination.

ADVANCEMENT TO PH.D. CANDIDACY

Upon completion of formal course requirements, each student will be required to take a written and oral qualifying examination that will admit the student to the candidacy of the Ph.D. Program. In advance of the qualifying examination, each student, in consultation with his or her faculty advisor(s), will establish a dissertation committee of five faculty members. The committee will consist of three faculty, at least two of whom are affiliated with the bioinformatics and systems biology program, and two other faculty from departments affiliated with the program, or who are themselves members of the program faculty. At least two of the five committee members must be from a department other than the committee chair's department and at least one of these two must be tenured. The thesis advisors will have the major responsibility for the student's research and dissertation.

Thesis or Dissertation

Each graduate student in the program will work on a bioinformatics thesis project under dual mentorship of the program faculty.

Final Examination

Bioinformatics graduate students will defend their thesis in a final oral examination. The exam will consist of (1) a presentation of the thesis by the graduate student, (2) questioning by the general audience, and (3) closed door questioning by the thesis committee. The student will be informed of the exam result at the completion of all three parts of the oral examination. The final report of the doctoral committee will be signed by all members of the committee and the final version of the dissertation will conform to the procedures outlined in the publication, *Instructions for the Preparation and Submission of Doctoral and Master's Theses*.

Teaching Requirement

Each graduate student admitted to the Ph.D. Program in bioinformatics is mandated to serve as a teaching assistant (TA) for at least two quarters. This will aid in preparing the students for a teaching career. In addition, each student will make periodic research presentations to the graduate program students/faculty. Students will also discuss their progress at the annual program meeting to be held each year. It is anticipated these formal presentations will serve as valuable training in preparing the student for a teaching career.

Bioinformatics graduate students will also participate in additional TA training provided by the Office of Graduate Studies and Research through the Center for Teaching Development (CTD).

Financial Support

It is expected that all students admitted into the Ph.D. Program in bioinformatics will receive financial assistance subject to their continuance and performance in the program. The assistance will be provided from (1) departmental financial commitments, (2) university financial commitments, (3) teaching assistantships, (4) research assistantships, and (5) NIH-funded graduate training grant.

Ph.D. Degrees with a Specialization in Bioinformatics

Currently, UCSD offers Ph.D. degrees with a specialization in bioinformatics from the participating departments listed in this section. Students are admitted into one of the departmental graduate programs and satisfy the requirements of both the department and the interdisciplinary bioinformatics graduate program. If you are interested in the Ph.D. degree with a specialization in bioinformatics, please consult with the Student Affairs Office of the department you are interested in to obtain further information on admission and individual program requirements.

FURTHER INFORMATION

For further information please visit our Web site at <http://www.bioinformatics.ucsd.edu>, or contact the bioinformatics student affairs office at (858) 822-4948 or bioinfo@ucsd.edu.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

BNFO 282. Seminar in Bioinformatics (1)

Weekly seminars by faculty and visiting bioinformaticists presenting their research.

Biological Sciences, Division of

PROFESSORS

Raffi Aroian, Ph.D.
Tim Baker, Ph.D.
Darwin K. Berg, Ph.D.
Ethan Bier, Ph.D.
Jack W. Bradbury, Ph.D., *Emeritus*
Steve Briggs, Ph.D.
Stuart Brody, Ph.D.
Ted J. Case, Ph.D., *Emeritus*
Lin Chao, Ph.D.
Andrew Chisholm, Ph.D.
Maarten J. Chrispeels, Ph.D., *Emeritus*
Nigel M. Crawford, Ph.D.
Michael David, Ph.D.
Russell F. Doolittle, Ph.D., *Emeritus*
Richard W. Dutton, Ph.D., *Emeritus*
Mark Estelle, Ph.D.
Richard A. Firtel, Ph.D., *Associate Dean of Operations*
Douglass J. Forbes, Ph.D.
E. Peter Geiduschek, Ph.D., *Emeritus*
Anirvan Ghosh, Ph.D., *Chair Neurobiology Section, Stephen W. Kuffler Chair in Biology*
Michael E. Gilpin, Ph.D., *Emeritus*
James Golden, Ph.D.
Susan Golden, Ph.D.
Melvin H. Green, Ph.D., *Emeritus*
Shelley L. Halpain, Ph.D.
Randolph Y. Hampton, Ph.D., *Academic Senate Distinguished Teaching Award, Chancellor's Associates Award for Excellence in Teaching*
Stephen M. Hedrick, Ph.D., *Chair, Molecular Biology Section, Chancellor's Associate Endowed Chair VII*
Donald R. Helinski, Ph.D., *Emeritus*
John J. Holland, Ph.D., *Emeritus*
Terrence Hwa, Ph.D.
Yishi Jin, Ph.D.
Randall S. Johnson, Ph.D.
James T. Kadonaga, Ph.D.
Steve A. Kay, Ph.D., *Dean, Richard C. Atkinson Endowed Chair*
Joshua R. Kohn, Ph.D., *Chair, Ecology, Behavior and Evolution Section*
William B. Kristan, Jr., Ph.D.
Sydney Kustu, Ph.D., *Research Professor*
Dan L. Lindsley, Ph.D., *Emeritus*
William F. Loomis, Jr., Ph.D.
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Dong-Er Zhang, Ph.D.

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Lei Wang, Ph.D.
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David J. Western, Ph.D.
John Young, Ph.D.
Charles Zuker, Ph.D., *Tamara and Kevin Kinsella Chair in Neurobiology*

STUDENT AND INSTRUCTIONAL SERVICES OFFICE
1128 Pacific Hall
(858) 534-0557

FINANCIAL AND ADMINISTRATIVE OFFICES
1610 Urey Hall, Revelle College
<http://biology.ucsd.edu/>

DIVISION OF BIOLOGICAL SCIENCES UNDERGRADUATE ADMISSIONS

Because of the large number of students interested in biological sciences undergraduate programs, and the limited resources available to accommodate this demand, the university has declared all majors in the Division of Biological Sciences as "impacted."

Effective fall 2009, freshmen admission to any of the Biological Sciences majors will be limited. Students will be selected by the UC San Diego Office of Undergraduate Admissions based on the students' comprehensive review scores and availability of slots in the Division of Biological Sciences. All potential freshmen must indicate on the UC application if they wish to major in biology.

Effective fall 2011, new transfer students will be selected by the UCSD Office of Undergraduate Admissions based on the students' demonstrated academic performance at the community college or previous university and availability of slots in the Division of Biological Sciences. All potential transfers must indicate on the UC application if they wish to major in biology.

Refer to the UCSD Division of Biological Sciences Web site for specific details and requirements (<http://biology.ucsd.edu>).

DIVISION OF BIOLOGICAL SCIENCES LABORATORY REQUIREMENT

Freshmen

The Division of Biological Sciences requires students in all biology majors, with the exception of bioinformatics, to take one biology lab before the end of the sophomore year.

Continuing Students

Continuing UCSD students who wish to transfer into the major will be evaluated under the rules that were in effect the year in which they entered the university.

Transfer Students

The Division of Biological Sciences requires students in all biology majors, with the exception of

bioinformatics, to take one biology lab before the end of the sophomore year. Transfer students may petition to have community college course work cover the lab requirement. Transfer students whose community college laboratory course is determined to be equivalent in content to an existing biology lab will have completed the requirement upon transfer. Transfer students are therefore strongly encouraged to complete this requirement at their community college. Transfer students who do not meet this requirement at the time of transfer may petition the division for an extension.

DIVISION OF BIOLOGICAL SCIENCES RESIDENCY REQUIREMENT

To receive a bachelor of science degree in biology from UCSD, all biology majors, including transfer students, must complete at least forty-eight or more units of upper-division course work within the major.

To receive a bachelor of science degree in biology from UCSD, all students must complete at least nine upper-division biology courses (each course must be at least four units) in the Division of Biological Sciences while officially enrolled at UCSD. Students participating in the Education Abroad Program (EAP), and courses at other UC campuses, may petition up to three of these courses to count toward their residency minima. Biology courses completed through the UC Extension program (concurrent enrollment) will not be counted toward this residency requirement.

SATISFACTORY PROGRESS

All students admitted into a biology major must maintain satisfactory progress in order to remain in a biology program. If the GPA in biology courses for such a student falls below 2.0, he or she will be placed on probation during the quarter after the average fell below the line. If the GPA is not brought above the 2.0 level during the quarter on probation, the student will be dropped from the major.

PREREQUISITES

All students are expected to have completed all prerequisites prior to enrolling in any biology course. Please visit the Biology Student and Instructional Services office or consult our web page for the most current information. Prerequisites are enforced in all courses and must be taken for a letter grade. Students who have satisfied the prerequisites of a class at another college may need to be pre-authorized to enroll. Please come to the Biology Student and Instructional Services office (1128 Pacific Hall) *before* your priority enrollment to be pre-authorized.

CONCURRENT ENROLLMENT IN BIOLOGY COURSES

For more information on concurrent enrollment, please call (858) 534-3400 or e-mail concurrent@ucsd.edu.

- Enrollment process for biology courses:
- Select the biology course(s) you wish to enroll in. Be sure that you've completed the prerequisites.
 - Attend class starting the first day of the quarter and continue attending. During the beginning of the third week, obtain the instructor's signature on the concurrent enrollment add card (available at the UCSD Extension Student Services office).

Please note that instructors are not required to admit you to the course, and that enrollment is on a space-available basis.

- If you have a signed add card, take it to Biology Student and Instructional Services for a department stamp. Space in the course will be verified at this time. Please note that even if the instructor has signed the add card, if space is not available, the card will not be stamped.
- Return your completed UCSD concurrent enrollment card to the Extension Student Services office with your enrollment fee. Submit one card per class. Concurrent enrollment is closed after the third week of the quarter.

Note: Students enrolling in a biology course will not incur a \$50 late fee if enrolling during the third week.

READMISSION TO A BIOLOGY MAJOR

Students who were absent for six quarters or more, and who have been readmitted to UCSD, must adhere to the major requirements in effect at the time of readmission or those subsequently established.

Readmitted students may petition to follow the major requirements in effect at the time they left UCSD. These petitions will be reviewed on a case-by-case basis.

GRADE REQUIREMENTS FOR THE MAJORS

The minimum grade requirements for all biology majors, effective fall 2008, are

- All courses required and used toward any biology major requirements must be passed with a grade of C- or better.
- The minimum grade requirement applies to all lower-division, upper-division, required courses taken in other departments, as well as courses transferred and used toward major requirements.
- Exceptions will be made only for those required courses that have a P/NP only grading option (i.e., BISP 199).

The minimum GPA requirement (for both the major and overall UC) for graduation is 2.0. Students who received D and/or F grades should contact one of the Division of Biological Sciences undergraduate advisors to determine the effect of such grades on their GPAs. The biology major GPA calculation is based on upper-division courses required for the major. (Upper-division courses from other UCs, other UCSD departments, and EAP which have been approved via petition to count toward the major are counted into the major GPA. Other transfer courses do not count toward the UC or major GPA.) All courses, required for any of the eight majors, must be taken for a letter grade with the exception of BISP 195, 196, 197, and 199.

STUDENTS WITH TRANSFER CREDIT

All courses (including prerequisites) taken at other institutions must be reviewed by the Division of Biological Sciences before they can be applied toward any major requirement. Students must obtain approval from the Biology Student and Instructional Services office prior to taking courses

outside of UCSD (for example, students wishing to take a BILD 1 equivalent at another institution must consult with Biology Student and Instructional Services *before enrolling in the substitute course*). In addition, any student wishing to satisfy a major requirement with upper-division transfer work (with the exception of organic chemistry) must first submit an Undergraduate Student Petition. Contact Biology Student and Instructional Services (1128 Pacific Hall) for specific information regarding transfer documentation and petition procedures.

The Division of Biological Sciences requires that students take the full content equivalencies to UCSD series in math, chemistry, and physics. The Division of Biological Sciences will follow the respective department's recommendations for equivalency. In some cases, attaining full content equivalency will require a student to complete more than two semesters in a subject. If the courses a student took do not provide full content equivalency, s/he will be required to complete the lacking material at UCSD or at a community college where the material is equivalent.

PROGRAMS ABROAD

The Division of Biological Sciences strongly encourages students to participate in the Education Abroad Program (EAP) or the UCSD Opportunities Abroad Program (OAP). It is very important that students who plan to participate in the UC Education Abroad Program (including the Costa Rica Tropical Ecology program) or the UCSD Opportunities Abroad Program obtain the name of a faculty advisor from the Biology Student Affairs Office in order to discuss the proposed program of study. For most EAP programs, it is strongly recommended that biology majors complete biochemistry (BIBC 100 or 102) and genetics (BICD 100) and their prerequisites before going abroad. For more information, please visit <http://programsabroad.ucsd.edu>.

SPECIAL STUDIES COURSES

For information on requirements and application procedures for special studies courses, students should go to the Biology Student and Instructional Services Office (1128 Pacific Hall) or visit the Web site at http://biology.ucsd.edu/undergrad/BISP_info.html.

How to apply special studies courses toward your biology major:

- Two quarters of BISP 194 (topics must vary) may count as one upper-division elective for any biology major.
- One quarter of BISP 195 may count as an upper-division elective for any biology major.
- One quarter of BISP 196, 197, or 199 may count as an upper division elective for any biology major.
- *Biochemistry/Cell Biology, General Biology, Human Biology, and Physiology/Neuroscience*. The second consecutive quarter of BISP 196 or 199 taken in the same research laboratory, may be petitioned to substitute for one of the upper-division elective lab requirements. The second quarter of BISP 196 or 199 must be complete prior to petitioning. Students are required to submit an undergraduate petition and summary of research to Biology Student and Instructional Services.

- *Microbiology, Molecular Biology, Ecology/Behavior, and Evolution*. The second consecutive quarter of BISP 196 or 199, taken in the same research laboratory, may be petitioned to substitute for one of the upper-division required laboratory courses. The content of the BISP 196 or 199 must be equivalent to the content covered in the required lab in order to be approved. The second quarter of BISP 196 or 199 must be complete prior to petitioning. Students are required to submit an undergraduate petition and summary of research to Biology Student and Instructional Services.
- Subsequent quarters of BISP 195, 196, 197, or 199 may be applied toward college and university requirements.

Note: Students who are approved to use a BISP 196 or 199 to satisfy a lab requirement cannot also use BISP 196, 197, or 199 to satisfy an upper-division elective requirement.

BISP 194—Advanced Topics in Modern Biology

Advanced Topics in Modern Biology is a two-unit topics course taught at a high level and open to upper-division students only. The course content will vary. Students should consult the quarterly *Schedule of Classes* for topics and descriptions.

BISP 195—Introduction to Teaching in Biology

Being a teaching assistant is an important task and can provide students with experience and faculty contact which can be valuable when applying for graduate school. Students who are interested in being an undergraduate tutor should have received a strong grade in the course which they want to teach, have an overall GPA of at least 3.0, and have taken at least ninety total units. Students should apply very early in the quarter prior to the quarter they wish to teach. Applications will be accepted beginning the second week of the quarter prior to the quarter in which the student wishes to teach. All undergraduate tutor applications are online and may be accessed through the biology Web site, <http://www.biology.ucsd.edu/undergrad/index.html>.

BISP 196—Honors Thesis in Biological Sciences

Students in any one of the eight biology major programs who have a 3.7 grade-point average or above in upper-division science courses, the biology major, and overall UC at the end of their junior year are eligible to undertake the honors thesis. This program covers the senior year of undergraduate study and involves a maximum of twelve units of senior thesis research (BISP 196) taken in addition to the major requirements for graduation. (Four units of senior thesis research BISP 196 are to be taken during three consecutive quarters.) Research is conducted under the supervision of a faculty member of the Division of Biological Sciences only and cannot be performed in the research labs of other departments such as the School of Medicine, SIO, etc. If there are any questions as to which faculty

members are eligible, students should consult with Biology Student and Instructional Services. The research will culminate in a senior thesis and an oral report (see below). Students who complete the program satisfactorily will have "Distinction in Biology" recorded on their transcript. Students who fail to make satisfactory progress will be advised to withdraw from the program. Students may also withdraw voluntarily from the program. Grades for BISP 196 are P or NP only.

- Application to the Honors Thesis Program
1. Students interested in the program who are eligible as of spring quarter of their junior year (the fourth quarter prior to graduation) need to find a Division of Biological Sciences faculty member willing to act in the capacity of thesis advisor and inform the Biology Student Affairs Office of their intent.
 2. After an advisor is selected, the student and the advisor should complete the Special Studies application form and research plan (available on the biology Web site).
 3. The application form and research plan should then be submitted to the Biology Student and Instructional Services Office. The deadline for submitting this form is the end of the eighth week of the quarter prior to the quarter the research will begin.
 4. The application will be submitted to the honors thesis coordinator after eligibility has been determined.
 5. If the student is approved for admission to the program, he or she will then be authorized to register for BISP 196.

Entry into the second and third quarter of the program will require submission to the honors thesis advisor of a written report in which the student summarizes the data obtained in the previous quarters. A brief oral interview with the student on this report can also be expected. If the progress made appears reasonable for an honors student, then the 196 petition will be signed. If not, the student may be dropped from the program. Completion of the program will require a final written report by the student at the end of the third quarter in addition to an oral presentation in the middle of the quarter to a suitable group of faculty and students, including the honors thesis advisor.

BISP 197—Biology Internship Program

The Division of Biological Sciences, in collaboration with local biotech industries, created Biotechnology Internship Opportunities (BIO). The mission of BIO is to provide biology majors with an opportunity to participate in research in an industrial setting. We believe that working as an intern in the private sector will enrich a student's educational experience. Students will gain **valuable insight into the relationship between theory and practice, and hence, a better understanding of the relevance of course work in their major. Most importantly, students will learn the importance of outstanding oral and written communication skills. This course may be counted as one of the upper-division**

electives for a biology major, providing that no other special studies courses have already been counted toward the major. Information on BIO may be accessed through the undergraduate biology Web site, <http://biointern.ucsd.edu>.

To enroll in BISP 197, students must have accrued at least ninety-quarter units with an overall UC GPA of at least 3.0.

There will be one weekly scheduled meeting lasting up to 1.5 hours. Attendance and participation at these meetings are mandatory and will affect the grade a student receives. There will be three formal oral and three written presentations, interspersed with informal discussions of progress achieved. All written reports must be done with the input of the industry and must have that mentor's signature. Grading will be based on the formal and informal written and oral presentations, as well as input from the industry mentor.

BISP 199—Individual Research for Undergraduates

Individual Research BISP 199 is intended to provide interested and qualified biology students with an opportunity to work closely with faculty and professionals in their chosen field and can be a valuable contribution to the student's preparation for graduate school or career goals. To enroll in BISP 199, students must have accrued at least ninety quarter-units with an overall UC GPA of at least 3.0. Students may select for their instructor any professor at UCSD, but the BISP 199 application must be submitted for approval to the Division of Biological Sciences. The deadline to apply for BISP 199 is the eighth week of the quarter prior to the quarter in which the research will begin.

AIP 197—Academic Internship Program

Because the undergraduate research conducted through the Academic Internship Program is generally done at a site not affiliated with the UCSD Division of Biological Sciences, students who wish to request that an AIP 197 course be counted toward their major must submit an Undergraduate Petition for their request. Biology faculty will review the student's research and ascertain the project's compatibility with the student's academic goals and major requirements. Please be advised that an AIP 197 may not be approved toward major requirements. If an AIP 197 course is approved for the student's major, no other special studies course (BISP 196, 197, or 199) can be used toward the major. For further information, please see <http://aip.ucsd.edu>.

MAJOR PROGRAMS IN BIOLOGICAL SCIENCES

For more information, please see biology's Web page, <http://biology.ucsd.edu/>.

The UCSD Division of Biological Sciences is structured around the different levels of biological organization—biochemical, cellular, physiological, and ecological. The research and teaching of the division emphasize the fundamentally important processes that occur at each of these levels. With a solid foundation in these processes future training and study in any area of biology is possible, from plant breeding to genetic counseling, from medical

microbiology to ecological epidemiology, from veterinary science to cancer research. The UCSD campus is situated among some of the finest research institutions in the world. The Division of Biological Sciences is fortunate in having close ties with the Scripps Institution of Oceanography, the Salk Institute of Biological Studies, and the Scripps Clinic and Research Foundation, all of which open interesting avenues for motivated students.

The division offers eight different major programs, each of which provides an excellent background for future graduate or professional study. They are (1) biochemistry and cell biology, (2) biology with a specialization in bioinformatics, (3) ecology, behavior, and evolution, (4) general biology, (5) human biology, (6) microbiology, (7) molecular biology, and (8) physiology and neuroscience. The requirements of each of the majors are designed to meet the needs of a different group of students. These requirements are quite concordant, reflecting the division's philosophy that familiarity with certain basic aspects of the subject is fundamental to all specialized understanding. Bachelor of science degrees granted in each of these majors will be so designated.

The Student and Instructional Services Office (1128 Pacific Hall) administers the undergraduate biology program for all six colleges. For complete details regarding policies and procedures pertaining to the biology programs, please contact Biology Student and Instructional Services.

BIOCHEMISTRY AND CELL BIOLOGY MAJOR

This major is designed to provide students with the fundamental courses required for entry into a school of medicine or into postgraduate training in a wide variety of areas of biological and biomedical sciences: biochemistry, biophysics, genetics, molecular biology, cell biology, developmental biology, microbiology, virology, human biology (physiology, metabolism, genetic disorders), cancer biology, pharmacology, and others. The emphasis is on basic principles which help us understand those processes unique to living organisms at the molecular level.

The program includes two required upper-division biology laboratory courses to provide practical experience with modern techniques and useful technology for those seeking positions as lab technicians in clinical and basic research laboratories. The opportunity to select four elective courses allows students either to seek a still broader background in a variety of biology courses or to begin specialization in a chosen field of study.

Lower-Division Requirements

- BILD 1 and 3 (Note: BILD 2 is not required, but is a prerequisite for many upper-division courses.)
- Chemistry 6A-B-C and 6BL
- Mathematics 10A-B, and 11 or 10C or 20A-B-C
- Physics 1A/1AL, 1B/1BL, 1C/1CL or 2A-B-C, and one lab

Upper-Division Requirements

1. Organic Chemistry (Chemistry 140A and 140B or 141A and 141B)
2. Organic Chemistry (Chemistry 143A) or Physical Chemistry (Chemistry 105A)
3. Structural Biochemistry (BIBC 100) or Physical Biochemistry (BIBC 110) or Physical Chemistry (Chemistry 126)
4. Metabolic Biochemistry (BIBC 102)
5. Biochemical Techniques (BIBC 103)
6. Genetics (BICD 100)
7. Cell Biology (BICD 110)
8. Molecular Biology (BIMM 100)
9. Capstone Course: (one of the following seven courses) BIBC 104 (Biochemistry and Biotechnology of Plants), BIBC 110 (Physical Biochemistry), BIBC 120 (Nutrition), BIBC 130 (Marine Biochemistry), BICD 118 (Pathways of Intracellular Protein Trafficking and Compartmentation), BIMM 118 (Pharmacology), BIMM 130 (Microbial Biochemistry)
10. One upper-division biology lab to be chosen from the following: BICD 101, 111, 123, 131, 145, BIMM 101, 121, 127, BIPN 105, 145, or Chemistry 143C.
11. Four additional upper-division biology courses (each course must be at least four units) taken through the UCSD Division of Biological Sciences are required.

Note: For more information on how the BISP 194, 195, 196, 197, or 199 can count toward major requirements, please see the previous section "[Special Studies Courses](#)."

The following courses offered by the Department of Chemistry and Biochemistry are recommended as electives for the biochemistry and cell biology major: Chemistry 115, 116, 122, 124, 126, 127. Please note that these courses will not count towards the Division of Biological Sciences residency requirement and must be petitioned to apply towards major requirements.

BIOINFORMATICS SPECIALIZATION IN THE DIVISION OF BIOLOGICAL SCIENCES

This major offers a rigorous, interdisciplinary training in the new and rapidly evolving field of bioinformatics within the Division of Biological Sciences. Bioinformatics refers to advanced computational and experimental methods that model the flow of information (genetic, metabolic, and regulatory) in living systems to provide an integrated understanding of the systems properties of model organisms. For a detailed understanding of the large amount of qualitative and quantitative data that is currently accruing, the bioinformatician of the future must have a substantial mastery in biology, chemistry, mathematics, physics, and computer sciences. This interdisciplinary specialization will be offered by three other departments (computer science and engineering, chemistry, and bioengineering), each with their own set of requirements and electives. The program offered by the Division of Biological Sciences is aimed at a student interested in applying,

and to some extent developing, tools of bioinformatics for the study of biological systems. Students will receive a B.S. degree in Biology with a Specialization in Bioinformatics. This degree will prepare students for graduate studies in biological and biomedical sciences, or provide excellent opportunities in the biomedical, pharmaceutical, biotechnology, and bioinformatics industries.

Lower-Division Requirements

- Mathematics 20A-B-C, 20F and Mathematics 15B or CSE 21
- Chemistry 6A-B-C, and lab
- Physics 2A-B-C
- BILD 1 and 2
- BILD 94
- CSE 11, CSE 12 (Students may take the slower paced version, CSE 8A + CSE 8B, instead of CSE 11.)

Upper-Division Requirements

1. Organic Chemistry (Chemistry 140A-B)
2. Advanced Data Structure (CSE 100 or Mathematics 176)
3. Design and Analysis of Algorithms (CSE 101 or Mathematics 188)
4. Metabolic Biochemistry (BIBC 102) or Biochemical Energetics and Metabolism (Chemistry 114B)
5. Biochemical Techniques (BIBC 103)
6. Physical Biochemistry (BIBC 110) or Physical Chemistry (Chemistry 127)
7. Genetics (BICD 100)
8. Cell Biology (BICD 110)
9. Molecular Biology (BIMM 100) or Molecular and Cellular Biochemistry (Chem 114D)
10. Recombinant DNA Lab (BIMM 101)
11. Molecular Sequence Analysis (BIMM 181)
12. Biological Databases (BIMM 182)
13. Applied Genomic Technologies (BENG 183)
14. Computational Molecular Biology (BIMM 184)
15. Bioinformatics Lab (BIMM 185)
16. Probability and Statistics (Math 186)
17. Three additional upper-division biology courses (each course must be at least four units) taken through the UCSD Division of Biological Sciences are required.

Note: For more information on how the BISP 194, 195, 196, 197, or 199 can count toward major requirements, please see the previous section "[Special Studies Courses](#)."

ECOLOGY, BEHAVIOR AND EVOLUTION MAJOR

This major includes the fields of population biology, ecology, conservation biology, animal behavior,

population genetics, biogeography, and evolution. These fields have in common a focus on evolutionary processes and whole organisms in relation to each other and to their environments. Research careers in ecology, behavior, and evolution can be found in universities, government agencies, and the biotechnology industry. More applied careers for ecologists are equally varied: recent graduates now work in forestry and wildlife management, as ecological consultants for U.S. and foreign governments and private industry, as teachers, or in new fields such as ecological medicine and epidemiology, environmental design and planning, and conservation biology. Because organismal biology spans such a wide variety of topics, this major has been designed to provide the basic fundamentals while allowing maximum flexibility within the general topic areas.

Lower-Division Requirements

- BILD 1, 2, and 3
- Chemistry 6A-B-C. Laboratories in chemistry are not required.
- Mathematics 10A-B, and 11 or 10C or 20A-B-C
- Physics 1A/1AL, 1B/1BL, 1C/1CL or 2A-B-C

Upper-Division Requirements

1. Genetics (BICD 100)
2. Biostatistics (BIEB 100) This course is a prerequisite for several core courses and should be taken in the first or second year.
3. Introductory Ecology (BIEB 102)
4. Evolution (BIEB 150)
5. Seven core courses to be chosen from BIEB 121-176 are required. At least two of these courses must be laboratory or field courses (BIEB 121, 123, 131, 145, 147, 165, 167). Laboratory courses may be taken concurrently with the prerequisite lecture course *if Biostatistics (BIEB 100) has been taken*. Note that some of the courses may not be offered every year. For that reason, it is recommended that students take as many required courses as possible when the courses are offered. Students who take the intensive EAP field courses in tropical biology offered in Costa Rica or marine biology in Australia will receive credit toward their degree. All EAP courses must be petitioned upon return. Consult the Education Abroad Program Office at the UCSD International Center for details.
6. Three additional upper-division courses (each course must be at least four units) in biology or other departments are required. EBE-related courses are offered in mathematics, chemistry, environmental systems, earth sciences, economics, biological anthropology, urban studies (GIS), some other social science departments, and in the graduate programs at SIO (marine biology and oceanography) and IR/PS. *Students are required to meet the Division of Biological Sciences residency requirement. Courses to be completed outside of the Division of Biological Sciences must be petitioned* (prior to enrollment) to satisfy this requirement. EBE students whose graduate education or careers require biochemistry

should take Organic Chemistry 140A, 140B, and Metabolic Biochemistry (BIBC 102) to satisfy this three-course requirement.

Note: For more information on how the BISP 194, 195, 196, 197, or 199 can count toward major requirements, please see the previous section "[Special Studies Courses](#)."

GENERAL BIOLOGY MAJOR

This program allows the most diversified exposure to biology of any of the majors offered by the Division of Biological Sciences. It is designed for students with broad interests who do not wish to be constrained by the specialized requirements of the other majors and who desire maximum freedom to pursue their particular educational goals.

LOWER-DIVISION REQUIREMENTS

- BILD 1, 2, and 3
- Chemistry 6A-B-C and BL
- Mathematics 10A-B, and 11 or 10C or 20A-B-C
- Physics 1A/1AL, 1B/1BL, 1C/1CL or 2A-B-C and one lab

UPPER-DIVISION REQUIREMENTS

1. Organic Chemistry (Chemistry 140A and 140B or 141A and 141B)
2. Metabolic Biochemistry (BIBC 102)
3. Genetics (BICD 100)
4. Two upper-division biology labs to be chosen from the following: BIBC 103, BICD 101, 111, 123, 131, 145, BIEB 121, 165, 167, BIMM 101, 121, 127, BIPN 105, or 145.
5. Seven additional upper-division biology courses (each course must be at least four units) taken through the UCSD Division of Biological Sciences are required.

Note: For more information on how the BISP 194, 195, 196, 197, or 199 can count toward major requirements, please see the previous section "[Special Studies Courses](#)."

Although students are free to design upper-division curricula which meet their individual educational goals, Molecular Biology (BIMM 100) and Cell Biology (BICD 110) are strongly recommended for those contemplating applying to graduate or professional schools.

HUMAN BIOLOGY MAJOR

This major is designed to provide students with the fundamental courses required for entry into: schools of medicine, veterinary medicine, dentistry, and pharmacy; Ph.D. programs in the biomedical sciences; and biotech research, teaching, medical technology, patent law, physical therapy, nutrition, and nursing. The core classes required of all human biology majors provide the student with the basic principles that help us understand normal human physiology and the molecular basis of human disease. The course options in Human Physiology, Human Disease, and Biomedical-related laboratories provide the students with educational breadth while

still allowing them considerable flexibility in tailoring their course of study to suit their educational goals.

LOWER-DIVISION REQUIREMENTS

- BILD 1 and 3 (Note: BILD 2 is not required, but is a prerequisite for many upper-division courses.)
- Chemistry 6A-B-C and 6BL
- Physics 1A/1AL, 1B/1BL, 1C/1CL or Physics 2A-B-C, and one lab
- Mathematics 10A-B, and 11 or 10C or 20A-B-C

UPPER-DIVISION REQUIREMENTS

1. Organic Chemistry (Chemistry 140A and 140B or 141A and 141B)
2. Organic Chemistry Lab (Chemistry 143A)
3. Metabolic Biochemistry (BIBC 102)
4. Genetics (BICD 100)
5. Molecular Biology (BIMM 100)
6. Molecular Basis of Human Disease (BIMM 110)
7. Mammalian Physiology I (BIPN 100)
8. Three courses from the following two groups, Human Physiology and Human Disease. At least one course must be taken from each group.

Human Physiology

- Nutrition (BIBC 120)
- Embryos, Genes, and Development (BICD 130)
- Human Reproduction and Development (BICD 134)
- Immunology (BICD 140)
- Endocrinology (BICD 150)
- Circadian Rhythms—Biological Clocks (BIMM 116)
- Mammalian Physiology II (BIPN 102)
- Cellular Basis of Learning and Memory (BIPN 148)

Human Disease

- Virology (BIMM 114)
 - Pharmacology (BIMM 118)
 - Bacteriology (BIMM 120)
 - Medical Microbiology (BIMM 124)
 - Biology of Cancer (BIMM 134)
 - Environmental and Molecular Toxicology (BIMM 166)
9. Two of the following lab courses: Biochemical Techniques (BIBC 103); Cell Biology Lab (BICD 111); Embryology Lab (BICD 131); Laboratory in Molecular Medicine (BICD 145); Recombinant DNA Techniques (BIMM 101); Microbiology Lab (BIMM 121); Animal Physiology Lab (BIPN 105)
 10. At least two other upper-division courses (each course must be at least four units) offered by the UCSD Division of Biological Sciences. Recommended courses include additional courses from the Human Physiology and Human Disease lists in section 8 above and BICD 110 (Cell Biology), BIEB 154 (Molecular Evolution), and BICD 118 (Pathways of Intracellular Protein Trafficking and Compartmentation).

Note: For more information on how the BISP 194, 195, 196, 197, or 199 can count toward major requirements, please see the previous section "[Special Studies Courses](#)." Microbiology Major

The microbiology major is designed to prepare students for graduate studies and for professional careers in a variety of health-related programs. The specialization in microbiology can provide the basic background for work in medical technology, or for further training in public health or other health-related specialties. The program is also designed to provide a foundation for graduate studies in microbiology, virology, and a variety of allied fields as well as for medical and dental school.

LOWER-DIVISION REQUIREMENTS

- BILD 1 and 3 (Note: BILD 2 is not required, but is a prerequisite for many upper-division courses.)
- Chemistry 6A-B-C and BL
- Mathematics 10A-B, and 11 or 10C or 20A-B-C
- Physics 1A/1AL, 1B/1BL, 1C/1CL or 2A-B-C and one lab

UPPER-DIVISION REQUIREMENTS

1. Organic Chemistry (Chemistry 140A-B or 141A-B)
 2. Organic Chemistry Laboratory (Chemistry 143A)
 3. Metabolic Biochemistry (BIBC 102)
 4. Biochemical Techniques (BIBC 103)
 5. Genetics (BICD 100)
 6. Immunology (BICD 140)
 7. Molecular Biology (BIMM 100)
 8. Virology (BIMM 114)
 9. Bacteriology (BIMM 120)
 10. Laboratory in Microbiology (BIMM 121)
 11. Medical Microbiology (BIMM 124)
 12. Three additional upper-division biology courses (each course must be at least four units) taken through the UCSD Division of Biological Sciences are required. Other courses of special interest to microbiology majors are listed below:
- Cell Biology (BICD 110)
 - Regulation of Gene Activity in Eucaryotic Cells (BIMM 112)
 - Microbial Genetics (BIMM 122)
 - Recombinant DNA Techniques (BIMM 101)

Note: For more information on how the BISP 194, 195, 196, 197, or 199 can count toward major requirements, please see the previous section "[Special Studies Courses](#)."

MOLECULAR BIOLOGY MAJOR

The program for molecular biology is designed to provide an intensive exposure to the theoretical concepts and experimental techniques of molecular biology. The concepts and techniques of molecular biology are the foundation for the studies of all aspects of biology in modern time. A focus on molecular biology, therefore, provides an excellent preparation for a wide range of advanced studies

including basic research, medicine, bioengineering, and biotechnology. Considerable emphasis is placed on chemistry, biochemistry, and genetics for students enrolled in the program. As such, it is recommended for those students who have a particularly strong interest in this field of study.

LOWER-DIVISION REQUIREMENTS

- BILD 1 and 3 (Note: BILD 2 is not required, but is a prerequisite for many upper-division courses.)
- Chemistry 6A-B-C and BL
- Mathematics 20A-B-C
- Physics 1A/1AL, 1B/1BL, 1C/1CL or 2A-B-C, and one lab

UPPER-DIVISION REQUIREMENTS

1. Organic Chemistry (Chemistry 140A-B or 141A-B)
2. Organic Chemistry Laboratory (Chemistry 143A) or Physical Chemistry Laboratory (Chemistry 105A)
3. Structural Biochemistry (BIBC 100)
4. Metabolic Biochemistry (BIBC 102)
5. Biochemical Techniques (BIBC 103)
6. Genetics (BICD 100)
7. Cell Biology (BICD 110)
8. Molecular Biology (BIMM 100)
9. Recombinant DNA Techniques (BIMM 101)
10. Regulation of Gene Activity in Eucaryotic Cells (BIMM 112)
11. Microbial Genetics (BIMM 122)
12. Four additional upper-division biology courses (each course must be at least four units) taken through the UCSD Division of Biological Sciences are required. Attention is drawn to BICD 120, BICD 122, BICD 140, BIMM 110, and BIMM 114.

Note: For more information on how the BISP 194, 195, 196, 197, or 199 can count toward major requirements, please see the previous section "[Special Studies Courses](#)."

PHYSIOLOGY AND NEUROSCIENCE MAJOR

This major provides a program for studying the bodily and neural functions of complex organisms. A student may concentrate upon a more specialized area of study, such as neurobiology, animal physiology, or endocrinology.

This major is designed to provide students with the fundamental courses required for entry into medical school, graduate school in biological or neural sciences, or entry into other health-related professions such as nursing, dentistry, veterinary medicine, pharmacy, physical therapy, physical education, agriculture, and wildlife management.

LOWER-DIVISION REQUIREMENTS

- BILD 1 and 3 (Note: BILD 2 is not required, but is a prerequisite for many upper-division courses.)
- Chemistry 6A-B-C and BL

- Mathematics 10A-B, and 11 or 10C or 20A-B-C
- Physics 1A/1AL, 1B/1BL, 1C/1CL or 2A-B-C, and one lab

UPPER-DIVISION REQUIREMENTS

1. Organic Chemistry (Chemistry 140A, 140B, or 141A, 141B)
2. Organic Chemistry Laboratory (Chemistry 143A)
3. Metabolic Biochemistry (BIBC 102)
4. Genetics (BICD 100)
5. Molecular Biology (BIMM 100)
6. Four from the following eight courses:
 - Mammalian Physiology I (BIPN 100)
 - Mammalian Physiology II (BIPN 102)
 - Comparative Physiology (BIPN 106)
 - Cellular Neurobiology (BIPN 140)
 - Systems Neurobiology (BIPN 142)
 - Developmental Neurobiology (BIPN 144)
 - Computational Neurobiology (BIPN 146)
 - Cellular Basis of Learning and Memory (BIPN 148)
7. One of three laboratories (BICD 131, BIPN 105, BIPN 145)
8. One upper-division biology lab to be chosen from the following: BIBC 103, BICD 101, 111, 123, 131, 145, BIEB 121, 131, 165, 167, BIMM 101, 121, 127, BIPN 105, 145. This requirement may include a lab from number 7 that has not already been taken by the student.
9. Three additional upper-division biology courses (each course must be at least four units) taken through the UCSD Division of Biological Sciences are required and may include the above (numbers 6–8) if not already taken.

Note: For more information on how the BISP 194, 195, 196, 197, or 199 can count toward major requirements, please see the previous section "[Special Studies Courses](#)."

MINOR IN BIOLOGICAL SCIENCES

To receive a minor from the Division of Biological Sciences, a student must complete at least seven four-unit biology courses (for a total of at least twenty-eight units of course work).

LOWER-DIVISION REQUIREMENTS

- BILD 1 and 3 or BILD 10 and 3

UPPER-DIVISION REQUIREMENTS

1. Any five upper-division biology courses offered by the Division of Biological Sciences at UCSD
2. Students may apply transferable biology courses from another institution toward the lower-division requirements, after obtaining approval from the UCSD Division of Biological Sciences.
3. No courses taken outside of the Division of Biological Sciences may be applied toward the biology minor.
4. All courses must be taken for a letter grade.

5. The minimum GPA requirement for the biology minor is 2.0 in the upper-division courses.
6. Advanced placement (AP) biology scores may be applied toward the minor.
7. BISP 195 may not be used toward the biology minor. One quarter of BISP 196, 197, or 199 may be counted toward the minor.
8. Students may not minor and major in the Division of Biological Sciences.

SECONDARY SCHOOL BIOLOGY TEACHING

UCSD's Division of Biological Science is committed to the education of future biology teachers and offers an excellent preparation for teaching biology in secondary schools. If you are interested in earning a California teaching credential from UCSD, contact Education Studies (EDS) for information about the prerequisite and professional preparation requirements. It is recommended that you contact EDS and the Biology Student and Instructional Services Office early in your academic career to help you plan a suitable biology curriculum. If you plan to get your credential at another institution, keep in mind that a broad education in biology is the best preparation to become a teacher.

<http://www-tep.ucsd.edu/>

We suggest that students take courses in plant and animal biology, microbiology, ecology, population biology, evolution, marine biology, genetics, and biochemistry. Courses in cellular and molecular biology are also advisable. After completion of BILD 1, 2, and 3, a suggested program of upper-division courses would be: BIBC 100 or 102, BICD 100, 120, 130, BIEB 102, 150, BIPN 106, SIO 275B. This would give you as a prospective teacher the required breadth of education.

CONTIGUOUS BACHELOR'S/ MASTER'S DEGREE PROGRAM

A contiguous program leading to a bachelor of science degree and a master of science degree in biology is offered to those undergraduate students who are enrolled in any of the major programs offered by the Division of Biological Sciences at UC San Diego. Qualified students are able to obtain the M.S. degree within one year following receipt of the B.S. degree. Students interested in applying to this program should meet with the BS/M.S. advisor in the Biology Student and Instructional Services Office *before* the end of their junior year.

The program is open only to UCSD undergraduates. The Division of Biological Sciences does not have financial aid available for students enrolled in this program although other sources of financial aid may be available to qualified students through the UCSD Financial Aid Office.

ELIGIBILITY AND ENROLLMENT

To be eligible, students must have completed the first two quarters of their junior year in residence at UCSD and must have an overall UC GPA of at least 3.0. Students' major GPA should be at least 3.3. Students must demonstrate excellent performance in upper-division biology core courses during their

undergraduate program to be eligible to enroll in biology graduate core courses.

It is the responsibility of the prospective B.S./M.S. student to select a faculty member (from the Division of Biological Sciences) who would be willing to serve as the student's advisor and in whose laboratory the student would complete at least twenty-four units of research over a two-year period. The units of research that must be completed during the student's senior undergraduate year, must be taken *in addition* to the requirements for the bachelor's degree. These units will count toward the requirements for the master's degree only. Students must complete six consecutive quarters of research to fulfill the research component of the program. Any deviation from this plan, such as a break in enrollment for one or more quarters, will be cause for the student to be dropped from the program.

Students who have been approved (by both the Division of Biological Sciences and the UCSD Office of Graduate Admissions) for the program must enroll in a Special Studies Course, BISP 199 (senior year) or BGGN 271 (graduate year only), for each, and every, quarter of participation in the B.S./M.S. program. Students can obtain the appropriate course code and division stamp at the Biology Student and Instructional Services Office.

Research work (BGGN 271) will be credited toward the B.S./M.S. program requirements only if it is completed during the time a student is officially enrolled at UCSD and has paid tuition for that quarter.

REQUIREMENTS FOR THE MASTER OF SCIENCE DEGREE

1. Completion of six consecutive quarters of research during the senior undergraduate year and the graduate period.
2. Completion of at least thirty-six units of graduate course work (BGGN 200-level or higher, or approved [via petition] graduate courses offered by related departments at a similar level) during the graduate year. The course of study must be approved by the faculty advisor.
3. Twelve of the thirty-six units must be in courses other than BGGN 271 (BGGN 297 and BGGN 299 may not be used to satisfy this requirement).
4. Serve as a graduate teaching assistant.
5. Maintenance of a grade-point average (both overall and in the major) of at least 3.0 for all course work, both cumulatively and for each quarter of enrollment in the B.S./M.S. program. If the student's GPA falls below 3.0 (for either overall or in the major), he or she will be automatically dropped from the program.
6. Completion of a thesis, with an oral presentation to, and approval of, a three-member Thesis Committee. Only ladder rank faculty in the Biological Sciences or an adjunct faculty in the Biological Sciences may serve as advisor and chair of the Thesis Committee. The Thesis Committee must contain at least two regular faculty from the Division of Biological Sciences and no more than one adjunct faculty can serve on the committee. If an adjunct faculty serves as chair of the Thesis

Committee, one of the biology members must serve as co-chair.

- At least three complete, separate, and consecutive quarters of residency as a graduate student that will commence the quarter immediately following the quarter in which the B.S. degree is awarded. (**Note:** The summer session is not considered an official quarter during the graduate year.)
- Students who have been approved for the B.S./M.S. program must provide the Office of Graduate Admissions with a copy of their official UCSD transcripts with the B.S. degree posted, *prior to the commencement of the graduate year in the program.*

NON-DEGREE PROGRAM

The Division of Biological Sciences will accept applicants into the non-degree program for a maximum of one year only. Qualified applicants must have at least a 3.0 GPA in their upper-division work to be accepted. Justification will not be made for those who fall below the GPA minimum.

Students who wish to apply to the UCSD biological sciences Ph.D. program at a later date should not apply for this program. However, students who have applied to graduate or medical schools elsewhere, but have not yet been accepted, are welcome to apply.

Once accepted into this program, the student has graduate status for the academic year. Courses may be taken on the undergraduate or graduate level with consent of the instructor. Students will not be assigned faculty advisors and must make their own academic plans.

THE DOCTORAL PROGRAM

Graduate studies for a Ph.D. degree in the Division of Biological Sciences in affiliation with the Salk Institute are oriented mainly toward the development of the capacity for independent research and for teaching in the biological sciences.

The requirements for entrance to graduate study in the Division of Biological Sciences are flexible, but a strong background in mathematics, chemistry, and physics is recommended.

Formal course work and opportunities for dissertation research include most basic areas of experimental biology, with emphasis in the general areas of biochemistry, biophysics, cell biology, developmental biology, genetics, immunology, molecular biology, neurobiology, plant molecular biology, ecology, behavior and evolution, virology, and cancer biology.

During the first year of graduate study, each student undertakes a research project in the laboratory of each of four to six different faculty members, and is expected to spend a major portion of his or her academic time on this project. The laboratories are selected by the student in consultation with the first year advisor to provide a broad view of the research interests of the division. The student is also expected to enroll in the first-year graduate biology sequence, which includes a "Boot Camp" that helps develop fundamental lab skills in biology, and advanced material in genetics, developmental biology, plant

biology, neurobiology, molecular biology, cell biology, virology, and immunology. Students are also required to complete a minimum of twelve units of BGGN 500 (Apprentice Teaching in Biology.) A program of further study, including seminars and courses appropriate to a student's background and interests, is arranged through consultation between the student and the faculty. Much reliance is placed on informal instruction through early and close association of the student with the faculty and research staff, and through regular seminars. After becoming familiar with the research activities of the faculty through the laboratory rotation program, the student begins work on a thesis research problem of his or her choice no later than the end of the first year. The student is free to choose for the thesis advisor a regular member of the UCSD faculty or an adjunct member of the Division of Biological Sciences faculty. The student is required to have completed a two-part examination in order to be admitted to candidacy for the Ph.D. degree. The purpose of the examinations is for the student to demonstrate competence in the field of major interest and in related fields of biology. The major remaining requirement for the Ph.D. degree is the satisfactory completion of a dissertation consisting of original research carried out under the guidance of a faculty member.

Close collaboration with members of the Department of Chemistry and Biochemistry is a vital and stimulating aspect of the biology program. Additional strength and breadth in biology are gained by collaborating with the Department of Marine Biology of the Scripps Institution of Oceanography, with The Scripps Research Institute, and with the Salk Institute for Biological Studies.

DIVISIONAL PH.D. TIME LIMIT POLICIES

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed seven years.

JOINT DOCTORAL PROGRAM WITH SAN DIEGO STATE UNIVERSITY

The Division of Biological Sciences at UCSD participates in a joint graduate program with the Department of Biology at San Diego State University, primarily in the areas of cell and molecular biology, and leading to the Ph.D. degree in biology. Graduate student participants in the joint doctoral program are required to spend one year enrolled at UCSD.

Information regarding admission is found in the current edition of the San Diego State University Graduate Bulletin.

SPECIALIZATION IN ANTHROPOGENY

<http://carta.anthropogeny.org/training/specialization-track>

A transdisciplinary graduate specialization in anthropogeny is available for doctoral students in the Division of Biological Sciences. The aim of the specialization is to provide graduate students the opportunity to specialize their research and education in addressing the origins of the human phenomenon. The student's research will be related to one of the oldest questions known to humankind,

namely, the origins of humans and humanity. This specialization is not a stand-alone program, but will provide graduate students the opportunity to interact and communicate with peers in radically different disciplines throughout the duration of their Ph.D. projects. Such communication across disciplines from the outset is key to fostering a capacity for interdisciplinary "language" skills and conceptual flexibility.

ADMISSION TO THE SPECIALIZATION

Students are admitted into the Division of Biological Sciences doctoral program. During the early stages of their program, currently enrolled biology students with an interest in human origins are eligible to apply for admission to the specialization in anthropogeny. Selected applicants will have the opportunity to enroll in the specialization.

SPECIALIZATION REQUIREMENTS

Students pursuing this specialization must satisfy the requirements of both the biology doctoral program and the specialization in anthropogeny. For the anthropogeny specialization, students will be required to take a series of courses and participate in research rounds over four years of study. It is advised that students begin their course work in their second year.

- Course work: Introduction to Anthropogeny (BIOM 225) and Advanced Anthropogeny (BIOM 229) are each taken once, in the winter and spring of the students' second year. Current Topics in Anthropogeny (BIOM 218) is to be taken every quarter for four years.
- Research Rounds: Monthly seminars during which all participating students talk about their respective research.

DEGREE REQUIREMENTS (QUALIFYING EXAMINATION, DISSERTATION)

Biological sciences students in the anthropogeny specialization must meet the departmental requirement for advancement to candidacy. In addition, students must meet internal deadlines, mentoring provisions, and proposal standards of the anthropogeny specialization track.

Ph.D. students must complete a dissertation, which meets all requirements of the biological sciences program. In addition, it is expected that the Ph.D. dissertation is broadly related to human origins and will be interdisciplinary in nature. Time Limits

Students admitted to the specialization in anthropogeny must meet the time limit requirements as all other doctoral students in the Division of Biological Sciences. It is expected that students will retain the same time to degree as students not pursuing this specialization. Additional course load consists only of two regular courses (two quarters, twenty lectures each). The third proposed course takes place only three times a year, from Friday noon to Saturday evening.

SPECIALIZATION IN MULTI-SCALE BIOLOGY

<http://interfaces.ucsd.edu/>

As of fall 2009, the UCSD campus is offering a new Ph.D. specialization in Multi-Scale Biology that

will be available to doctoral candidates in participating programs that span four divisions: Biological Sciences, Physical Sciences, Jacobs School of Engineering, and Health Sciences at UCSD.

The Ph.D. specialization is designed to allow students to obtain standard basic training in their chosen field within the biological sciences, physical sciences, engineering, and health sciences with training in integrative and quantitative analysis across multiple scales of biological organization from molecule to organism in health and disease into their graduate studies. It trains a new cadre of Ph.D. scientists and provides a unique interdisciplinary education at the interfaces between the biological, medical, physical, and engineering sciences.

The specific objectives of this program are

- 1. Focused Collaboration** across nine graduate degree programs at UCSD to train a new generation of cross-disciplinary scientists.
- 2. State-of-the-art Interdisciplinary Training** through a new technology-centered hands-on graduate laboratory course curriculum.
- 3. Novel Emphasis on Research** aimed at integrative and quantitative analysis across multiple scales of biological organization from molecule to organism in health and disease.

Prospective students must apply and be admitted into the Ph.D. program in biology described previously. (For more information, see the [Biological Sciences Graduate Program](#) and/or the [Interfaces Graduate Training Program](#) administered within the Department of Chemistry & Biochemistry, 4010 York Hall, Revelle College.)

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Note: The division will endeavor to offer many of the courses as outlined below; however, unforeseen circumstances sometimes mandate a change of scheduled offerings. Students are strongly advised to check the *Schedule of Classes* or the division's Student and Instructional Services Office (1128 Pacific Hall) to obtain current information. Courses required for the major may be scheduled on the same day and/or same time. This is of particular importance in planning schedules for graduation requirements.

Students who have satisfied the prerequisites for courses at another college or by AP credit may need to be pre-authorized to register for the course. Please come to the Biology Student and Instructional Services Office before your registration time to be authorized. If the class is full please place your name on the waitlist and attend the first class meeting. Students who do not attend the first thirty minutes of the first scheduled meeting (be it lab or lecture) will be considered not enrolled in the course and may be administratively dropped. Prior written notification to the instructor regarding an anticipated absence may ensure a space.

IF A STUDENT DROPS A LAB COURSE AFTER THE END OF THE SECOND SESSION, THE DIVISION WILL REPORT A "W" FOR THE COURSE.

LOWER-DIVISION

BILD 1. The Cell (4)

An introduction to cellular structure and function, to biological molecules, bioenergetics, to the genetics of both prokaryotic and eukaryotic organisms, and to the elements of molecular biology. Three hours of lecture and one hour of recitation. **Prerequisite:** Chem. 6A; Chem. 6B may be taken concurrently.

BILD 2. Multicellular Life (4)

An introduction to the development and the physiological processes of plants and animals. Included are treatments of reproduction, nutrition, respiration, transport systems, regulation of the internal environment, the nervous system, and behavior. Three hours of lecture and one hour of recitation. **Prerequisite:** BILD 1.

BILD 3. Organismic and Evolutionary Biology (4)

The first principles of evolutionary theory, classification, ecology, and behavior; a phylogenetic synopsis of the major groups of organisms from viruses to primates. **Prerequisite:** none. (**Note:** E.B.E. majors should complete this course during their first year at UCSD.)

BILD 7. The Beginning of Life (4)

An introduction to the basic principles of plant and animal development, emphasizing the similar strategies by which diverse organisms develop. Practical applications of developmental principles as well as ethical considerations arising from these technologies will be discussed. **Prerequisite:** none.

BILD 10. Fundamental Concepts of Modern Biology (4)

An introduction to the biochemistry and genetics of cells and organisms; illustrations are drawn from microbiology and human biology. Three hours of lecture and one hour of discussion. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major. **Note:** Students may not receive credit for BILD 10 after receiving credit for BILD 1.

BILD 12. Neurobiology and Behavior (4)

An introduction to the organization and functions of the nervous system; topics include molecular, cellular, developmental, systems, and behavioral neurobiology. Three hours of lecture and one hour of discussion. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major.

BILD 16. History of Life (4)

Life has a very long history on earth and this course will chronicle patterns of biological diversity from its origin over 3 billion years ago to the present day. Topics covered will include methods for reconstructing the history of life on this planet, the origin and evolution of major groups of plants and animals, dinosaur paleobiology, past environmental changes and their effects on species and communities, and extinctions. We will also explore how insights from the past can be used to understand how present and future environmental changes will impact biological diversity. This course is designed for non-biology majors.

BILD 18. Human Impact on the Environment (4)

Course will focus on issues such as global warming, species extinction, and human impact on the oceans and forests. History and scientific projections will be examined in relation to these events. Possible solutions to these worldwide processes and a critical assessment of their causes and consequences will be covered. **Prerequisite:** none.

BILD 20. Human Genetics in Modern Society (4)

Fundamentals of human genetics and introduction to modern genetic technology such as gene cloning and DNA finger printing. Applications of these techniques, such as forensic genetics, genetic screening, and genetic engineering. Social impacts and ethical implications of these applications. This course is designed for non-biology students and does not satisfy a lower-division requirement

for any biology major. **Note:** Students may not receive credit for BILD 20 after receiving credit for BICD 100.

BILD 22. Human Nutrition (4)

A survey of our understanding of the basic chemistry and biology of human nutrition; discussions of all aspects of food: nutritional value, diet, nutritional diseases, public health, and public policy. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major. **Note:** Students may not receive credit for BILD 22 after receiving credit for BIBC 120.

BILD 24. Biology of Human Reproduction (4)

The topics covered are: sexual development in embryo and fetus, the nature and regulation of changes at puberty, the functioning of the mature sexual system. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major. **Note:** Students may not receive credit for BILD 24 after receiving credit for BICD 134.

BILD 26. Human Physiology (4)

Introduction to the elements of human physiology and the functioning of the various organ systems. The course presents a broad, yet detailed, analysis of human physiology, with particular emphasis towards understanding disease processes. Three hours of lecture and one hour of discussion. This course is designed for non-biology students and does not satisfy a lower-division requirement for any biology major.

BILD 30. The Biology of Plagues: Past and Present (4)

An introduction to diseases caused by viruses, bacteria, and parasites, and the impact of these diseases on human society. Topics include the biology of infectious disease, epidemiology, and promising new methods to fight disease. Three hours of lecture and one hour discussion. This course is designed for non-biology majors and does not satisfy a lower-division requirement for any biology major. (**Note:** Students may not receive credit for BILD 30 after receiving credit for BIMM 120.)

BILD 36. AIDS Science and Society (4)

An introduction to all aspects of the AIDS epidemic. Topics include the epidemiology, biology, and clinical aspects of HIV infection; HIV testing; education and approaches to therapy; and the social, political, and legal impacts of AIDS on the individual and society. Students may not receive credit for BILD 36 after receiving credit for BICD 136.

BILD 87. Freshman Seminar (1)

The freshman seminar program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshmen seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

BILD 90. Undergraduate Seminar (1)

This seminar is restricted to lower-division undergraduate students (freshmen and sophomores). The course introduces current biological topics. The topics vary with instructors and for each quarter. Examples of topics which may be discussed are: wildlife conservation, signalling within and between cells, mapping the human genome, etc. This course does not satisfy any requirement for the biology major, biology minor, or college general/education.

BILD 92. Professional Topics (1)

This seminar will introduce students to the various subdisciplines and their research methodology in the biological sciences. Emphasis will be on bioinformatics, neurophysiology, and biotechnology. Current research topics in the specialized areas in academe and industry will be discussed. The role and professional identity of biologists in research, consulting, government, management, and teaching will be reviewed. In addition, issues surrounding professional ethics will be discussed.

BILD 94. Professional Issues in Bioinformatics (1)

This seminar will introduce undergraduate students, especially freshmen and sophomores, to a variety of issues and topics in the field of bioinformatics.

BILD 95. Undergraduate Workshops (1)

The workshops will be restricted to lower-division undergraduates. The course will introduce students to the methods of scientific research and to a variety of research topics in the biological/biomedical sciences. Examples of topics are: Introduction to Scientific Research, AIDS, Medical and Social Aspects, Is the Mind the Same as the Brain, Wildlife Conservation.

BILD 99. Independent Research (2 or 4)

Independent research by special arrangement with a faculty member. (P/NP grades only.) Students must have an overall UCSD GPA of at least 3.0 and a minimum of thirty units complete. Students must complete a "Special Studies" form and a Division of Biological Sciences "Research Plan." Credit may not be received for a course numbered 99 subsequent to receiving credit for a course numbered 199.

UPPER-DIVISION

BIOCHEMISTRY

BIBC 100. Structural Biochemistry (4)

The structure and function of biomolecules. Includes protein conformation, dynamics, and function; enzymatic catalysis, enzyme kinetics, and allosteric regulation; lipids and membranes; sugars and polysaccharides; and nucleic acids. Three hours of lecture and one hour of recitation. **Prerequisite:** Chem. 140A; Chem. 140B may be taken concurrently. (Note: Students may not receive credit for both BIBC 100 and Chem. 114A.)

BIBC 102. Metabolic Biochemistry (4)

Energy-producing pathways—glycolysis, the TCA cycle, oxidative phosphorylation, photosynthesis, and fatty acid oxidation; and biosynthetic pathways—gluconeogenesis, glycogen synthesis, and fatty acid biosynthesis. Nitrogen metabolism, urea cycle, amino acid metabolism, nucleotide metabolism, and metabolism of macromolecules. **Prerequisite:** Chem. 140A; Chem. 140B may be taken concurrently. (Note: Students may not receive credit for both BIBC 102 and Chem. 114B.)

BIBC 103. Biochemical Techniques (4)

Introductory laboratory course in current principles and techniques applicable to research problems in biochemistry and molecular biology. Techniques include protein and nucleic acid purification; identification methods such as centrifugation, chromatography, and electrophoresis; immunological, spectrophotometric, and enzymatic methods. **Prerequisite:** BILD 1. Students may not receive credit for BIBC 103 after taking Chem. 112A (renumbered to Chem. 108). Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BIBC 104. Biochemistry and Biotechnology of Plants (4)

The biochemical and molecular basis of plant genetic engineering to understand modern approaches to crop improvement. **Prerequisites:** BILD 1; Chem. 140A. BIBC 102 and Chem. 140B may be taken concurrently.

BIBC 110. Physical Biochemistry (4)

The theory and applications of physical chemistry to biological molecules, process and systems and techniques used in biochemistry and physiology. Topics include reversible and irreversible thermodynamics, bioenergetics, energy coupling and transduction, solutions of macromolecules, sedimentation, chromatography, electrophoresis, passive and active membrane transport, spectroscopy, and chemical kinetics. Three hours of lecture and one hour of recitation. **Prerequisites:** calculus and organic chemistry.

BIBC 116. Evolution of Genes and Proteins (4)

The history of an organism can be found in its genome. Analyses of the primary sequences will be used to recognize families of genes that arose by duplication and divergence. Topics include comparisons of amino acid sequences and three dimensional structures and range from the oldest and most widely distributed proteins to modern mosaics. Where possible, specific motifs and folds will be traced to their ancestral beginnings. **Prerequisites:** BIBC 100, BIMM 100.

BIBC 120. Nutrition (4)

Elaborates the relationship between diet and human metabolism, physiology, health, and disease. Covers the functions of carbohydrates, lipids, proteins, vitamins, and minerals, and discusses dietary influences on cardiovascular disease, diabetes, obesity, and cancer. **Prerequisite:** BIBC 102.

BIBC 130 Marine Biochemistry (4)

Biochemical mechanisms of adaptation in organisms to the marine environment. Special emphasis will be on the effects of pressure, temperature, salinity, oxygen, and light on the physiology and biochemistry. **Prerequisite:** BIBC 102 or consent of instructor.

GENETICS, CELLULAR AND DEVELOPMENTAL BIOLOGY OF PLANTS AND ANIMALS

BICD 100. Genetics (4)

An introduction to the principles of heredity in diploid organisms, fungi, bacteria, and viruses. Mendelian inheritance; population genetics; quantitative genetics; linkage; sex determination; meiotic behavior of chromosome aberrations, gene structure, regulation, and replication; genetic code. Three hours of lecture and one hour of recitation. **Prerequisite:** BILD 1 or the equivalent.

BICD 101. Eucaryotic Genetics Laboratory (4)

Students will implement forward and reverse genetic methodologies widely used in contemporary biological research, focusing primarily on model organisms. Lab work is complemented by computer work that includes utilization of genome sequence databases and basic bioinformatics. **Prerequisite:** BIMM 100. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BICD 110. Cell Biology (4)

The structure and function of cells and cell organelles, cell growth and division, motility, cell differentiation and specialization. Three hours of lecture and one hour of recitation. **Prerequisites:** BIBC 100 or BIBC 102, and BICD 100.

BICD 111. Cell Biology Laboratory (6)

A laboratory course in the application of cellular techniques to biological problems. The establishment, growth, transformation, immortalization, and senescence of mammalian cells will be studied at the molecular and the cellular level. Ten hours of laboratory. In addition to the formal lab hours listed above, there will be an average of two hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. **Prerequisite:** BICD 110 (may be taken concurrently); BIBC 103 is strongly recommended. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BICD 118. Pathways of Intracellular Protein Trafficking and Compartmentation (4)

This course will focus on various subcellular organelles, their function, protein traffic, disulfide bond formation, protein folding, assembly of macromolecular complexes, protein quality control, and cellular responses to misfolded proteins. The emphasis will be on experimental approaches and model systems for the analysis of these problems, and on the connection of these topics to human disease. Three hours of lecture and one hour of mandatory discussion of primary publications per week. Open to upper-division students only. **Prerequisites:** BICD 110 and BIMM 100.

BICD 120. Fundamentals of Plant Biology (4)

An introduction to the biology of plants. Basic principles of plant anatomy, physiology, development, and diversity are covered as well as specialized topics, including plant genetic engineering, plant disease and stress, medicinal plants, plants and the environment, and sustainable agriculture. **Prerequisites:** BILD 1 and BILD 2.

BICD 122. Plant Cellular and Molecular Biology (4)

The cellular and molecular basis of plant development, including plant hormones, signal transduction mechanisms, light and plant growth, plant microorganism interaction, plant transformation, genetic engineering of plants. **Prerequisite:** BIBC 102 required; BICD 120 recommended.

BICD 123. Plant Molecular Genetics and Biotechnology Laboratory (6)

Techniques in plant cell and tissue culture, plant transformation, genetic selection and screening of mutants, host pathogen interactions, gene regulation, organelle isolation, membrane transport. Two hours of lecture and eight hours of laboratory each week. **Prerequisite:** upper-division standing; BICD 120 strongly recommended. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BICD 130. Embryos, Genes, and Development (4)

Developmental biology of animals at the tissue, cellular, and molecular levels. Basic processes of embryogenesis in a variety of invertebrate and vertebrate organisms. Cellular and molecular mechanisms that underlie cell fate determination and cell differentiation. More advanced topics such as pattern formation and sex determination are discussed. Open to upper-division students only. Three hours of lecture and one hour of recitation. **Prerequisites:** upper-division standing; BICD 100; BIBC 100 or BIBC 102; BICD 110 strongly recommended.

BICD 131. Embryology Laboratory (6)

Descriptive and experimental embryology of various animal species. One and one-half hours of lecture and ten hours of laboratory each week. **Prerequisites:** BILD 1; BILD 2. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BICD 134. Human Reproduction and Development (4)

This course is addressed to the development of the human sexual system, including gametogenesis, fertilization, and embryo implantation. Emphasis is placed on the physiology of reproductive functions. Three hours of lecture and one hour of discussion. **Prerequisites:** BIBC 102 and BICD 100.

BICD 136. AIDS Science and Society (4)

An introduction to all aspects of the AIDS epidemic. Topics will include the epidemiology, biology, and clinical aspects of HIV infection, HIV testing, education and approaches to therapy, and the social, political, and legal impacts of AIDS on the individual and society. In order to count for their major, biology majors must take the upper-division course, BICD 136. **Prerequisites:** BILD 1, BILD 2 recommended.

BICD 140. Immunology (4)

Formation and function of the mammalian immune system, molecular and cellular basis of the immune response, infectious diseases and autoimmunity. **Prerequisites:** BICD 100, BIMM 100. BIBC 100 recommended.

BICD 145. Laboratory in Molecular Medicine (4)

This course focuses upon a molecular and immunological approach to study problems in modern medical research. The emphasis will be on novel approaches in medicine, including lymphocyte biology, cancer biology, and gene transfer. **Prerequisites:** BIBC 103, BIMM 100. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BICD 150. Endocrinology (4)

Normal function and diseases of the major hormone systems of the body including the hypothalamus/pituitary axis, the thyroid gland, reproduction and sexual development, metabolism and the pancreas, bone and calcium metabolism, and the adrenal glands. **Prerequisite:** BIPN 100 (may be taken concurrently).

BICD 170. Topics in Human Genetics (4)

An advanced course covering human genetics using papers from the scientific literature as the major source of information. A review of basic genetics as applied to the human species. Consideration of recent genetic insights into a number of human conditions. **Prerequisite:** BICD 100, BIMM 100 is strongly recommended.

ECOLOGY, BEHAVIOR, AND EVOLUTION

BIEB 100. Biostatistics (4)

Application of statistics to biological problems. Topics: descriptive statistics, parametric statistics, (t-test, correlation, regression, ANOVA, GLM), non-parametric statistics, experimental design. Mandatory homework to apply theory

requires knowledge and application of statistics software. Mandatory one- to two-hour discussion in computer lab. **Prerequisite:** BILD 3.

BIEB 102. Introductory Ecology-Organisms and Habitat (4)

This course emphasizes principles shaping organisms, habitats, and ecosystems. Topics covered include population regulation, physiological ecology, competition, predation, and human exploitation. This will be an empirical look at general principles in ecology and conservation with emphasis on the unique organisms and habitats of California. **Prerequisite:** BILD 3 or equivalent.

BIEB 121. Ecology Laboratory (6)

A laboratory course to familiarize students with ecological problem solving and methods. Students will perform outdoor field work and use the Macintosh computer for data exploration and analysis. Two hours of lecture and eight hours of laboratory each week. **Prerequisite:** BIEB 100. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BIEB 123. Molecular Methods in Ecology and Evolution Lab (4)

Theory and practice of molecular biology techniques used in ecological and evolutionary research. Includes isolation of DNA and RNA, PCR and its applications, DNA sequencing, gene expression analysis, bioinformatics, and ecological and evolutionary analysis of molecular data. Students may not enroll in or receive credit for both BIMM 101 and BIEB 123. **Prerequisite:** BILD 3. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BIEB 126. Plant Ecology (4)

This course begins with an introduction to plant population biology including whole-plant growth and physiology. We then focus on three classes of ecological interactions: plant-plant competition, plant-herbivore coevolution, and plant reproductive ecology including animal pollination and seed dispersal. **Prerequisite:** BILD 3.

BIEB 128. Insect Ecology (4)

This course begins with a survey of insect diversity and phylogenetic relationships. We then address ecological issues including thermal ecology, population dynamics (including outbreaks), movement and migration, competition, predation, herbivory, parasitism, insect defense, mimicry complexes, and sociality. **Prerequisite:** BILD 3 or equivalent.

BIEB 131. Marine Invertebrate Ecology Laboratory (6)

A laboratory course introducing students to marine ecology. Students will participate in outdoor fieldwork and work in the laboratory gathering and analyzing ecological data. We will focus on ecological communities in estuary, sandy beach, and rocky intertidal habitats. Two hours of lecture and eight hours of laboratory each week. In addition to the formal lab hours, there will be at least nine hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. **Prerequisites:** BILD 3; BIEB 100. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BIEB 132. Introduction to Marine Biology (4)

Overview of marine organisms and their adaptations to sea life. Selected examples of physiological, behavioral, and evolutionary adaptations in response to the unique challenges of a maritime environment. **Prerequisite:** BILD 3.

BIEB 134. Introduction to Biological Oceanography (4)

Basis for understanding the ecology of marine communities. The approach is process-oriented, focusing on major functional groups of organisms, their food-web interactions and community responses to environmental forcing, and contemporary issues in human and climate influences. **Prerequisite:** upper-division standing; BILD 3 is recommended.

BIEB 136. Ichthyology (4)

Course will study aspects of the biology of fishes from all over the world, from the crushing pressure of the deep sea to the chilling temperatures of Antarctic waters. Students

will learn about form/function that allow fishes to thrive in diverse marine environments. Students will conduct an independent field project. Field trips may be required. **Prerequisite:** BILD 3 recommended.

BIEB 140. Biodiversity (4)

An introduction to the patterns of geographic distribution and natural history of plants and animals living in terrestrial and marine ecosystems. We will explore: ecological and evolutionary processes responsible for generating and maintaining biological diversity; and the nature of extinction both in past and present ecosystem. **Prerequisite:** BILD 3.

BIEB 144. Quantitative Ecology and Conservation (4)

Introduction to mathematical and statistical tools for prediction of deterministic and stochastic ecological systems, including age-structured population growth; population regulation; interspecific interaction; species diversity. Conservation biology topics include sustainable harvesting; metapopulation dynamics; extinction; case studies of endangered species. **Prerequisite:** BILD 3; BIEB 100 and BIEB 102 recommended.

BIEB 145. Spatial Analyses in Ecology and Conservation (4)

Course familiarizes students with the concept and application of geographic analyses in biology and, specifically, the use of GIS as analytical tool. Example studies will be performed that range from global ecology to conservation in San Diego county. **Prerequisites:** BILD 3, BIEB 100, BIEB 102. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BIEB 147. Introduction to Phylogenetics (4)

Course will review some of the methods for constructing phylogenetic trees using morphological and molecular data. Topics to be covered will include evolutionary and ecological transformations, biodiversity measurements, biogeography, systematics, and taxonomy among others. **Prerequisite:** BILD 3.

BIEB 150. Evolution (4)

Evolutionary processes are discussed in their genetic, historical, and ecological contexts. Population genetics, agents of evolution, microevolution, speciation, macroevolution. **Prerequisites:** BILD 1 and BILD 3.

BIEB 154. Molecular Evolution (4)

This course deals with the evolution of genes and the molecules they encode. The role of mutation, selection, and drift at the molecular level are discussed. Molecular phylogenies, jumping genes, viral evolution, and searches for molecular homologies are a few of the topics covered. Three hours of lecture and one hour of discussion. **Prerequisites:** BIBC 102, BICD 100, and BIMM 100 recommended.

BIEB 156. Population Genetics (4)

Course on empirical and theoretical population genetics. The goal is to review basic models of population genetics, empirical tests of these models and gain intuitions about the population-level processes underlying genome evolution, phenotypic change and the origin of new species. A working knowledge of basic molecular genetics, algebra, and statistics is assumed. **Prerequisite:** BICD 100.

BIEB 159. Advanced Field Ecology Lab (4)

Course will familiarize students with the design, performance, analysis, and presentation of ecological experiments. Students will perform two field studies; one with terrestrial insects, the other with plant biodiversity. Field work in Mexico required during "spring break" for spring course and week prior to fall quarter for fall course. Students will continue on campus with lectures and laboratory sessions. **Prerequisites:** BIEB 100; departmental approval only (department will preauthorize student to enroll); restricted to students participating in NSF/REU program.

BIEB 164. Behavioral Ecology (4)

A survey of the patterns of social behavior in animals and a discussion of the ecological principles underlying the evolution of animal societies. Three hours of lecture and one hour of discussion. **Prerequisite:** BILD 3 recommended.

BIEB 165. Behavioral Ecology Laboratory (6)

This course deals with quantitative methods for the study of animal social behaviors. Topics include spatial patterns, mating systems, and cooperation. The course includes both lab exercises and field trips. Two hours of lecture and eight hours of laboratory each week. **Prerequisites:** BIEB 100 and BIEB 164. (BIEB 164 may be taken concurrently.) Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BIEB 166. Animal Behavior and Communication (4)

An integrated approach to animal behavior focusing on mechanisms of acoustic, visual, and olfactory communication. Course covers ethology and the genetics and neurobiology of behavior; orientation and navigation; and signal origins, properties, design, and evolution. **Prerequisites:** BILD 3 and Physics 1A or 2A.

BIEB 167. Animal Communication Laboratory (6)

Laboratory exercises will introduce students to quantitative methods of visual, auditory, and olfactory signal analysis and to lab and field studies of animal signaling. Two hours of lecture and eight hours of laboratory each week. In addition to the formal lab hours, there will be at least nine hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. **Prerequisites:** BIEB 100 and BIEB 166. (BIEB 166 may be taken concurrently.) Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BIEB 174. Ecosystems and Global Change (4)

Course will teach the principles of terrestrial ecosystem ecology, and will use examples from recent research to help students understand how global environmental changes are altering processes from leaf-level ecophysiology to global cycling of carbon, water, and nutrients. Field work may be required. **Prerequisites:** BILD 2 and BILD 3.

BIEB 176. Conservation and the Human Predicament (4)

(Cross-listed with ANTH/BIO 132; however, biology majors must take the course as Biology 176.) An interdisciplinary discussion of the human predicament, the biodiversity crisis, and the importance of biological and environmental conservation. Examines issues from biological, cultural, historical, economic, social, political, and ethical perspectives emphasizing new approaches and new techniques for safeguarding the future of humans and other biosphere inhabitants. **Prerequisites:** upper-division standing and BILD 3 or consent of instructor.

MOLECULAR BIOLOGY, MICROBIOLOGY

BIMM 100. Molecular Biology (4)

Molecular basis of biological processes, emphasizing gene action in context of entire genome. Chromosomes and DNA metabolism: chromatin, DNA replication, repair, mutation, recombination, transposition. Transcription, protein synthesis, regulation of gene activity. Prokaryotes and eukaryotes. **Prerequisites:** BIBC 100 or BIBC 102, BICD 100. (Note: Students may not receive credit for both BIMM 100 and Chem. 114C.)

BIMM 101. Recombinant DNA Techniques (4)

Theory and practice of recombinant DNA and molecular biology techniques. Includes construction and screening of DNA libraries, DNA sequencing, PCR and its applications, bioinformatics, and RNA analysis. **Prerequisite:** BILD 1. Students may not enroll in or receive credit for both BIMM 101 and BIEB 123, or BIMM 101 and Chem. 112B (renumbered to Chem. 109). BIMM 100 recommended.

BIMM 108. Adventures in Chromatin Structure and Gene Expression (4)

Chromatin, the natural state of DNA in eukaryotes, has recently emerged as a critical component of many important biological processes. Topics include histone modifications, chromatin dynamics, transcription factors, enhancers, CpG methylation, heterochromatin, epigenetics, and the role of chromatin in human biology. **Prerequisite:** BIMM 100.

BIMM 110. Molecular Basis of Human Disease (4)

An examination of the molecular basis of human diseases. Course emphasizes inherited human disorders, and some important diseases caused by viruses. Focus on the

application of genetic, biochemical, and molecular biological principles to an understanding of the diseases. Three hours of lecture. Course restricted to upper-division biology majors. **Prerequisites:** BICD 100; BIBC 102; BIMM 100.

BIMM 112. Regulation of Gene Activity in Eucaryotic Cells (4)

This course explores problems in the regulation of gene activity in eucaryotic cells approached at the molecular level. The course includes the organization, structure, transcription, and regulation of eucaryotic genes; mechanism of hormonal regulation in controlling gene activity; induction of gene expression in eucaryotic cells; role of signal transduction in controlling gene expression; and regulation of gene activity during differentiation in developing systems. Examples are taken from eucaryotic microorganisms, invertebrates, as well as mammalian and other vertebrate systems. Three hours of lecture and one hour of discussion. **Prerequisite:** BIMM 100.

BIMM 114. Virology (4)

An introduction to eucaryotic virology, with emphasis on animal virus systems. Topics discussed include the molecular structure of viruses; the multiplication strategies of the major virus families; and viral latency, persistence, and oncology. Three hours of lecture and one hour of discussion. **Prerequisite:** BIMM 100.

BIMM 116. Circadian Rhythms—Biological Clocks (4) (Cross-listed with Psyc. 133; however, biology majors must take the course as BIMM 116.) Examples and fundamental properties of the daily biological clock in humans, animals, and microbes. Experimental approaches employed to understand how organisms keep time and how this applies to human health. **Prerequisite:** BILD 1 or Psych. 106 or consent of instructor.

BIMM 118. Pharmacology (4)

Basics of pharmacology such as drug absorption, distribution, metabolism, and elimination. Concepts in toxicology and pharmacognosy are used to survey the major drug categories. **Prerequisites:** BIBC 100 or BIBC 102; BIPN 100.

BIMM 120. Bacteriology (4)

A discussion of the structure, growth, molecular genetics, and physiology of prokaryotic microorganisms, with emphasis on the diverse activities of bacteria and on the interaction of various bacterial species with their environment. Three hours of lecture and one hour recitation. **Prerequisites:** Chem. 140A; Chem. 140B; BIBC 100 or BIBC 102 (may be taken concurrently).

BIMM 121. Laboratory in Microbiology (4)

Course emphasizes fundamental principles of microbiology, including comparative bacterial morphology and physiology, pure culture techniques, and bacterial growth. Additional studies include bacteriophage interactions, antibiotics, the use of bio-assays, natural microbial communities through metagenomics and enrichment, and bacteria in biotechnology. **Prerequisites:** BIBC 102 or BIMM 120 strongly recommended; upper-division standing.

BIMM 122. Microbial Genetics (4)

Organization and function of prokaryotic genetic systems including sex factors, transduction, transformation, phage genetics, transposons, genetic engineering. Three hours of lecture. **Prerequisites:** BIMM 100, BICD 100, or consent of instructor.

BIMM 124. Medical Microbiology (4)

Encompasses the increasingly important areas of viral, bacterial, and parasitic diseases and understanding the complex interaction between humans and infectious agents. Covers human-pathogen interactions, mechanisms and molecular principles of infectious diseases, immune responses, countermeasures by pathogens and hosts, epidemiology, and cutting-edge approaches to therapy. **Prerequisites:** BIBC 100 or BIBC 102 recommended; upper-division standing.

BIMM 126. Marine Microbiology (4)

The role of microorganisms in the oceans: metabolic diversity, methods in marine microbiology, interactions of microbes with other microbes, plants and animals, biogeochemical cycling, pollution and water quality, microbe-mineral interactions, extremophiles. **Prerequisite:** BIBC 102 and BIMM 120 recommended.

BIMM 127. Marine Microbiology Laboratory (4)

Techniques and theory in environmental microbiology. Students perform experiments concerning a) enrichment, enumeration, and identification and b) metabolic and physicochemical adaptations, along with an independent project. Graduate students submit an additional report and take a modified final exam. **Prerequisite:** upper-division standing. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BIMM 130. Microbial Physiology (4)

Prokaryotic microbial physiology will be discussed primarily from a biochemical standpoint with emphasis on mechanism. Topics will vary from year to year but will include the following themes: Central metabolism, bioenergetics, biosynthesis, regulation, differentiation, prokaryotic structure-function relationships. **Prerequisite:** BIBC 100 or BIBC 102 or equivalent.

BIMM 132. Molecular Biology of Human Retroviruses (4)

Replication cycle and gene regulation of HIV. Molecular approaches to therapy and vaccines. Three hours of lecture. **Prerequisite:** BIMM 100.

BIMM 134. Biology of Cancer (4)

This course covers basic processes of transformation and tumor formation in a two-part format. The first section is focused on molecular and cellular mechanisms of carcinogenesis. The second section discusses tumor pathology and metastasis. Open to upper-division students only. **Prerequisites:** BICD 110 and BIMM 100.

BIMM 150. Post-Genomics Biology (2)

This course will focus on large-scale analysis of post-genomics biological systems. Students will be introduced to methods for analyzing changes in gene expression, identifying protein-protein interactions, screening for pathway inhibitors, characterizing multiprotein complexes, and probing protein localization and function. **Prerequisite:** consent of instructor.

BIMM 162. 3D Electron Microscopy of Macromolecules (4)

Biological macromolecules and supramolecular complexes as well as organelles, and small cells are being examined in three-dimensions by modern electron cryomicroscopy and image reconstruction techniques. The basic principles of transmission electron microscopy and 3D image reconstruction are discussed. **Prerequisites:** Physics 1A and 1B and 1C or Physics 2A and 2B and 2D.

BIMM 164. Structural Biology of Viruses (4)

An introduction to virus structures, how they are determined, and how they facilitate the various stages of the viral life cycle from host recognition and entry to replication, assembly, release, and transmission to uninfected host cells. **Prerequisites:** BIBC 100 or Chem. 114A; upper-division standing.

BIMM 166. Environmental and Molecular Toxicology (4)

(Cross-listed with CHEM 166; conjoined with BGGN 256, BIOM 266, and CHEM 266.) This course will investigate approaches to study the impact of environmental toxicants on human health. Other modern approaches that are being implemented to detect and remediate environmental toxicants will also be examined. Graduate students will be required to complete an additional paper and/or exam beyond that expected of undergraduate students. **Prerequisites:** upper-division standing for BIMM 166 and CHEM 166; graduate standing for BGGN 256, BIOM 266, and CHEM 266.

BIMM 171. Genomics Research Initiative (1)

This class will examine the theoretical and practical basis of modern genomics research. Students will learn the theoretical basis of genomics and tools used for the sequencing and annotation of genomic DNA, and computational and molecular methods for the study of evolution. **Prerequisite:** departmental approval required (department will preauthorize students to enroll). Restricted to students participating in the National Genomics Research Initiative Program.

BIMM 171A. Genomics Research Initiative Laboratory I (4)

Students will isolate bacterial viruses or other organisms from the environment and characterize them by methods including electron microscopy and nucleic acid analysis. The genomic DNA will be purified, and sent for sequencing. **Prerequisites:** departmental approval required. Restricted to students participating in the National Genomics Research Initiative Program.

BIMM 171B. Genomics Research Initiative Laboratory II (4)

Students will characterize the genomic sequence of the organisms isolated in BIMM 171A and use molecular and computational tools to resolve ambiguities and close gaps. They will then annotate the DNA sequence to identify protein and RNA coding regions. **Prerequisites:** BIMM 171 and BIMM 171A.

BIMM 171C. Genomics Research Initiative Laboratory III (4)

Computational methods will be used to characterize the annotated genome sequence produced in BIMM 171A-B to study the evolution of genes and their products. Various mechanisms shaping genome evolution will be discussed and the genome evaluated for evidence of these processes. **Prerequisites:** BIMM 171, BIMM 171A, and BIMM 171B.

BIMM 173. Undergraduate Research Explorations in Genomics (2)

Analyzing *Drosophila* dot chromosome sequences and making comparisons among species to discern patterns of genome organization related to control of gene expression. Computer analysis of finished sequence data, annotation of genes, assessment of repeats, exploration of evolutionary questions. **Prerequisites:** BIMM 100, upper-division standing, department authorization.

BIMM 181. Molecular Sequence Analysis (4)

This course covers the analysis of nucleic acid and protein sequences, with an emphasis on the application of algorithms to biological problems. Topics include sequence alignments, database searching, comparative genomics, and phylogenetic and clustering analyses. Pairwise alignment, multiple alignment, DNA sequencing, scoring functions, fast database search, comparative genomics, clustering, phylogenetic trees, gene finding/DNA statistics. This course open to bioinformatics majors only. **Prerequisites:** CSE 100 or Math. 176, CSE 101 or Math. 188, BIMM 100 or Chem. 114C.

BIMM 182. Biological Databases (4)

This course provides an introduction to the features of biological data, how that data are organized efficiently in databases, and how existing data resources can be utilized to solve a variety of biological problems. Object-oriented databases, data modeling and description, survey of current biological database with respect to above, implementation of database focused on a biological topic. This course open to bioinformatics majors only. **Prerequisite:** CSE 100 or Math 176.

BIMM 184. Computational Molecular Biology (4)

This advanced course covers the application of machine learning and modeling techniques to biological systems. Topics include gene structure, recognition of DNA and protein sequence patterns, classification, and protein structure prediction. Pattern discovery, hidden Markov models/support vector machines/ neural network/profiles, protein structure prediction, functional characterization of proteins, functional genomics/proteomics, metabolic pathways/gene networks. This course open to bioinformatics majors only. **Prerequisites:** BIMM 181 or BENG 181 or CSE 181, BIMM 182 or BENG 182 or CSE 182 or Chem. 182. Bioinformatics majors only.

BIMM 185. Bioinformatics Laboratory (Advanced) (4)

This course emphasizes the hands-on application of bioinformatics methods to biological problems. Students will gain experience in the application of existing software, as well as in combining approaches to answer specific biological questions. Sequence alignment, fast database search, profiles and motifs, comparative genomics, gene finding, phylogenetic trees, protein structure, functional characterization of proteins, expression analysis, computational proteomics. This course open to bioinformatics

majors only. **Prerequisite:** two courses out of BIMM 181 or BENG 181 or CSE 181, BIMM 182 or BENG 182 or CSE 182, BENG 183, BIMM 184 or BENG 184 or CSE 184. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

PHYSIOLOGY AND NEUROSCIENCE

BIPN 100. Mammalian Physiology I (4)

This course introduces the concepts of physiological regulation, controlled and integrated by the nervous and endocrine systems. It then examines the muscular, cardiovascular, and renal systems in detail and considers their control through the interaction of nervous activity and hormones. Three hours of lecture and one hour of discussion. **Prerequisites:** BILD 1; BILD 2.

BIPN 102. Mammalian Physiology II (4)

This course completes a survey of organ systems begun in BIPN 100 by considering the respiratory and gastrointestinal systems. Consideration is given to interactions of these systems in weight and temperature regulation, exercise physiology, stress, and pregnancy and reproduction. Three hours of lecture and one hour of section per week. **Prerequisite:** BIPN 100; BIBC 102 may be taken concurrently.

BIPN 105. Animal Physiology Lab (6)

Experiments are performed on membrane physiology; nerve muscle function; cardiovascular physiology; respiratory, gastrointestinal and renal physiology. Subjects include experimental animals and humans. **Prerequisite:** BIPN 100 (may be taken concurrently). Three hours of lecture and ten hours of laboratory each week. In addition to the formal lab hours, there will be at least eight hours in which students will be required to work in the class laboratory to complete experiments and prepare for presentations. Attendance at the first lecture/lab is required. Nonattendance will result in the student's being dropped from the course roster.

BIPN 106. Comparative Physiology (4)

This course examines the physiological adaptation of animals, invertebrates and vertebrates, to their particular environmental and behavioral niches. Structural, functional, and molecular adaptations of the basic organ systems are discussed. **Prerequisites:** BILD 2, Chem. 6A-B-C. BILD 3 is recommended.

BIPN 108. Physiology of Exercise (4)

Course addresses the human body's response to exercise, addressing energy metabolism and the effects of both acute and chronic exercise on function in several important organ systems. Designing training regimes and the role of exercise in health will be considered. **Prerequisite:** BIPN 100 required; BIPN 102 and BIBC 102 recommended.

BIPN 110. Organ Systems and Disease (4)

Course will offer in-depth instruction to human anatomy and diseases from the conceptual framework of organ systems. Central nervous system, cardiovascular system, and gastrointestinal system will be discussed in terms of normal anatomy, pathology, and relevant scientific frontiers. **Prerequisite:** BIPN 100.

BIPN 140. Cellular Neurobiology (4)

This course covers the biophysics of the resting and active membranes of nerve cells. It also covers the mechanisms of sensory transduction and neuromodulation, as well as the molecular basis of nerve cell function. **Prerequisites:** BILD 1, 2; BIBC 100 or 102 recommended.

BIPN 142. Systems Neurobiology (4)

This course covers integrated networks of nerve cells, including simple circuits like those involved in spinal reflexes. We will study how information and motor output is integrated and processed in the brain. We will also discuss higher-level neural processing. **Prerequisites:** BILD 1, 2, and BIBC 100 or 102.

BIPN 144. Developmental Neurobiology (4)

Molecular basis of neuronal cell fate determination, axon pathfinding, synaptogenesis experience-based refinement of connections, and learning in the brain will be examined. **Prerequisite:** upper-division standing.

BIPN 145. Neurobiology Laboratory (6)

Basic principles of nerve and muscle physiology will be taught through weekly exercises and individual projects. One hour of lecture and nine hours of laboratory each week. **Prerequisite:** BIPN 140. Attendance at the first lecture/lab is required. Nonattendance will result in the student being dropped from the course roster.

BIPN 146. Computational Neurobiology (4)

An exploration of computational brain models, including biophysical models of single neurons, small neural circuits, and larger scale network models. **Prerequisite:** BILD 12 or BIPN 140 or Psych. 106 or Cog. Sci. 107 recommended.

BIPN 148. Cellular Basis of Learning and Memory (4)

Cellular and molecular mechanisms that underlie learning and memory. Synapse formation and synaptic plasticity, neurotransmitter systems and their receptors, mechanisms of synaptic modification, and effect of experience on neuronal connectivity, and gene expression. **Prerequisites:** BILD 1; BILD 2; BIBC 100 or BIBC 102 (may be taken concurrently).

BIPN 150. Diseases of the Nervous System (4)

Course will be taught from a research perspective, highlighting the biological pathways impacted by different neurological diseases. Each disease covered will be used to illustrate a key molecular/cellular pathway involved in proper neurological function. **Prerequisites:** BIBC 102 and BILD 100; BIPN 140 may be taken concurrently.

SPECIAL COURSES

BISP 190. Advanced Biology Seminars for Seniors (2)

Experts in diverse areas of biology from major universities in the U.S. and abroad will describe current research activities being conducted in their laboratories. Relevant readings will be assigned. P/NP grades only. **Prerequisites:** seniors only; concurrent enrollment in BISP 199 or consent of instructor.

BISP 192. Senior Seminar in Biology (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in biology (at the upper-division level). Topics will vary from quarter to quarter. Senior Seminars may be taken for credit up to four times, with a change in topic and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** upper-division standing; department stamp and/or consent of instructor.

BISP 194. Advanced Topics in Modern Biology (2)

Course will vary in title and content. When offered, the current description and title are found in the Schedule of Classes and the Biological Sciences Web site. Can be taken a total of four times as topics vary. Students may not receive credit for the same topic. **Prerequisites:** BIBC 102; BILD 100; upper-division standing.

BISP 195. Introduction to Teaching in Biology (4)

Introduction to the teaching of the basic course in biology. A student under the direction of the instructor of the course is assigned one class section and will meet one time per week with the section. A student is required to attend the course lecture, lead a discussion section, and meet with the instructor of the course at least one time per week. Limited to upper-division students who have a B average or higher. Three hours' lecture. (P/NP grades only.) **Prerequisites:** consent of instructor and approval of department chair. (Note: Applications for a BISP 195 are to be submitted to the Division of Biological Sciences by the end of the sixth week of the quarter preceding the quarter in which the BISP 195 will be completed.) This course may be counted as one of the upper-division electives for a biology major.

BISP 196. Honors Thesis in Biology (4)

Senior thesis research program. Research is conducted under the supervision of a biology faculty member. This one-year program is taken in addition to the major requirements for graduation. Upon satisfactory completion of the program, students will receive "Distinction in Biology" on their transcripts. **Prerequisites:** senior standing, 3.7 GPA or above; prior selection for the program by a faculty member and approval by program coordinator. A department stamp will be used to monitor during registration.

BISP 197. Biology Internship Program (4)

Under the joint supervision of a biology faculty advisor and a selected industry mentor, the student will conduct independent research on a problem in an industrial biotech laboratory. The student will gain insight into industry research and practical biotech experience. **Prerequisites:** BIBC 103 or BIMM 101, BIBC 102, BICD 100, BIMM 100, overall GPA 3.0, and consent of the biology faculty coordinator.

BISP 199. Individual Research for Undergraduates (2 or 4)

Individual research on a problem by special arrangement with a faculty member. Projects are expected to involve primary, experimental approaches that augment training in basic biology and that echo the curricular focus of the Division of Biological Sciences. (P/NP grades only.) **Prerequisites:** Students must have an overall UCSD GPA of at least 3.0, a minimum of ninety units complete, and approval by division chair. Students must complete a "Special Studies" form and a Division of Biological Sciences "Research Plan." (Note: Applications for a BISP 199 must be submitted to the Division of Biological Sciences prior to the eighth week of the quarter preceding the quarter in which the BISP 199 will be completed.) This course may be counted as one of the upper-division electives for a biology major, providing that no other special studies courses have already been counted toward the major. May be taken for credit three times.

GRADUATE

BGGN 200. Graduate School Fundamentals: Introduction to Graduate Studies in the Division of Biological Sciences (2)

Course will cover fundamental issues in academia, including campus resources, research design, ethical issues in research, scientific publishing and review, grant preparation, etc. Required of all first year Ph.D. students in the Division of Biological Sciences. **Prerequisites:** graduate (Ph.D.) standing only; for students in the following major code B177, or consent of instructor. (S/U grades only.) (F)

BGGN 204. Topics in Community and Population Ecology (3)

This course teaches a different topic each quarter on the theoretical or conceptual side of community and population ecology. Students will read materials in depth, attend weekly discussions, and explore theories and models with statistical, analytical, and algorithmic tools of the trade. **Prerequisite:** graduate standing or consent of instructor. (S/U grades only.) (Quarter offered varies and course is not offered every year.)

BGGN 205. Communicating Science to the Public (2)

Learn effective ways of communicating science to non-scientists. Develop an understanding of how people's views of science and background knowledge can influence their learning, and develop methods to tailor communication for different audiences. (Quarter offered varies, and course is not offered every year.)

BGGN 206. Topics in Biophysics and Physical Biochemistry (4)

Selection of topics of current interest. Examples: primary processes of photosynthesis; membrane biophysics; applications of physical methods to problems in biology and chemistry, e.g., magnetic resonance, X-ray diffraction, fluctuation spectroscopy, optical techniques (fluorescence, optical rotary dispersion, circular dichroism). Topics may vary from year to year. **Prerequisite:** consent of instructor. (S/U grades permitted.) This course is cross-listed with Physics 206 and Chemistry 206. (Quarter offered varies, and course is not offered every year.)

BGGN 208. Biological Sciences Graduate Boot Camp (4)

Intensive lecture-, seminar-, and laboratory-based course for incoming first year students in the biological sciences Ph.D. program. Topics covered: evolution and quantitative biology, including biostatistics, image analysis, bioinformatics, genomics, evolution, analysis of DNA proteins. During the first two weeks in September, students commit to ten to fifteen hours per day. **Prerequisites:** graduate

(Ph.D.) standing only; for students in the following major code BI77 (S/U grades only.) (F)

BGGN 210. Neurobiology Boot Camp (4)

For incoming doctoral students in Neurobiology, Computational Neurobiology, and Neurosciences. During first two weeks in September, students commit to ten to fifteen hours per day in lectures and laboratories in electrophysiology, cellular anatomy, molecular biology, optical imaging, and computational neurobiology. Students also attend weekly seminars during fall quarter. **Prerequisite:** graduate standing; major codes BI77, BI79, NE75. (F)

BGGN 212. Special Topics in Microbiology (3)

Recent developments in prokaryotic and eukaryotic microbial research. Topics vary from year to year but may include the following subjects: the molecular basis of (a) sex determination, expression, and interconversion; (b) differentiation, morphogenesis, and programmed death; (c) transcriptional and metabolic regulation; and (d) chemical macromolecular and energy-mediated reception, transmission, and response processes. The main thesis of the course is that examples of complex regulatory phenomena in higher organisms can be found in single celled organisms. This course is open to enrollment by undergraduates. **Prerequisites:** BIBC 102 and BICD 100. (S/U grades permitted.) (Quarter offered varies, and course is not offered every year.)

BGGN 213. Topics in Conservation Biology (3)

Provides in depth coverage of topics in population genetics and ecology, community ecology, biogeography, human ecology, and ecosystem management relevant to conservation biology. Topics vary from year to year and have included pedigree analysis, inbreeding depression, minimum viable population size, problems of overabundance, fragmented populations, key-stone species, in-situ and ex-situ conservation techniques. One two-hour meeting weekly. **Prerequisite:** graduate standing or consent of instructor. (S/U/ grades only) (S)

BGGN 215. Phylogenetics (3)

This course provides the theoretical and practical basis of phylogenetic analysis (the estimation of phylogenetic trees). Students will understand the assumptions made in phylogenetic analyses, be able to identify the strengths and weaknesses of various methods, and perform a phylogenetic analysis on DNA sequence data. **Prerequisite:** one semester of calculus is recommended. (S)

BGGN 218. Post-Genomics Biology (2)

This course will focus on large-scale analysis of post-genomics biological systems. Students will be introduced to methods for analyzing changes in gene expression, identifying protein-protein interactions, screening for pathway inhibitors, characterizing multiprotein complexes, and probing protein localization and function.

BGGN 219. Classic Papers in Genetics (3)

The course explores, through classic papers, how genetic approaches in the distant and near past have opened up novel areas of biology. The goal of the course is to teach students the type of approach that allowed these researchers to break out of old paradigms and form new ones of their own based on genetic pathfinding. (W)

BGGN 220. Graduate Molecular Biology (6)

Provides a broad, advanced-level coverage of modern molecular biology for first-year graduate students. Topics include prokaryotic and eukaryotic gene structure and regulation, chromatin structure, DNA replication, translation, mechanisms of transcription, and an introduction to viruses. OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (F)

BGGN 221. Graduate Protein Biochemistry (4)

Topics include general aspects of protein structure and biochemical approaches to the isolation and study of proteins. This course also covers the relationship between the structure and function of selected proteins. Detailed discussion of modern biophysical methods to study protein-protein interactions will be included. BGGN 220 is a co-requisite. OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) Corequisite: BGGN 220. (F)

BGGN 222. Graduate Cell Biology (6)

A coverage of modern cell biology for first year graduate students. There is an up-to-date discussion of topics such as: structure and function of membranes; ion pumps, ion channels, transmembrane signalling; receptor mediated endocytosis; protein targeting; the role of RER and Golgi apparatus; the biosynthesis of intracellular organelles in animal and plant cells; the cytoskeleton, motility, molecular motors, cell-cell interactions, mitosis; and the control of cell division. Also included are extensive coverage of cell signalling mechanisms and discussions on molecular approaches to cell biology. **Prerequisites:** BGGN 220 and 221. OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (W)

BGGN 223. Graduate Genetics (6)

Provides a broad and extensive advanced-level coverage of molecular and formal aspects of genetics for first-year graduate students. Topics covered include: bacterial genetics, recombination in prokaryotes and eukaryotes, mammalian somatic-cell genetics, developmental genetics, sex determination, dosage compensation, and immunogenetics. Extensive coverage of the use of model systems like *Drosophila* and *C. elegans* is included. General and specific aspects of cellular signalling mechanisms will be covered. **Prerequisites:** BGGN 220, 221 and 222. OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (S)

BGGN 224. Graduate Neurobiology (4)

Course covers modern molecular, cellular, developmental, and physiological aspects of neurobiology. Extensive discussion of original research articles will be included. **Prerequisites:** BGGN 220 and 221. OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (F)

BGGN 225. Graduate Immunology (4)

The course is devoted to immunology and is organized as a combined lecture-tutorial course stressing classical as well as current literature. Each week will compose an independent section. Topics will include cellular interactions involved in the immune response and the molecular biology unique to lymphoid factor and receptors. **Prerequisites:** BGGN 220 and 221. OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (S)

BGGN 226. Graduate Animal Virology (4)

This course consists of a review of fundamental concepts together with an in-depth analysis of the structure, genetics, multiplication and oncogenicity of animal viruses. Particular emphasis will be given to the DNA and RNA tumor viruses. The format of this section includes lectures and discussion of selected papers. **Prerequisites:** BGGN 220 and 221. OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (W)

BGGN 227. Graduate Topics in Plant Biology (4)

This course covers advanced topics in plant biology in the areas of molecular genetic developmental, and physiological biology. We will discuss plant-microbe interactions, transposable elements, protein trafficking, ion transport, and organ development. The format of this section includes lectures and discussion of selected papers. **Prerequisites:** BGGN 220, 221, and 222. OPEN ONLY TO STUDENTS ENROLLED IN A GRADUATE DEGREE PROGRAM. (Letter grades only.) (W)

BGGN 228. Graduate Developmental Biology (4)

This course covers graduate level lectures on developmental biology, emphasizing the use of genetically tractable model systems. Discussion of recent research articles is an integral aspect of this course. Students are introduced to classical experiments and given detailed coverage of recent fundamental findings in developmental biology. **Prerequisites:** BGGN 220 and 221. (Letter grades only.) (S)

BGGN 229. Graduate Oncogenes (4)

This course provides detailed coverage of the cellular and molecular basis of cellular transformation and oncogenesis. There will be extensive discussion on the role of oncogenes and their cellular counterparts. The course also provides in-depth analysis of intracellular signal transduction mechanisms. **Prerequisites:** BGGN 220, 221, and 222. (Letter grades only.) (S)

BGGN 230. Graduate Signal Transduction (4)

The course will introduce students to a variety of signal transduction pathways and their function in the regulation of cellular processes. Special emphasis will be given to signaling cascades regulating immunological responses and alterations of signaling pathways during oncogenesis. (W)

BGGN 231. Current Concepts in Stem Cell Biology (4)

Research papers from all aspects of stem cell biology will be read, presented, and discussed. Papers will range from landmark to current studies, spanning many developmental organisms and cell types. Students will present one paper, provide relevant background, and lead discussions. **Prerequisite:** graduate standing or consent of instructor. (F)

BGGN 233. Cellular Immunology (3)

This course covers the molecular and cellular events in the humoral and cellular response to antigen, transplantation biology, the structure and function of the major histocompatibility gene complex, the T-cell receptor, lymphokines, and the induction of immunological tolerance. It serves as the second course in a two-part sequence. May be taken by undergraduates who have taken Part 1 (BICD 140) and by graduate students (S/U grades only.) (Quarter offered varies and course is not offered every year.)

BGGN 235. Biology and Biochemistry of Cancer Cells (2)

This course covers recent advances in cell biology, biochemistry, immunology, and virology as they relate to cancer cells and their interaction with the host. Cancer research specialists from outside will be brought in to discuss the most recent evidence and interpretations in key areas of cancer research. This course meets two hours per week for lecture and discussion. It will be at an advanced graduate level but open to a limited number of seniors (with permission of instructor) on a P/NP basis. (S/U grades only.) (Quarter offered varies, and course is not offered every year.)

BGGN 238A. Integrative Microbiology I (4)

To introduce students with structural and functional properties of microorganisms and with the role of microbes in the world. Course will emphasize the integrative aspects of microbiology. First course in series. **Prerequisite:** graduate standing.

BGGN 238B. Integrative Microbiology II (4)

To introduce students with structural and functional properties of microorganisms and with the role of microbes in the world. Course will emphasize the integrative aspects of microbiology. Second course in series. **Prerequisite:** graduate standing.

BGGN 240. Cellular Neurobiology (2)

Students read classic and modern papers that form the basis of the undergraduate lectures (BIPN 240), which they are encouraged to attend. These papers are presented by the students at weekly discussion sessions. **Prerequisite:** consent of instructor. (S/U grades only.) (F)

BGGN 241. Neurobiology Seminar (3)

Presentation of current research by local and visiting neurobiologists. (S/U grades only.)

BGGN 242. Graduate Cancer Biology (3)

Research-oriented approach to oncology topics and problems with an emphasis on interactions between tumor and the immune system. Prerequisite: graduate standing.

BGGN 243. Systems Neurophysiology (3)

Ways in which neurons are assembled into circuits to achieve perception and patterned movement. **Prerequisite:** graduate standing or consent of instructor. (S/U grades only.)

BGGN 246A-B. Computational Neurobiology (2-2)

Students read classic and modern papers that form the basis of the undergraduate lectures (BIPN 146), which they are encouraged to attend. Students present these papers at weekly discussion sessions. The focus of 246A is cellular neuronal properties and the focus of 246B is properties of neuronal systems. **Prerequisite:** graduate standing or consent of instructor. (S/U grades only.)

BGGN 248. Molecular Mechanisms of Neural Development (4)

This course will cover the cellular and molecular basis of neural development. Focus is on primary research papers and topics include neural induction and neurogenesis, cell patterning, neuronal and glial differentiation, neuronal migration, axon pathfinding, synaptogenesis, neuronal cell death, regeneration, activity-dependent events, topographic maps, invertebrate and vertebrate model systems. **Prerequisites:** graduate standing or consent of instructor.

BGGN 249B-C. Basic Neuroscience (4-4)

These courses are designed for graduate students in the neurosciences and other departments that are part of the interdisciplinary program (i.e., Biology, Cog. SCI). These courses have been designed to cover as much basic neuroscience as possible in three quarters of study. They will combine two three-hour meetings each week with a 1.5 hour lecture and a 1.5 hour discussion of papers. These are required courses for all first-year neurosciences graduate students. **Prerequisite:** graduate standing or consent of instructor. (F,W,S)

BGGN 251. Molecular Biology (3)

The first section of this course consists of a review of fundamental concepts in molecular biology together with an in-depth analysis of molecular biological topics of medical importance. The second section covers the structure, genetics, and multiplication of animal viruses, with particular emphasis on the DNA and RNA tumor viruses. Other subjects discussed include viral persistence, latency, and approaches to viral chemotherapy. Three hours of lecture. **Prerequisite:** biochemistry. (Not open to undergraduates.) (S/U grades only.) (F)

BGGN 252. Genetics (3)

Human genetics, with emphasis on basic principles. Topics covered include chromosome abnormalities, the mechanisms of dominant and recessive diseases, pedigree analysis, ascertainment of linkage, the interaction of genotype with diseases. Mechanisms of maintaining genetic diversity in human populations will be discussed along with recent approaches to genetic counseling and intervention. **Prerequisite:** consent of instructor. (Not open to undergraduates.) (S/U grades only.) (F)

BGGN 253. Immunology (3)

Graduate students will explore topics in specialized areas of immunochemistry and cellular immunology, antigenic and molecular structure of immunoglobulin molecules; antigen-antibody interactions; cellular events in the humoral and cellular immune responses; translation immunology. **Prerequisite:** consent of instructor. The course is similar in content to BICD 140 but is accelerated in pace. (S/U grades permitted.) This course is cross-listed with Chemistry 217.(F)

BGGN 254. Cell and Membrane Physiology (3)

This course is a survey covering current subjects in membrane biology relevant to medicine. Subjects are: 1) membrane isolation, composition, and structure; 2) consequences of membrane fluidity (mode of action of anesthetics, intercellular communication, eso- and endocytosis biogenesis); 3) sensory perception and response (chemo- and energy reception, cellular neurophysiology, muscle; physiology); 4) regulation of membrane function (hormone reception, intercellular adhesion, neoplastic transformation). **Prerequisites:** biochemistry and genetics. (S/U grades only.)

BGGN 260. Neurodynamics (4)

Introduction to the nonlinear dynamics of neurons and simple neural systems through nonlinear dynamics, bifurcation theory, and chaotic motions. The dynamics of single cells is considered at different levels of abstraction, e.g., biophysical and "reduced" models for analysis of regularly spiking and bursting cells, their dynamical properties, and their representation in phase space. Laboratory exercises will accompany the lectures. **Prerequisite:** graduate standing or consent of instructor.

BGGN 262. 3D Electron Microscopy Macromolecules (4)

Biological macromolecules and supramolecular complexes as well as organelles, and small cells are being examined in three dimensions by modern electron cryomicroscopy and image reconstruction techniques. The basic principles

of transmission electron microscopy and 3D image reconstruction are discussed. Chem. 265/BGGN 262 students will be required to complete an additional assignment/exam beyond that expected of students in Chem. 165/BIMM 162.

BGGN 266. Advanced Laboratory in Biophysical Techniques (6)

Experiments that emphasize biophysical principles through hands-on experience, with an emphasis on the blending of physical measurements with a clearly identified biological problem. Exercises include the use of optical tweezers to measure viscous forces at the level of cellular organelles, the characterization of sensorimotor control in the fly during visually guided flight, and the use of microscopic imaging techniques to characterize cell motility and organelle transport. Includes instruction in LabView. Students are encouraged to attend the Phys. 173 undergraduate lectures. **Prerequisite:** graduate standing or consent of instructor. Phys. 120A, BILD 1, and Chem. 6CL for undergraduates.

BGGN 269. Mathematics for Neurobiologists (6)

An intensive course to introduce the mathematical concepts and techniques used in modern neurobiology. Intended for beginning graduate students in the neurosciences, but is also available to advanced undergraduates, with the consent of the instructor. **Prerequisite:** graduate standing or consent of instructor.

BGGN 271. Advanced Experimental Methods in Biology (4-12)

Advanced laboratory and/or field experience in contemporary biological methodology. Open only to students enrolled in the integrated Bachelor's/Master's Degree Program. **Prerequisites:** consent of instructor and approval of division chair. (F,W,S) (Graduate students: letter grades only.)

BGGN 290. Advances in Cellular & Molecular Mechanisms

Students present and discuss papers on recent discoveries involving basic mechanistic research into biological phenomena. Papers are selected by instructors from visiting seminar speaker's research from the biological sciences and biochemistry seminar series. **Prerequisites:** graduate (Ph.D.) standing only; for students in the following major code B177, or consent of instructor. (S/U grades only.)

BGGN 292. Professional Pathways in Biological Sciences (1)

Students meet experienced science professionals from a wide variety of backgrounds, including academia, science industry, and allied roles. Through discussions with these professionals, students will refine and improve their professional skills, including communication and presentation expertise, and develop a personal career action plan. **Prerequisites:** graduate (Ph.D.) standing only; for students in the following major code B177; or consent of instructor. (S/U grades only.)

BGGN 297. Research Conference (1-3)

Group and individual discussion of research activities and of current literature. **Prerequisite:** graduate standing. (S/U grades only.) (F,W,S)

BGGN 298. Laboratory Projects in Biology (3-12)

An introduction to contemporary laboratory techniques and research interests through independent, original projects under the direction of individual faculty members. **Prerequisite:** consent of instructor. (Letter grades only) (F,W,S)

BGGN 299. Thesis Research in Biology (1-12)

(F,W,S)

BGGN 500. Apprentice Teaching (4)

This course involves participation in upper-division undergraduate teaching at the level of assuming responsibility for recitation sections or laboratories under the supervision of the responsible faculty member. Some experience in lecturing to upper-division classes will occasionally be provided. (S/U grades only.) (F,W,S)

BGJC 201. Journal Club in Cell Biology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. **Prerequisite:** none for graduate students. Undergraduates

must be seniors or enrolled in BISP 199. (S/U grades only.) (F,W,S)

BGJC 202. Journal Club in Developmental Biology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.) (Quarter offered is varies, and course is not offered every year.)

BGJC 203. Journal Club in HIV Molecular Biology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.) (F,W,S)

BGJC 204. Journal Club in Molecular and Cellular Immunology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.) (F,W,S)

BGJC 206. Journal Club in Microbial Physiology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.) (S)

BGJC 208. Journal Club in Plant Molecular Biology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.) (F,W,S)

BGJC 210. Journal Club in Cell Cycle Regulation (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.) (F,W,S)

BGJC 213. Journal Club in Computational Neurobiology (1)

Weekly presentations and discussions pertaining to research results reported in recently published literature. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.)

BGRD 203. Research Discussion in Development of Dictyostelium (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.)

BGRD 204. Molecular Biology of the Cell (1)

Research reports and discussions based on recent experimental results in cell biology, oncogenesis, genetics, molecular biology and development. Students are expected to present and discuss their own new data and the recent data of others. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.)

BGRD 205. Research Discussion in Plant Membrane Biology (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.)

BGRD 206. Research Discussion in Metals in Biology (1)

Presentations of new research results and discussions of closely related published reports. All students are expected to report on their own research findings each quarter. **Prerequisite:** none for graduate students. Undergraduates must be seniors or enrolled in BISP 199. (S/U grades only.)

Biomedical Sciences

PROFESSORS

Kim E. Barrett, Ph.D., *Medicine*
Timothy D. Bigby, M.D., *Clinical Medicine*
Roland C. Blantz, M.D., *Medicine*
Rolf Bodmer, Ph.D., *Pediatrics (Adjunct)*
Gerry R. Boss, M.D., *Medicine*
Philip Bourne, Ph.D., *Pharmacology*
Joan Heller Brown, Ph.D., *Pharmacology (Chair)*
Laurence L. Brunton, Ph.D., *Pharmacology/Medicine*
Nigel Calcutt, Ph.D., *Pathology*
John M. Carethers, M.D., *Medicine*
Dennis A. Carson, M.D., *Medicine*
Webster K. Cavenee, Ph.D., *Medicine*
Ju Chen, Ph.D., *Medicine*
Shu Chien, M.D., Ph.D., *Bioengineering/Medicine*
Mario Chojkier, M.D., *Medicine (In-Residence)*
Jerold J. M. Chun, Ph.D., *Pharmacology (Adjunct)*
Don W. Cleveland, Ph.D., *Medicine*
James W. Covell, M.D., *Medicine (Emeritus)*
Antonio De Maio, Ph.D., *Surgery*
Edward Dennis, Ph.D., *Pharmacology/Chemistry and Biochemistry*
Jack E. Dixon, Ph.D., *Pharmacology/Cellular and Molecular Medicine/Chemistry and Biochemistry (Dean, Scientific Affairs)*
Daniel Donoghue, Ph.D., *Chemistry and Biochemistry*
Steven F. Dowdy, M.D., *Cellular and Molecular Medicine*
Mark H. Ellisman, Ph.D., *Neurosciences*
Scott D. Emr, Ph.D., *Cellular and Molecular Medicine*
Gregory F. Erickson, Ph.D., *Reproductive Medicine (Emeritus)*
Jeffrey Esko, Ph.D., *Cellular and Molecular Medicine*
Ronald M. Evans, Ph.D., *Biology (Adjunct)*
Sylvia Evans, Ph.D., *Pharmacy/Pharmacology*
Marilyn G. Farquhar, Ph.D., *Cellular and Molecular Medicine (Chair)*
James R. Feramisco, Ph.D., *Medicine/Pharmacology*
Hudson Freeze, Ph.D., *Medicine (Adjunct)*
Theodore Friedmann, M.D., *Pediatrics*
Xiang-Dong Fu, Ph.D., *Cellular and Molecular Medicine*
Gen-Sheng Feng, Ph.D., *Pathology (Adjunct)*
Susan Ferro-Novick, Ph.D., *Cellular and Molecular Medicine*
Minoru Fukuda, Ph.D., *Pathology (Adjunct)*
Richard Gallo, M.D., Ph.D., *Medicine*
William Gerwick, Ph.D., *Pharmacy*
Fran Gillin, Ph.D., *Pathology*
Mark Ginsberg, M.D., *Medicine*
Christopher K. Glass, M.D., Ph.D., *Cellular and Molecular Medicine/Medicine*
Lawrence S. B. Goldstein, Ph.D., *Cellular and Molecular Medicine*
Steven Gonias, M.D., Ph.D., *Pathology (Chair)*
Kun-Liang Guan, Ph.D., *Pharmacology*
John C. Guatelli, Ph.D., *Medicine*
Gabriel Haddad, M.D., *Pediatrics (Chair)/Neurosciences*
Tracy Handel, Ph.D., *Pharmacy*
Stephen Hedrick, Ph.D., *Cellular and Molecular Medicine*

Michael C. Hogan, Ph.D., *Medicine (Adjunct)*
Vivian Hook, Ph.D., *Pharmacology*
Stephen B. Howell, M.D., *Medicine*
Ziwei Huang, Ph.D., *Pathology (Adjunct)*
Paul A. Insel, M.D., *Pharmacology/Medicine*
Yishi Jin, Ph.D., *Cellular and Molecular Medicine/Biological Sciences*
Martin F. Kagnoff, M.D., *Medicine*
Mark Kamps, Ph.D., *Pathology*
Michael Karin, Ph.D., *Pharmacology*
Kenneth Kaushansky, M.D., *Medicine (Chair)*
John Kelsoe, M.D., *Psychiatry*
Thomas J. Kipps, M.D., Ph.D., *Medicine*
Richard Klemke, Ph.D., *Pathology*
Richard Kolodner, Ph.D., *Medicine*
Elizabeth A. Komives, Ph.D., *Chemistry and Biochemistry*
Ronald Kuczynski, Ph.D., *Psychiatry (In-Residence)*
Hyam L. Leffert, M.D., *Pharmacology*
Fred Levine, M.D., Ph.D., *Pediatrics (In-Residence)*
Richard Lieber, Ph.D., *Orthopaedics*
Stuart Lipton, M.D., Ph.D., *Neurosciences (Adjunct)*
Martin Marsala, M.D., *Anesthesiology*
Jamey D. Marth, Ph.D., *Cellular and Molecular Medicine*
James Andrew McCammon, Ph.D., *Chemistry and Biochemistry/Pharmacology*
Pamela L. Mellon, Ph.D., *Reproductive Medicine/Neurosciences*
Mark Mercola, Ph.D., *Pathology (Adjunct)*
Andrew Mizisin, Ph.D., *Pathology*
Marc Montminy, M.D., Ph.D., *Biological Sciences (Adjunct)*
Alexandra Newton, Ph.D., *Pharmacology*
Sanjay Nigam, M.D., *Cellular and Molecular Medicine/Pediatrics*
Victor Nizet, Ph.D., *Pediatrics*
Peter Novick, Ph.D., *Cellular and Molecular Medicine*
Daniel T. O'Connor, M.D., *Medicine (In-Residence)*
Jerrod M. Olefsky, M.D., *Medicine*
Robert Oshima, Ph.D., *Pathology (Adjunct)*
Ana Pajor, Ph.D., *Pharmacy*
Maurizio Pellecchia, Ph.D., *Pathology (Adjunct)*
Manuel Perucho, Ph.D., *Pathology (Adjunct)*
Renate B. Pilz, M.D., *Medicine (In-Residence)*
Frank L. Powell Jr., Ph.D., *Medicine*
Morton P. Printz, Ph.D., *Pharmacology*
Oswald Quehenberger, Ph.D., *Medicine (Adjunct)*
James Quigley, Ph.D., *Pathology (Adjunct)*
Eyal Raz, M.D., *Medicine (In-Residence)*
John Reed, M.D., Ph.D., *Pathology (Adjunct)*
Douglas D. Richman, M.D., *Pathology/Medicine (In-Residence)*
Ze'ev Ronai, Ph.D., *Pathology (Adjunct)*
Michael G. Rosenfeld, M.D., *Medicine*
Robert Ross, M.D., *Medicine (In-Residence)*
Guy Salvesen, Ph.D., *Pathology (Adjunct)*
David Schlaepfer, Ph.D., *Reproductive Medicine*
Sanford Shattil, M.D., *Medicine*
Geert Schmid-Schoenbein, Ph.D., *Bioengineering*
Nicholas Schork, M.D., *Psychiatry*
Shunichi Shimasaki, Ph.D., *Reproductive Medicine*
Aleem Siddiqui, Ph.D., *Medicine*
Gregg J. Silverman, M.D., *Medicine (In-Residence)*
Deborah Spector, Ph.D., *Cellular and Molecular Medicine*
Stephen A. Spector, M.D., *Pediatrics*
Charles F. Stevens, Ph.D., *Pharmacology (Adjunct)*

Palmer W. Taylor, Ph.D., *Pharmacy and Pharmaceutical Sciences (Dean)*
Susan S. Taylor, Ph.D., *Chemistry and Biochemistry*
Lynn F. TenEyck, Ph.D., *Pharmacology (Adjunct)*
Alexey Tersikh, Ph.D., *Pediatrics (Adjunct)*
Roger Y. Tsien, Ph.D., *Pharmacology/Chemistry and Biochemistry*
Robert H. Tukey, Ph.D., *Pharmacology/Chemistry and Biochemistry*
Eric Turner, M.D., Ph.D., *Psychiatry*
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Judith A. Varner, Ph.D., *Medicine (Professor-in-Residence)*
Francisco Villarreal, M.D., Ph.D., *Medicine (Adjunct)*
Joseph Vinetz, Ph.D., *Medicine*
Peter D. Wagner, M.D., *Medicine*
Jean Wang, Ph.D., *Medicine*
Nicholas J.G. Webster, Ph.D., *Medicine (In-Residence)*
John B. West, M.D., Ph.D., *Medicine*
Joseph L. Witzum, M.D., *Medicine*
Virgil L. Woods, Jr., M.D., Ph.D., *Medicine*
Tony L. Yaksh, Ph.D., *Anesthesiology/Pharmacology*
Jason X. Yuan, M.D., Ph.D., *Medicine*
Maurizio Zanetti, M.D., *Medicine (In-Residence)*
Dong-Er Zhang, Ph.D., *Pathology/Biological Sciences*
Kang Zhang, M.D., Ph.D., *Ophthalmology*

ASSOCIATE PROFESSORS

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Radha Ayyagari, Ph.D., *Radiology/Ophthalmology*
Nazneen Dewji, Ph.D., *Medicine (Adjunct)*
Frank Furnari, Ph.D., *Medicine (Associate Adjunct)*
Joseph G. Gleeson, M.D., *Neurosciences*
Bruce Hamilton, Ph.D., *Medicine*
Mark Lawson, Ph.D., *Reproductive Medicine (In-Residence)*
Robert Naviaux, M.D., Ph.D. *Radiology/Medicine*
Elena Pasquale, Ph.D., *Pathology (Adjunct)*
Bing Ren, Ph.D., *Cellular and Molecular Medicine*
Maïke Sander, M.D., *Pediatrics*
Evan Snyder, M.D., Ph.D., *Pediatrics (Associate Physician)*
Bruce Torbett, Ph.D., *Pathology (Adjunct)*
JoAnn Trejo, Ph.D., *Pharmacology*

ASSISTANT PROFESSORS

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Jack Bui, M.D., Ph.D., *Pathology*
Steven Chessler, M.D., Ph.D., *Medicine*
Shane Crotty, Ph.D., *Medicine (Assistant Adjunct)*
Arshad Desai, Ph.D., *Cellular and Molecular Medicine*
Pieter Dorrestein, Ph.D., *Pharmacy, Pharmacology and Chemistry and Biochemistry*
Adam Engler, Ph.D., *Bioengineering/UCSD Stem Cell Institute*
Seth Field, M.D., Ph.D., *Medicine*
Pradipta Ghosh, M.D., *Medicine*
Dorit Hanein, Ph.D., *Pathology (Adjunct)*
Alexander Kauffman, Ph.D., *Reproductive Medicine*
Jonathan Lin, M.D., Ph.D., *Pathology*
Karen Oegema, Ph.D., *Cellular and Molecular Medicine*
Alysson Muotri, Ph.D., *Pediatrics*
Dwayne Stupack, Ph.D., *Pathology (Assistant Adjunct)*
Lei Wang, Ph.D., *Biological Sciences (Assistant Adjunct)*
Jing Yang, Ph.D., *Pharmacology and Pediatrics*

Gene Yeo, Ph.D., *Cellular and Molecular Medicine*
Benjamin Yu, M.D., Ph.D., *Medicine and Dermatology*
(In-Residence)

Binhai Zheng, Ph.D., *Neurosciences*

Huilin Zhou, Ph.D., *Cellular and Molecular Medicine*

OFFICE: 5008 Basic Science Building, School of
Medicine

<http://biomedsci.ucsd.edu>

THE GRADUATE PROGRAM

The graduate program offered by the Group in Biomedical Sciences (BMS) is designed to lead to the Ph.D. students through a combination of didactic study, laboratory rotations, and thesis research in basic and translational biomedical sciences. Research opportunities in BMS span a wide spectrum of biological and medical sciences, permitting students the options of selecting molecular, cellular, organismal, and integrated systems approaches in their research projects. Students are encouraged to design and execute original and creative research in a self-critical and independent manner. Undergraduate preparation must include courses in mathematics (through calculus), chemistry (including organic, physical, and biochemistry), and preferably participation in research. Students whose undergraduate backgrounds are significantly different will be considered provided there is sufficient evidence of interest in cell and molecular biology, genetics, pathology, physiology, pharmacology, or other disciplines in biomedical sciences, and a strong commitment to enter a field of active research and academic excellence.

DOCTORAL DEGREE PROGRAM

During the first year, the students enroll in two core courses and specialized track courses in cell biology, molecular biology, pathology, pharmacology, physiology, genetics, and microbiology/immunology. In a required laboratory rotation program, students develop laboratory skills and the ability to formulate scientific hypotheses and become familiar with the research activities of the faculty. Students may differentiate into one of six advanced training tracks: genetics, microbiology/immunology, molecular cell biology, molecular pathology, molecular pharmacology, or physiology. Students can also associate with a number of focus groups in Cancer Biology, Stem Cell Biology, Developmental Biology, Bioinformatics, Neurobiology, Endocrinology, Glycobiology, and Structural-Chemical Biology. Required advanced courses and electives in subsequent years are chosen to develop students' interests and specialized knowledge in the thesis research area and chosen training tracks. BMS students are required to select their thesis advisors and begin their thesis research by the end of the first year in the program, the average matriculation time among BMS students is between five to six years. Besides course work and examinations, BMS students are required to assist in the teaching of undergraduate biology majors at UC San Diego for one academic quarter. The teaching requirement allows BMS students to learn and practice the skills of effective scientific communication, which is of critical importance to the career development of independent investigators in biomedical research.

The graduate program is interdepartmental and interdisciplinary; it includes faculty of the Departments of Cellular and Molecular Medicine, Medicine, Pathology, Pediatrics, Pharmacology, Neurosciences, Reproductive Medicine, Chemistry and Biochemistry, Biology, Bioengineering, Psychiatry, Orthopedics, Anesthesiology, the Moores UCSD Cancer Center, the Skaggs School of Pharmacy and Pharmaceutical Sciences, the Burnham Institute, and The Salk Institute.

The graduate program in biomedical sciences is also designed to educate physician-scientists through the School of Medicine's Medical Scientist Training Program, in conjunction with the School of Pharmacy and Pharmaceutical Sciences (SPPS). Students receive a Pharm.D./Ph.D. degree. Students already admitted to the School of Medicine and the SPPS are eligible for admission to the BMS program for Ph.D. training. Such students generally apply in the first or second year of their medical or pharmacy studies and enter graduate studies following completion of their second year of medical or pharmacy school. Normative time for M.D./Ph.D. or Pharm.D./Ph.D. students is seven years.

EXAMINATIONS

Students obtain letter grades in the core and track courses. Candidacy for the Ph.D. degree is granted following the successful completion of two research-oriented examinations. The first examination, the Research Proposition Exam, tests the student's preparation for his/her thesis research. Preparation for the Research Proposition Exam begins as soon as students join their thesis laboratories during the first summer quarter in the program. Students prepare a written research proposal and defend the proposal in an oral examination conducted by a program-approved exam committee. The second examination that determines the Advancement to Ph.D. candidacy takes place after the students finalize their thesis research plan, and should be completed by the end of the second summer quarter. Thereafter, the students' thesis research progress is reviewed annually by the thesis committee. The thesis committee also approves the final dissertation. After the preparation of the dissertation, a public oral defense of the thesis completes the requirement for the Ph.D. in biomedical sciences.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

200A. Molecules to Organisms: Concepts (6)

This course provides a systematic approach to current biomedical research, using analysis of selected topics to focus on the process of research discovery and its critical evaluation. The course progresses through five thematic modules that cover genes, building a cell, cellular responses, organogenesis, and the processes that allow survival in the world. **Prerequisite:** limited to BMS graduate students except by consent of instructor.

200B. Molecules to Organisms: Approaches (2)

Students will critically evaluate classic and current research papers in biomedical research, in addition to being exposed to state-of-the-art technologies in research. **Prerequisite:** limited to BMS graduate students except by consent of instructor.

201. Seminars in Biomedical Research (4)

This course includes attendance at seminars in the biomedical sciences and is designed to provoke critical discussion of the presented findings and scientific approaches in a small-group setting. **Prerequisite:** limited to BMS graduate students except by consent of instructor.

202. Carcinogenesis (3)

This elective will explore carcinogenesis at cellular, molecular, and etiological levels. Guided by faculty, students will research and present papers and principles underlying the biochemistry, genetic, biophysics, and computer-assisted aspects of several assigned topics. **Prerequisites:** Equivalent background in biology and chemistry. May be concurrent in biology, chemistry plus cell biology, biochemistry, molecular biology. Corequisites as above.

204. Evolution of Modern Concepts in Pharmacology (2)

This course details the evolution of modern principles of pharmacology from first evidences to the present level of knowledge. The course will be independent of but compliment general principles of pharmacology courses for medical and graduate students. **Prerequisite:** prior or concurrent Principles of Pharmacology, or equivalent course.

219. Ethics in Scientific Research (1)

Overview of ethical issues in scientific research, conflicts of interest; national, statewide and campus issues and requirement; ethical issues in publications; authorship; retention of research records; tracing of research records; attribution; plagiarism; copyright considerations; primary, archival and meeting summary publications; ethical procedures and policies; NIH, NSF, California and UCSD; case studies and precedents in ethics. **Prerequisite:** consent of instructor.

222. Essentials of Glycobiology (2)

Advanced elective for graduate/medical students who have had core courses in cell biology or biochemistry. Expert faculty will present a coordinated overview of the field of glycobiology, which explores the structure, synthesis, and functions of sugar chains in biological systems.

224. Topics in Cancer Research (2)

Each quarter will focus on an important area of cancer research such as immunology (fall), growth regulation (winter), and cancer genetics (spring). One-hour lecture coordinated with a one-hour seminar with the opportunity to meet with the invited speaker. **Prerequisites:** limited to senior undergraduates, graduate students, and medical students. (W, S)

226. Hormone Action (3)

The course covers recent advances in research into hormone action, molecular endocrinology, lipid, lipoprotein, and carbohydrate metabolism, and reproductive medicine. **Prerequisites:** BIOM 200, 201. Limited to BMS graduate students, except by consent of instructor.

228. Modern Drug Discovery Technologies (2)

Drug discovery is an emerging science available to academic investigators. This course provides an overview of these drug discovery techniques, including high throughput screening, cell-based screening, computational methods of lead compound discovery, and chemical methods of optimization. **Prerequisite:** Graduate student status or consent of graduate program director.

229. Methods in Pharmacology (3)

A combination of lecture and lab exercises presented by the faculty of the Group in Biomedical Sciences, designed to introduce biomedical science graduate students to the essential techniques employed in molecular and cellular pharmacology. **Prerequisites:** BMS 212, OP, CBB, biochemistry, molecular biology, biomedical sciences or consent of instructor. (S)

230. Structural and Quantitative Pharmacology (4)

This course is essentially biophysical pharmacology. Two-thirds will be didactic, covering protein structure, thermodynamic stability, receptor-ligand binding, enzyme kinetics, biophysical methods, visualization of structures/docking, mathematical analysis of data. The last section will involve student presentations of topics in biophysical pharmacology. **Prerequisite:** knowledge of graduate or undergraduate biochemistry is recommended.

231. Contemporary Topics in Pharmacology (2)

A selection of short courses in the biomedical and pharmacological sciences offered by resident experts. Topics will vary annually. Each short course will last one to two weeks, meeting five hours a week. **Prerequisite:** consent of instructor. (F, W, S)

232. In vivo Cellular and Molecular Imaging (1)

Strategies such as positron emission tomography, magnetic resonance imaging, and ultrasound for nondestructively imaging molecular and cell biological events inside living animals and eventually human patients. Emphasis on detecting angiogenesis, apoptosis, and expression of tumor-specific genes. **Prerequisites:** upper-division or graduate courses in molecular and cell biology.

233. Molecular Biology of Human Retroviruses (3)

Replication cycle and gene regulation of HIV. Molecular approaches to therapy and vaccines. **Prerequisites:** undergraduate lower-division courses in BMM 100.

234. Practical Histopathology and Mouse Models of Human Diseases (2)

The course is designed to introduce or reintroduce histology and histopathology of the various organ systems to those who need to analyze mouse tissues as an essential part of their research. **Prerequisites:** standard undergraduate biology courses.

235. Pharmacogenomics (3)

The pharmacogenetics course is designed to introduce graduate students, medical students, and pharmacy students to this emerging area of interest, indicating how hereditary mechanisms influence drug responses in humans. The lectures, examples, discussions, and journal presentations will provide the students with a working knowledge of the domains of pharmacology, how heredity influences any response traits, and the ways that advances in genome technologies support our emerging understanding of how polymorphic genetic variants determine inter-individual differences in drug responses. The course will include lectures, discussions, and journal article presentations by students. **Prerequisite:** admission to a UCSD graduate program, School of Medicine, or School of Pharmacy and Pharmaceutical Sciences.

240. Critical Reading in Cell Biology (3)

This course will focus on critical reading and understanding current areas in cell and molecular biology. The exact topic will vary, but will include such topics as protein trafficking, cell division, intracellular movement, cell interaction, and cell cycle.

242. Seminar in Genetics (1)

Intended for graduate students interested in principles of classical and molecular genetics. Will attend weekly genetics seminar and participate in didactic/discussion preparatory session. **Prerequisite:** consent of instructor.

246. Current Literature in Glycobiology (1)

Informal presentations on topics of current interest in glycobiology as represented in the current scientific literature. **Prerequisite:** consent of instructor.

252. Genetics and Genomics (3)

This course will examine the basic principles of genetics and genomics. We will focus on classic discoveries and examples of approaches to current experimental problems. Emphasis areas will vary but general topics include Mendelian inheritance, imprinting, cytogenetics, genome structure, genetic variation, linkage and recombination, complex traits, statistical genetics, population genetics, genomic tools and methodology, medical genetics, model organisms. **Prerequisites:** BIOM 200, 201. Limited to BMS graduate students except by consent of instructor.

253. Pathogens and Host Defense (3)

This course will examine the innate and adaptive immune responses of humans to microbial infection. In parallel, we will explore the virulence mechanisms through which certain medically important viruses, bacteria, fungi, and parasites subvert host defense to produce infectious disease. Emphasis will be placed on basic molecular genetic and cellular approaches to understanding microbial pathogenesis and host susceptibility, including progress toward novel antibiotic and immune stimulatory therapies. **Prerequisites:** BIOM 200, 201.

254. Molecular and Cell Biology (3)

This course will examine the basic principles of molecular and cellular biology and their impact on medicine focusing on classic discoveries and examples of approaches to current experimental problems. Emphasis areas will vary but will include genes and genomics, chromosome biology and nuclear structure, transcriptional regulation, RNA processing, cell cycle control, cell growth and death, cell differentiation and stem cell biology, molecular motors and motility, membrane trafficking and signaling. **Prerequisites:** BIOM 200, 201. Limited to BMS graduate students except by consent of instructor.

255. Drugs and Disease (3)

Examines physiological and pathological basis for diseases by exploring normal and dysregulated molecular mechanisms controlling tissue and organ functions. Considers how alterations can be translated into therapeutic interventions and probe unexplored questions regarding human disease etiology and novel drug targets. **Prerequisites:** BIOM 200A-B, 201. Limited to BMS graduate students except by consent of instructor (BS 75, BS 77).

260. Immune Regulation (3)

This course will cover most of today's key aspects in the organization and dynamics of the immune system and its regulation. It will provide students with a basis for understanding the physiology and functioning of the immune system in normal and pathological states. **Prerequisites:** core courses in Biomedical Sciences Ph.D. Program, or consent of instructor.

262. Neurophysiology (4)

An overview of neurophysiological systems, emphasizing mammalian neurophysiology and related model vertebrate systems and concepts. (W)

264. Molecular and Cellular Basis of Disease (2)

Lectures on the molecular and cellular mechanisms of pathogenesis. Topics will include Alzheimer's disease, cell surface and nuclear receptors in disease, signal transduction by oncogenes in cancer cells, AIDS, human diseases affecting glycosylation pathways, rheumatoid arthritis, and arteriosclerosis. **Prerequisite:** graduate students. (W)

266. Environmental and Molecular Toxicology (4)

Molecular and cellular mechanisms underlie the actions of environmental toxicants. This course will investigate approaches to study the impact of environmental toxicants on human health. Other modern approaches that are being implemented to detect and remediate environmental toxicants will also be examined. BGGN 256, BIOM 266 and Chem. 266 students will be required to complete an additional paper and/or exam beyond that expected of students in Chem. 166 and BMM 166. **Prerequisites:** Chem. 114A and 114B required for Chem. 166 and BIBC 100 and BIBC 102 required for BMM 166. (S)

272. Seminars in Genetics (2)

This course includes attendance at seminars in genetics and is designed to provoke critical discussion of the presented findings and scientific approaches in a small group setting. **Prerequisite:** limited to BMS graduate students except by consent of instructor.

273. Seminars in Microbiology (2)

This course includes attendance at seminars in microbiology and is designed to provoke critical discussion of the presented findings and scientific approaches in a small group setting. **Prerequisite:** limited to BMS graduate students except by consent of instructor.

274. Seminars in Molecular and Cell Biology (2)

This course includes attendance at seminars in molecular and cell biology and is designed to provoke critical discussion of the presented findings and scientific approaches in a small group setting. **Prerequisite:** limited to BMS graduate students except by consent of instructor.

275. Seminars in Pharmacology (2)

This course includes attendance at seminars in pharmacology and is designed to provoke critical discussion of the presented findings and the scientific approaches in a small group setting. **Prerequisite:** limited to BMS graduate students except by consent of instructor.

276. Seminars in Physiology (2)

This course includes attendance at seminars in physiology and is designed to provoke critical discussion of the presented findings and scientific approaches in a small group setting. **Prerequisite:** limited to BMS graduate students except by consent of instructor.

282. Microbial Pathogenesis (3)

Topics covered in this course include molecular and cellular mechanisms of viral, bacterial, and protozoan pathogenesis. Host response and microbial mechanisms of evasion of host defense will also be discussed. Sessions will consist of faculty and student presentations of current literature. **Prerequisite:** graduate standing or consent of instructor. (S)

283 Supramolecular Structure Determination Laboratory (4)

A laboratory course combining hands-on mass spectrometry and bioinformatics tools to explore the relationship between structure and function in macromolecules. Tools for peptide sequencing, analysis of post-translational modification, and fragmentation analysis by mass spectrometry are examples of experiments students will run. (F,W,S) **Prerequisite:** consent of instructor.

285. Statistical Inference in the Medical Sciences (2)

An introduction to basic techniques used in biomedical literature: t tests, ANOVA, chi-square, linear and nonlinear regression. Emphasis will be on understanding the appropriate use and interpretation of the tests, rather than on the calculations.

287. Tissue Engineering Laboratory (4)

Students will learn to conduct tissue engineering and developmental biology experiments, microfabricate cell culture systems, engineer biopolymer materials, and develop and analyze quantitative models of transport, cell fate, and growth mechanics. The understanding and manipulation of multi-cellular processes that comprise development and growth involves specialized areas of biomechanics, developmental biology, biomaterials, and the tools of molecular biology, as well as the integration of theory and experiment. To fabricate functional tissues, it is important to establish underlying molecular and physical mechanisms, and then control and integrate these. (F,W,S) **Prerequisite:** consent of instructor.

294. Pharmacology and Molecular Biology Journal Club (0-1)

Current literature in molecular pharmacology and molecular biology is reviewed. Two papers are chosen per week for oral presentation by students. Faculty critique the student presentations. **Prerequisite:** enrollment in Ph.D. program at year two and above. (F,W,S)

295. Pharmacology Research Discussions (0-1)

Student, faculty, and fellow discussion groups on research projects. Students are expected to present research findings to fellows, other Ph.D. students, and faculty. Written critiques are provided by the faculty. **Prerequisites:** completion of minor proposition examination and two years of graduate work. (F,W,S)

296. Directed Reading (1-4)

Reading of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases. **Prerequisite:** consent of instructor.

297. Progress in Signal Transduction (1)

Papers describing recent progress in signal transduction from the cell-surface to the nucleus will be chosen from recent research literature. Two papers will be discussed and criticized in detail each week for one hour. **Prerequisites:** graduate-level biochemistry, cell biology, and molecular biology; registered as second-year and above graduate student in biomedical sciences, biology, or chemistry. (F,W,S)

298. Directed Study (1-12)

Reading and laboratory study of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases. (F,W,S)

299. Independent Study or Research (1-12)

Independent study or research. **Prerequisite:** consent of instructor. (F,W,S)

California Cultures in Comparative Perspective Minor Program

PROGRAM DIRECTOR

Robert R. Alvarez, Ph.D.

AFFILIATED FACULTY

Marisa Abrajano, *Political Science*

Robert Alvarez, *Ethnic Studies*

Luis Alvarez, *History*

Amy Binder, *Sociology*

Jodie Blanco, *Literature*

Robert Cancel, *Literature*

Dennis Childs, *Literature*

Wayne Cornelius, *Political Science*

Zeinabu Davis, *Communication*

Paul Drake, *Political Science*

Steve Erie, *Political Science*

Yen Espiritu, *Ethnic Studies*

Rosemary George, *Literature*

Nora Gordon, *Economics*

David Gutierrez, *History*

Gordon Hanson, *International Relations/
Pacific Studies*

Mark Hardimon, *Philosophy*

James Holston, *Anthropology*

Jorge Huerta, *Theater and Dance*

Mark Jacobsen, *Economics*

Roger Levy, *Linguistics*

Fred Lonidier, *Visual Arts*

Cecil Lytle, *Music*

Richard Marciano, *San Diego Supercomputer Center*

Jorge Mariscal, *Literature*

Natalia Molina, *Ethnic Studies*

John Moore, *Linguistics*

Lisa Sun-Hee Park, *Ethnic Studies*

David N. Pellow, *Ethnic Studies and Director,
California Cultures*

Keith Pezzoli, *Urban Studies and Planning*

Maria Polinsky, *Linguistics*

Emily Roxworthy, *Theatre and Dance*

Rosaura Sanchez, *Literature*

Nayan Shah, *History*

Roberto Tejada, *Visual Arts*

Olga Vasquez, *Communication*

Daniel Widener, *History*

Chris Woodruff, *International Relations/Pacific Studies*

K. Wayne Yang, *Ethnic Studies*

Elana Zillberg, *Communication*

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THE MINOR

The California cultures in comparative perspective minor allows students to better understand California's place in the global community and in history. Students can learn about the impact of language, immigration, market forces, the arts, politics and culture, music, and globalization in the past, present, and future of California.

The California cultures minor will be a core component in a broader, cutting-edge interdisciplinary program that encourages research, teaching, and collaboration among faculty, students, and the public to explore the broad implications of the history and current growth of the state of California's immigrant and ethnic populations. This minor is a universitywide interdisciplinary initiative integrating faculty across a range of departments who all share a common focus on the people, economies, and cultures of California.

The minor in California cultures in comparative perspective is administered by the program director. The minor helps students prepare for careers in the legal, governmental, corporate, and nonprofit sectors that service socially, culturally, and economically diverse populations. The minor concentration in California cultures would also allow undergraduate students to enroll in courses focusing on racial/ethnic populations in the United States and the border region, from departments across the social sciences and humanities.

MINOR REQUIREMENTS

California cultures minor requirements include lower- and upper-division courses from departments in the social sciences and the arts and humanities. Alternatively, minor requirements may be fulfilled with course work in conjunction with internships at local and community-based organizations. Requirements are as follows:

Students will be required to take one lower-division course from the following list. These courses will provide them with background on California cultures and race/ethnicity in the U.S.

Anthropology 23: Debating Multiculturalism: Race, Ethnicity, and Class in American Societies (4)

Ethnic Studies 1A. Introduction to Ethnic Studies: Population Histories of the United States (4)

Ethnic Studies 1B. Introduction to Ethnic Studies: Immigration and Assimilation in American Life (4)

Ethnic Studies 1C. Introduction to Ethnic Studies: Race and Ethnic Relations in the United States (4)

History LD 7A. Race and Ethnicity in the United States (4)

History LD 7B. Race and Ethnicity in the United States (4)

History LD 7C. Race and Ethnicity in the United States (4)

Urban Studies and Planning 3. The City and Social Theory (4)

Students will be required to take one upper-division course (HIUS 114. California History or ETHN 118. Contemporary Immigration Issues). These courses will provide students with broad coverage of the various social, economic, cultural, and political aspects of California's changing population

dynamics and how these relate to transnational trends as well.

Students will be allowed to complete the minor (twenty more required units) by pursuing one of two separate tracks:

Track 1: Additional Course Work

Students can choose to take five additional courses from the following list, four of which must be upper-division. These courses generally provide students with in-depth coverage of specialized topics in California cultures and/or race, immigration, urban studies. They may not take more than three courses from any one department.

Communication 114. Bilingual Communication (4)
Communication 115. Education and Global Citizenship (4)

Critical Gender Studies 2A. Introduction to Critical Gender Studies. Social Movements (4)

Economics 135/USP 102. Urban Economics (4)

Ethnic Studies 1A. Introduction to Ethnic Studies. Population Histories of the United States (4) (if not taken as a required course above)

Ethnic Studies 1B. Introduction to Ethnic Studies. Immigration and the Transformation of American Life (4) (if not taken as a required course above)

Ethnic Studies 1C. Introduction to Ethnic Studies. Race and Ethnic Relations in the United States (4) (if not taken as a required course above)

Ethnic Studies 109. Race and Social Movements (4)
Ethnic Studies 111. Native American Literature (4)

Ethnic Studies 116. The United States-Mexico Border in Comparative Perspective. (4)

Ethnic Studies 118. Contemporary Immigration Issues (4)

Ethnic Studies 121. Contemporary Asian-American History (4)

Ethnic Studies 123. Asian-American Politics (4)

Ethnic Studies 129. Asian and Latina Immigrant Workers in the Global Economy (4)

Ethnic Studies 130. Social and Economic History of the Southwest I (4)

Ethnic Studies 132. Chicano Dramatic Literature (4)
Ethnic Studies 136. Topics in Chicano/a-Latino/a Cultures (4)

Ethnic Studies 148. Latino/a and Chicano/a Literature (4)

Ethnic Studies 144. Bilingual Communities in the USA (4)

Ethnic Studies 149. African American History in the 20th Century (4)

Ethnic Studies 160. Black Politics and Protest in the Early Twentieth Century (1895–1941) (4) (Not offered 2008–2010)

Ethnic Studies 161. Black Politics and Protest since 1941 (4)

Ethnic Studies 164. African Americans and the Mass Media (4)

Ethnic Studies 168. Comparative Ethnic Literature (4)

History 108/ETH 112A. History of Native Americans in the United States (4)

History 114. California History (4)

History 117. History of Los Angeles (4)

History 124. Asian-American History (4)

History 158. Social and Economic History of the Southwest I (4)
 History 159. Social and Economic History of the Southwest II (4)
 History 180. Immigration and Ethnicity in Modern American Society (4)
 Literature 28. Introduction to Asian American Literature. Race and Modernity (4)
 Literature 108. Intellectual and Political Traditions. The Chicano Movement, 1965–1975 (4)
 Music 13AM. World Music/Multicultural America (4)
 Political Sci 100H. Race and Ethnicity in American Politics (4)
 Poli Sci 100J. Race in American Political Development (4)
 Poli Sci 150A. Politics of Immigration (4)
 Sociology B 114. Culture and Ethnicity (4)
 Sociology D 151. Comparative Race and Ethnic Relations (4)
 Theater/History 110. Chicano Dramatic Literature (4)
 Urban Studies and Planning 105/SOC 153. Urban Sociology (4)
 Urban Studies and Planning 107/POLI 102E. Urban Politics (4)
 Urban Studies and Planning 109/POLI 103A. California Government and Politics (4)
 Urban Studies and Planning 113/POLI 103B. Politics and Policymaking in L.A. (4)
 Urban Studies and Planning 115. Politics and Policymaking in San Diego (4)
 Urban Studies and Planning 136/SOC 148M. Labor Market Inequality in Los Angeles and the Border Region (4)
 Urban Studies and Planning 165. History of the American Suburb (4)
 Urban Studies and Planning 166. History of San Diego (4)
 Urban Studies and Planning 171. Sustainable Development (4)
 Urban Studies and Planning 172. Planning/ Policymaking. U.S.-Mexican Border (4)
 Visual Arts 126CN. Art of the North American Indians (4)
 Visual Arts 126DN. African and Afro-American Art (4)

Track 2: Internship Opportunities

Students who choose Track 2 will be able to gain a greater depth of knowledge and appreciation for the California cultures curriculum by applying themselves in an academic or community-based setting. The California cultures in comparative perspective staff has established relationships with several institutions and organizations on and off campus in the San Diego area and other parts of the state, to provide undergraduates firsthand experience at applying themselves and engaging in collaborative efforts and service with a network of practitioners. Internships are to be arranged by the Academic Internship Program for up to eight units. The remaining units needed to complete the internship track will consist of upper-division courses from the list under Track 1.

Chemistry and Biochemistry

PROFESSORS

William S. Allison, Ph.D., *Emeritus*
James R. Arnold, Ph.D., *Emeritus*
Timothy S. Baker, Ph.D.
F. Thomas Bond, Ph.D., *Emeritus*
Marjorie C. Caserio, Ph.D., *Emerita*
Leigh B. Clark, Ph.D., *Emeritus*
Robert E. Continetti, Ph.D., *Chair*
John E. Crowell, Ph.D.
Edward A. Dennis, Ph.D.
Jack E. Dixon, Ph.D., *Pharmacology*
Daniel J. Donoghue, Ph.D., *Vice Chair*
Russell F. Doolittle, Ph.D., *Research Professor*
Arthur B. Ellis, Ph.D., *Vice Chancellor for Research*
Robert C. Fahey, Ph.D., *Research Professor*
Marye Anne Fox, Ph.D., *Chancellor*
Gourisankar Ghosh, Ph.D.
Partho Ghosh, Ph.D.
Elvin Harper, Ph.D., *Emeritus*
Anthony D. J. Haymet, Ph.D., *Vice Chancellor for Marine Sciences*
David N. Hendrickson, Ph.D.
Patricia A. Jennings, Ph.D.
Simpson Joseph, Ph.D.
David R. Kearns, Ph.D., *Emeritus*
Elizabeth A. Komives, Ph.D.
Joseph Kraut, Ph.D., *Emeritus*
Clifford P. Kubiak, Ph.D.
Andrew C. Kummel, Ph.D.
Jack E. Kyte, Ph.D., *Emeritus*
Katja Lindenberg, Ph.D., *Academic Senate Distinguished Teaching Award*
Douglas Magde, Ph.D., *Vice Chair*
Kurt Marti, Ph.D., *Research Professor*
J. Andrew McCammon, Ph.D.
Trevor C. McMorris, Ph.D., *Emeritus*
Mario J. Molina, Ph.D.
Tadeusz F. Molinski, Ph.D.
Xuong Nguyen-Huu, Ph.D., *Research Professor*
K.C. Nicolaou, Ph.D.
Joseph M. O'Connor, Ph.D.
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Stanley J. Opella, Ph.D.
Charles L. Perrin, Ph.D., *Academic Senate Distinguished Teaching Award*
Kimberly A. Prather, Ph.D.
Michael J. Sailor, Ph.D.
Gerhard N. Schrauzer, Ph.D., *Emeritus*
Kurt E. Shuler, Ph.D., *Emeritus*
Amitabha Sinha, Ph.D.
Susan S. Taylor, Ph.D.
Emmanuel A. Theodorakis, Ph.D.
Mark H. Thiemens, Ph.D., *Dean, Division of Physical Sciences*
Yitzhak Tor, Ph.D.
William C. Troglor, Ph.D.
Roger Y. Tsien, Ph.D.
Robert H. Tukey, Ph.D.
Joseph W. Watson, Ph.D., *Emeritus*
John H. Weare, Ph.D.

Ernest Wenkert, Ph.D., *Emeritus*
John C. Wheeler, Ph.D., *Emeritus*
James K. Whitesell, Ph.D.
Peter G. Wolynes, Ph.D.

PROFESSOR-IN-RESIDENCE

Arnold L. Rheingold, Ph.D.

SENIOR LECTURER (SOE)

Barbara A. Sawrey, Ph.D., *Associate Vice Chancellor for Undergraduate Education, Academic Senate Distinguished Teaching Award*

ASSOCIATE PROFESSORS

Michael D. Burkart, Ph.D.
Seth M. Cohen, Ph.D.
Alexander Hoffmann, Ph.D.
Wei Wang, Ph.D.
Jerry C. Yang, Ph.D.

LECTURER (SOE)

Haim Weizman, Ph.D., *Academic Senate Distinguished Teaching Award*

ASSISTANT PROFESSORS

Timothy H. Bertram, Ph.D.
Pieter Dorrestein, Ph.D.
Joshua S. Figueroa, Ph.D.
Michael Galperin, Ph.D.
Nathan C. Gianneschi, Ph.D.
Thomas C. Hermann, Ph.D.
Judy E. Kim, Ph.D.
Ulrich F. Müller, Ph.D.
Terunaga Nakagawa, M.D., Ph.D.
Francesco Paesani, Ph.D.
Michael Tauber, Ph.D.
F. Akif Tezcan, Ph.D.
Navtej Toor, Ph.D.
Hector Viadiu, Ph.D.
Leor S. Weinberger, Ph.D.

LECTURERS (PSOE)

Stacey Brydges, Ph.D.
John Czworkowski, Ph.D.
Robert Pomeroy, Ph.D.

ADJUNCT PROFESSORS

John E. Johnson, Ph.D.
John M. Newsam, Ph.D.
Joseph P. Noel, Ph.D.
Shankar Subramaniam, Ph.D.
Lei Wang, Ph.D.
John Wooley, Ph.D., *Associate Vice Chancellor for Research*

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4010 York Hall, Revelle College
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INTRODUCTION

The UC San Diego Department of Chemistry and Biochemistry was founded in the 1950s by the late Professor Harold Urey and a group of colleagues who strove to create a department that would stress the fundamentals of chemistry and, at the same time, embrace diverse applications of those principles at the frontiers of knowledge.

Degrees offered include

Biochemistry

- B.S. biochemistry/chemistry
- M.S. chemistry
- Ph.D. chemistry
- Ph.D. chemistry with specialization in bioinformatics

Chemistry

- B.S. biochemistry/chemistry
- B.S. bioinformatics from the Department of Chemistry and Biochemistry
- B.S. chemical education
- B.S. chemical physics
- B.S. chemistry
- B.S. environmental chemistry
- B.S. molecular synthesis
- B.S. pharmacological chemistry
- M.S. chemistry
- Ph.D. chemistry
- Ph.D. chemistry with specialization in bioinformatics
- Ph.D. chemistry with specialization in computational science
- Ph.D. chemistry with specialization in multi-scale biology

CHEMISTRY-PREMEDICAL MAJORS

Either a biochemistry/chemistry major or a chemistry major with appropriate choice of electives provides a strong background for students intending to pursue careers in the medical sciences.

Premedical students are encouraged to complete the three-quarter general chemistry series (Chem. 6A-B-C or 6AH-6BH-6CH) in their first year. Most medical schools require a full year of general chemistry, and may not accept Advanced Placement exam scores to satisfy admissions requirements. Students with Advanced Placement exam scores of 4 or 5 who plan to attend medical school should discuss their academic plan with an academic or career advisor early in their academic career. Students should complete the organic chemistry series (Chem. 140A-B-C) in their sophomore year.

The lower-division biology (BILD 1-2-3) series or equivalent is also required for most medical schools, along with certain upper-division biology courses, some of which may be counted toward the major requirements in chemistry. Students should meet with the department's undergraduate advisor early in order to plan their courses and discuss their options.

GENERAL CHEMISTRY

The General Chemistry Chem. 6 sequence (6A-B-C) is intended for science and engineering majors as well as others who need a quantitative course. It satisfies all preprofessional programs. Chem. 4 is a one-quarter preparation for 6A, which should be taken only by those whose college advisor so recommends. The Honors General Chemistry sequence (6AH-6BH-6CH) is designed for science and engineering majors with strong preparation in science and mathematics. A student intending to major in chemistry can thus begin with 4, 6A, or 6AH depending on the level of preparation. A student intending to major in a discipline other than chemistry should consult his or her advisor in the appropriate department to determine which chemistry course is recommended.

Chem. 11, 12, 13 is a terminal sequence for non-science/non-engineering majors. Chem. 15 is a one-quarter survey course suitable for non-science majors. Students should check with their college advisor to determine applicability toward general-education requirements.

GENERAL INFORMATION ON UNDERGRADUATE MAJOR PROGRAMS

The minimum passing grade is a D, though students may not graduate with more than one D grade in upper-division required course work and must maintain a minimum of a 2.0 GPA in the major. All courses for the major, except for independent research (Chem. 196 and 199) and chemistry instruction (Chem. 195), must be taken for a letter grade. Chem. 195, 196, and 199 must be taken on a P/NP basis. All chemistry majors, including transfer students, must complete forty-eight units of upper-division chemistry course work at UCSD and fulfill the campus senior residency requirement.

In addition to the requirements, Math. 20F (required for chemical physics majors) and a course in computer programming are also recommended.

Any departure from the requirements outlined below must be approved by petition. This applies to lower- and upper-division requirements.

The suggested programs following each of the major descriptions are only examples.

All undergraduate degree programs, unless otherwise noted, are certified by the American Chemical Society.

BIOCHEMISTRY/CHEMISTRY MAJOR

The biochemistry/chemistry major deals with the chemical processes in living organisms, including structure and function of nucleic acids and proteins. It is suitable for those planning to go to graduate school as well as medical, dental, veterinary, and

other professional schools. It is also suitable at the bachelor's level for jobs in the biotechnology or pharmaceutical field. Note the requirement for two advanced elective courses in biochemistry. If one does not wish to take so much biochemistry, one should major in chemistry and use some of the five electives to take the desired number of biochemistry courses.

The following courses must be taken for a letter grade:

LOWER-DIVISION REQUIREMENTS

1. General chemistry including laboratory (Chem. 6A-C or 6AH-CH, and 7L, or equivalent).
2. Calculus (Math. 20A-D, or equivalent).
3. Calculus-based physics including laboratory (Phys. 2A-B and 2D or equivalent, and either 2BL, 2CL or 2DL. Phys. 2CL is recommended and is accessible without Phys. 2C).

UPPER-DIVISION REQUIREMENTS

1. Three quarters of organic chemistry (Chem. 140A, B or BH, C or CH).
2. Two quarters of physical chemistry (Chem. 126-127 recommended, or the equivalent).
3. One quarter of inorganic chemistry (Chem. 120A).
4. Three quarters of biochemistry (Chem. 114A-C).
5. Six laboratory courses (Chem. 100A, 143AH or 143A, 143B, 105A, either 108 or 109 and one additional chemistry lab from the following: Chem. 100B-BL, 105B, 108 or 109, 123, 143C, or 143D).
6. Two elective courses from the following list: Chem. 104/204, 113/213, 114D, 116, 118, 124/225, 157/257, 164, 165, 166, 221, 280.
7. One additional elective course chosen from among all of the upper-division and graduate courses offered by the Department of Chemistry and Biochemistry (except non-letter-graded courses) or from the following list of courses offered by the Department of Biology (some biology courses will require additional course work to fulfill prerequisites): BICD 100, BICD 110, BICD 140, BIMM 114, BIMM 120, BIPN 100, BIPN 102, BIPN 140. Other electives, including Chem. 195 and Chem. 199, may be arranged by petition.

SUGGESTED PROGRAM FOR BIOCHEMISTRY/CHEMISTRY B.S. MAJOR

Many courses have enforced prerequisites or are offered once per year.

FALL	WINTER	SPRING
FRESHMAN YEAR		
Chem. 6A	Chem. 6B	Chem. 6C
Math. 20A	Math. 20B	Chem. 7L
	BILD 1*	Math. 20C
SOPHOMORE YEAR		
Chem. 100A	Chem. 140B	Chem. 140C
Chem. 140A	Chem. 143AH	Chem. 143B
Math. 20D	Phys. 2B	Phys. 2D
Phys. 2A		
JUNIOR YEAR		
Chem. 114A	Chem. 114B	Chem. 105A
Chem. 127	Chem. 126	Chem. 114C
Phys. 2CL		

SENIOR YEAR

Chem. 120A	Elective Lab**	Elective Lab**
Elective	Elective	Elective

*Recommended, but not required.

**One of these must be Chem. 108 or 109.

BIOINFORMATICS MAJOR FROM THE DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

Also see the program information listed under "Bioinformatics" in the catalog.

The Bioinformatics major offers a rigorous, interdisciplinary training in the new and rapidly evolving field of bioinformatics with a strong focus on chemistry and biochemistry. Bioinformatics is the field of advanced computational and experimental methods that model the flow of information (genetic, metabolic, and regulatory) in living systems to provide an integrated understanding of the systems properties of model organisms. This is a new and rapidly evolving field in which large volumes of both qualitative and quantitative data will accrue at an increasing pace, and the bioinformatician must have a substantial mastery of both the sciences and engineering. This interdisciplinary specialization will be offered jointly with computer science and engineering, bioengineering, and biological sciences, each with its own set of requirements and electives. The program offered by the Department of Chemistry and Biochemistry is aimed at a student interested in applying and developing tools of bioinformatics for the study of chemical processes in biological systems.

ADMISSION TO THE BIOINFORMATICS MAJOR

Freshmen and transfer students are invited to declare to the Department of Chemistry and Biochemistry for a bioinformatics major. Starting fall 2008 the Department of Chemistry and Biochemistry has removed the "Impacted/Closed Status" and admission restrictions for freshmen and transfer applicants to the bioinformatics major. This means the Department of Chemistry and Biochemistry will accept all students that apply to the B.S. Bioinformatics major and are admitted by the UC San Diego Admissions Office.

Furthermore, freshmen and transfer students that start at UC San Diego as undeclared or another major may also switch into the B.S. Bioinformatics major in the Department of Chemistry and Biochemistry (major code CH37), via the Major/Minor link under Tools at <http://tritonlink.ucsd.edu> to make this change.

It is strongly recommended that students meet with an advisor in the Department of Chemistry and Biochemistry to discuss requirements for the Bioinformatics Program.

LOWER-DIVISION REQUIREMENTS

1. Calculus and linear algebra (Math. 20A-20C, 20F)
2. General chemistry including laboratory (Chem. 6A-C or 6AH-CH, and 7L).
3. Physics (Phys. 2A-B)

- Biology (BILD 1-2)
- Computer programming (CSE 11-12)
- Mathematics for algorithm and systems (CSE 21/ Math. 15B)
- Bioinformatics seminar (BILD 94)

The department recommends that students complete an introductory C programming course before taking CSE 11 and CSE 12, either in their first year or during the summer between their first and second years.

UPPER-DIVISION REQUIREMENTS

- Two quarters of organic chemistry (Chem. 140A-B)
- Organic chemistry (Chem. 140C) or structural biochemistry (Chem. 114A)
- Metabolic biochemistry (Chem. 114B)
- Physical chemistry (Chem. 127 accepted, Chem. 131 and 132 recommended)
- Molecular and cellular biochemistry (Chem. 114D)
- Two quarters of biochemistry laboratory (Chem. 108-109)
- Genetics (BICD 100)
- Cell biology (BICD 110)
- Two computer science courses (CSE 100 or Math. 176; and CSE 101 or Math. 188)
- Two additional upper-division electives offered by the Department of Chemistry and Biochemistry (each course must be at least four units) with only one quarter of credit allowed for any given course. Recommended courses are: Chem. 100A, 118, and 143A.

The bioinformatics series comprising the following courses:

- Molecular sequence analysis (BIMM 181 or CSE 181 or BENG 181)
- Biological databases (Chem. 182 or BIMM 182 or CSE 182 or BENG 182)
- Applied genomic technologies (BENG 183)
- Computational molecular biology (BIMM 184 or CSE 184 or BENG 184 or Chem. 184)
- Bioinformatics lab (BIMM 185)
- Probability and statistics (Math. 186)

SUGGESTED PROGRAM FOR THE BIOINFORMATICS B.S. FROM THE DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

Many courses have enforced prerequisites or are offered once per year.

FALL	WINTER	SPRING
FRESHMAN YEAR		
Chem. 6A Math. 20A	Chem. 6B BILD 1 Math. 20B	Chem. 6C Chem. 7L Math. 20C BILD 94
SOPHOMORE YEAR		
CSE 11	Chem. 140A	Chem. 109*

BILD 2	CSE 12	Chem. 140B
Phys. 2A	Phys. 2B	CSE 21/ Math. 15B

JUNIOR YEAR

Chem. 114A/140C Chem. 114D*	Chem. 114B* BICD 100	Elective BIMM 181/ BENG 181/ CSE 181 BICD 110
CSE 100/ Math. 176 Math. 20F	Math. 186	
	CSE 101/ Math. 188	

SENIOR YEAR

Chem. 182/ BIMM 182/ BENG 182/ CSE 182 BENG 183 Chem. 127*	Chem. 108*	BIMM 185
	BIMM 184/ BENG 184/ CSE 184	Elective

*Certain prerequisite courses are waived for the bioinformatics majors. See the department advisor for details.

CHEMICAL EDUCATION MAJOR

The chemical education major offers an excellent preparation for teaching physical science in secondary schools, including chemistry, physics, earth science, biology, and mathematics.

Students taking the minimal chemical education program may be admissible as graduate students in chemistry and biochemistry, but are better prepared for admission to teacher education programs at most universities. The ACS-Certified option will ensure admissibility to chemistry graduate programs. This program is also excellent preparation for students interested in a career in science writing.

The program is basically a chemistry major with three courses in chemistry for educators and three courses from Education Studies. Requirements allow some work in earth science and biology or other sciences.

If you are interested in earning a California teaching credential through UCSD, contact [Education Studies](#) for information about the prerequisite and professional preparation requirements. It is recommended that you contact Education Studies as early as possible in your academic career.

The following courses must be taken for a letter grade:

LOWER-DIVISION REQUIREMENTS

- General chemistry including laboratory (Chem. 6A-C or 6AH-CH, and 7L, or equivalent).
- Calculus (Math. 20A-D, or equivalent).
- Calculus-based physics including laboratory (Phys. 2A-B and 2D or equivalent, and either 2BL, 2CL or 2DL. Phys. 2CL is recommended and is accessible without Phys. 2C).
- Biology (BILD 1).
- Earth Science (SIO 50).
- Introduction to Chemical Education (Chem. 96).

UPPER-DIVISION REQUIREMENTS

- Two quarters of organic chemistry (Chem. 140A-B).
- Two quarters of physical chemistry (Chem. 126-127 recommended, or the equivalent).
- Three quarters of chemistry for educators (Chem. 187 and two among Chem. 188, Chem. 195 (preferably with Chem. 4), Chem. 196, or Chem. 199)
- Advanced chemistry (either Chem. 114A or 120A).
- Three laboratory courses (Chem. 100A, 143AH or 143A, and 105A).
- Three additional elective course chosen from among Chem. 114A, 114B, 114C, 120A, 140C, 149A, 149B, SIO 102, SIO 103, other upper-division and graduate courses offered by the Department of Chemistry and Biochemistry, or, by petition, from other natural science departments.
- Three courses from Education Studies (EDS 129A-B-C).

For ACS Certification

- 1. Take Chem. 114A, 120A, and 140C. Eliminate required electives above.
- 2. Three additional labs must be chosen from among Chem. 143B, 143C, 143D, 108, 109, 123, or 105B.
- 3. Only one among Chem. 188, Chem. 195 (preferably with Chem. 4), Chem. 196, or Chem. 199 is required.

SUGGESTED PROGRAM FOR CHEMICAL EDUCATION B.S. MAJOR

Many courses have enforced prerequisites or are offered once per year.

FALL	WINTER	SPRING
FRESHMAN YEAR		
Chem. 6A Math. 20A	Chem. 6B BILD 1 Math. 20B	Chem. 6C Chem. 96 Math. 20C
SOPHOMORE YEAR		
Chem. 7L Math. 20D Phys. 2A	Chem. 140A Chem. 100A Phys. 2B	Chem. 140B Chem. 143A Phys. 2D
JUNIOR YEAR		
Chem. 127 Phys. 2CL SIO 50	Chem. 126 Chem. 187 Elective	Phys. 105A Chem. 120A Elective
SENIOR YEAR		
Elective Chem. 195 EDS 129A	Chem. 196/199 EDS 129B	Chem. 188 EDS 129C

CHEMICAL PHYSICS MAJOR

The chemical physics major applies the concepts and quantitative methods of physics to the descriptions of atoms and molecules, analyzes matter as a statistical assembly of molecular building blocks, and develops and exploits physical (largely spectroscopic), experimental tools with which to test and refine such theories.

The chemical physics major is designed as a preparation for graduate work in chemistry, physics, or other interdisciplinary areas.

The following courses must be taken for a letter grade:

LOWER-DIVISION REQUIREMENTS

1. General chemistry including laboratory (Chem. 6A-C or 6AH-CH, and 7L, or equivalent).
2. Calculus and linear algebra (Math. 20A-F, or equivalent).
3. Calculus-based physics including laboratory (Phys. 2A-D or equivalent, and either 2BL, 2CL or 2DL. Phys. 2CL is recommended).

It is recommended that the above requirements be completed by the end of the sophomore year.

UPPER-DIVISION REQUIREMENTS

1. Two quarters of organic chemistry (Chem. 140A-B).
2. One year of physical chemistry (Chem. 131-133).
3. Two quarters of inorganic chemistry (Chem. 120A-B). Chem. 114A can substitute for Chem. 120B.
4. Six upper-division chemistry labs: Chem. 100A, 100B-BL, 143AH or 143A, 143B or 143C, 105A and one of the following: 105B, 108, 109, 123, 143B, 143C, or 143D.
5. Molecular spectroscopy (Chem. 135).
6. Partial differential equations (Math. 110).
7. Two quarters of physics (Phys. 110A-B, or Phys. 100A-B).
8. One additional course in physical chemistry or related areas as approved by the department. Chem. 199 may be petitioned.

SUGGESTED PROGRAM FOR CHEMICAL PHYSICS B.S. MAJOR

Many courses have enforced prerequisites or are offered once per year.

FALL	WINTER	SPRING
FRESHMAN YEAR		
Chem. 6A Math. 20A	Chem. 6B Math. 20B	Chem. 6C Chem. 7L Math. 20C Phys. 2A
SOPHOMORE YEAR		
Chem. 140A Math. 20D Phys. 2B	Chem. 140B Chem. 143AH Math. 20E Phys. 2C	Chem. 100A Math. 20F Phys. 2D
JUNIOR YEAR		
Chem. 133 Chem. 143C Phys. 110A/ 100A	Chem. 131 Phys. 2CL Phys. 110B/ 100B	Chem. 100B-BL Chem. 132 Math. 110
SENIOR YEAR		
Chem. 105A Chem. 120A	Elective Lab Chem. 120B*	Chem. 135 Elective

*Chem. 114A (fall or winter quarter) may be substituted.

CHEMISTRY MAJOR

The chemistry major provides a broad introduction for the biochemistry, organic, physical, or inorganic student as well as those who prefer not to specialize. This major will enable a student to pursue further studies in chemistry or in related fields of science, medicine, or engineering.

The following courses must be taken for a letter grade:

LOWER-DIVISION REQUIREMENTS

1. General chemistry including laboratory (Chem. 6A-C or 6AH-CH, and 7L, or equivalent).
2. Calculus (Math. 20A-D, or equivalent).
3. Calculus-based physics including laboratory (Phys. 2A-B and 2D or equivalent, and either 2BL, 2CL or 2DL. Phys. 2CL is recommended and is accessible without Phys. 2C).

UPPER-DIVISION REQUIREMENTS

1. Three quarters of organic chemistry (Chem. 140A-C).
2. Three quarters of physical chemistry (Chem. 131-133).
3. Two quarters of inorganic chemistry (Chem. 120A-B).
4. One quarter of biochemistry (Chem. 114A).
5. Six laboratory courses (Chem. 100A, 143AH or 143A, 143B, 105A and two of the following: Chem. 100B-BL, 105B, 108, 109, 123, 143C, or 143D).
6. Three additional four-unit upper-division or graduate courses in chemistry and biochemistry or related areas. One of Chem. 195 or 199 may be petitioned.

SUGGESTED PROGRAM FOR CHEMISTRY B.S. MAJOR

Many courses have enforced prerequisites or are offered once per year.

FALL	WINTER	SPRING
FRESHMAN YEAR		
Chem. 6A Math. 20A	Chem. 6B Math. 20B	Chem. 6C Chem. 7L Math. 20C
SOPHOMORE YEAR		
Chem. 100A Chem. 140A Math. 20D	Chem. 140B Chem. 143AH Phys. 2A	Chem. 140C Chem. 143B Phys. 2B
JUNIOR YEAR		
Chem. 120A Chem. 133 Phys. 2D	Chem. 120B Chem. 131 Phys. 2CL	Chem. 105A Chem. 132
SENIOR YEAR		
Chem. 114A Elective Lab	Elective Lab Elective	Elective Elective

ENVIRONMENTAL CHEMISTRY MAJOR

Students have an option of earning a B.S. in environmental chemistry that is ACS-Certified or not. The ACS-Certified version is recommended for those who intend to apply to graduate school in chemistry. The noncertified program is designed to prepare students to enter the industrial, governmental, or

legal workforce, or to continue studies in some of the environmental sciences.

The following courses must be taken for a letter grade, except where that is not permitted:

LOWER-DIVISION REQUIREMENTS

1. General chemistry including laboratory (Chem. 6A-C or 6AH-CH, and 7L, or equivalent).
2. Calculus (Math. 20A-D, or equivalent).
3. Calculus-based physics including laboratory (Phys. 2A-B and 2D or equivalent, and either 2BL, 2CL or 2DL. Phys. 2CL is recommended and is accessible without Phys. 2C).

UPPER-DIVISION REQUIREMENTS

1. Two quarters of organic chemistry (Chem. 140A-B).
2. Physical chemistry (Chem. 131-133 recommended, or Chem. 126-127).
3. Four advanced laboratory courses (Chem. 100A, 100B-BL, 105A, and 143AH or 143A).
4. Two quarters of environmental chemistry (Chem. 149A-B).
5. Atmospheric chemistry (Chem. 173) and marine chemistry (Chem. 174).
6. Electives: Any four with at least two upper-division among: Chem. 114A, 120A, 140C, 143C, 166, BILD 1, 2, 3, BIEB 121, 140, 144, 176, ESYS 101, SIO 50, 101, 102, 103, 144, Math. 183, or others (including labs) by petition. One of 195 or 199 by petition.

For ACS Certification

1. Increase electives by one to a total of five.
2. For three of the electives, choose Chem. 140C, 114A, and 120A,
3. For two of the electives, choose two labs from among Chem. 143B, 143C, 143D, 108, 109, 123, 105B.

Recommended, but not Required, Electives

- Nonscience elective courses used to meet general-education requirements or as free electives might be chosen from among: Econ. 1, 2, 3, 131, 132, HIUS 154, Phil. 148, 164, Poli. Sci. 10, 160AA, 162, Soc. 185, USP 2, 124, 144, 171.

SUGGESTED PROGRAM FOR ENVIRONMENTAL CHEMISTRY B.A. OR B.S. MAJOR (B.S. AND ACS CERTIFICATION REQUIRE ADDITIONAL COURSES)

Many courses have enforced prerequisites or are offered once per year.

FALL	WINTER	SPRING
FRESHMAN YEAR		
Chem. 6A Math. 20A	Chem. 6B Math. 20B Phys. 2A	Chem. 6C Chem. 7L Math. 20C
SOPHOMORE YEAR		
Chem. 100A	Chem. 140B	Phys. 2CL

Chem. 140A Math. 20D	Chem. 143AH Phys. 2B	Phys. 2D
JUNIOR YEAR		
Chem. 133 Chem. 149A Elective	Chem. 131 Chem. 149B Elective	Chem. 132 Chem. 173 Elective
SENIOR YEAR		
Chem. 105A Elective	Chem. 100B-BL	Chem. 174

*Chem. 140C may be substituted.

MOLECULAR SYNTHESIS MAJOR

The molecular synthesis major offers a thorough training in all aspects of the molecular synthesis of organic, inorganic, and biological substances, and with a fundamental understanding of their structure and reactivity. This major provides an excellent preparation for employment in biotechnology, diagnostic, electronic, and pharmaceutical enterprises as well as for graduate programs in organic, bioorganic, and inorganic chemistry.

The following courses must be taken for a letter grade:

LOWER-DIVISION REQUIREMENTS

1. General chemistry including laboratory (Chem. 6A-6C or 6AH-CH and 7L, or equivalent)
2. Calculus (Math. 20A-D, or equivalent).
3. Calculus-based physics including laboratory (Phys. 2A-B and 2D or equivalent, and either 2BL, 2CL or 2DL. Phys. 2CL is recommended and is accessible without Phys. 2C).

UPPER-DIVISION REQUIREMENTS

1. Three quarters of organic chemistry (Chem. 140A-C).
2. Three quarters of physical chemistry (Chem. 131-133).
3. Two quarters of inorganic chemistry (Chem. 120A-B).
4. One quarter of biochemistry (Chem. 114A).
5. Six laboratory courses (Chem. 100A, 143A or 143AH, 143B, 143C, or 143D, 105A, and 123).
6. Synthetic methods (Chem. 152).
7. Structural or mechanistic organic chemistry (Chem. 154 or 156).
8. Bioorganic or bioinorganic chemistry (Chem. 124 or 157).
9. One additional course from the following: Chem. 114B, 114C, 155, 185, or 199.

SUGGESTED PROGRAM FOR MOLECULAR SYNTHESIS B.S. MAJOR

Many courses have enforced prerequisites or are offered once per year.

FALL	WINTER	SPRING
FRESHMAN YEAR		
Chem. 6A Math. 20A	Chem. 6B Math. 20B	Chem. 6C Chem. 7L Math. 20C

SOPHOMORE YEAR

Chem. 100A Chem. 140A Math. 20D Phys. 2A	Chem. 140B Chem. 143AH Phys. 2B	Chem. 140C Chem. 143B Phys. 2CL Phys. 2D
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JUNIOR YEAR

Chem. 120A Chem. 133 Chem. 143C*	Chem. 120B Chem. 123 Chem. 131	Chem. 105A Chem. 132
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SENIOR YEAR

Chem. 114A Chem. 152	Chem. 154/156 Elective	Chem. 107/124/157
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*Chem. 143D may be substituted.

PHARMACOLOGICAL CHEMISTRY MAJOR

The pharmacological chemistry major provides a strong background in chemistry and includes most courses required by California pharmacy schools. The major is intended primarily to prepare students for pharmacy school (Pharm.D.). Students fulfilling their elective requirements with appropriate courses would be prepared for graduate school to obtain a Ph.D. in pharmacology, biochemistry, or other areas of science. Degree recipients would also be prepared for most jobs in the biotechnology and chemical industries.

Pharmacological chemistry students are strongly encouraged to complete a full year of general chemistry and a full year of lower-division biology. As with some medical programs, some pharmacy programs may require a full year of these courses and may not accept tests such as the Advanced Placement exam to satisfy these requirements.

The following courses must be taken for a letter grade:

LOWER-DIVISION REQUIREMENTS

1. Biology (BILD 1, 2 and 3, and either BICD 101, 111, 131, or BIPN 105 or BIMM 121). Alternatively, a year of biology with laboratory at a community college may be petitioned.
2. General chemistry including laboratory (Chem. 6A-C or 6AH-CH, and Chem. 7L, or equivalent).
3. Calculus-based physics including laboratory. (Phys. 2A-B and 2D or equivalent, and either 2BL, 2CL, or 2DL. Phys. 2CL is recommended and is usually the course required by pharmacy schools. It is accessible without Phys. 2C).
4. Calculus (Math. 20A-D, or equivalent).
5. Economics (Econ. 1 or 3 or equivalent).
6. Pharmacology seminar (Chem. 92).

Most California pharmacy schools require a course in public speaking for admission to the school. Students planning to apply to these programs should take Public Speaking, TDGE 25, or an appropriate course at a community college.

UPPER-DIVISION REQUIREMENTS

1. Two quarters of physical chemistry (Chem. 126-127 recommended; 131-133 acceptable).
2. Three quarters of organic chemistry (Chem. 140A-C).
3. Three quarters of biochemistry (Chem. 114A-B-C).

4. Four laboratory courses (Chem. 100A, 143AH or 143A, 143B and either 108, 109, or 143C).
5. One quarter of pharmacology and toxicology (Chem. 118).
6. One chemistry elective course chosen from among all the upper-division and graduate courses offered by the Department of Chemistry and Biochemistry (except non-letter graded courses).

If ACS certification is desired, Chem. 120A, plus two additional laboratory courses (Chem. 105A and a lab chosen from Chem. 100B-BL, 105B, 123, or 143C/108/109, if not already taken), are required. Any of these courses would satisfy number 6 above.

SUGGESTED PROGRAM FOR PHARMACOLOGICAL CHEMISTRY B.S. MAJOR (ACS CERTIFICATION REQUIRES ADDITIONAL COURSES)

Many courses have enforced prerequisites or are offered once per year.

FALL	WINTER	SPRING
FRESHMAN YEAR		
Chem. 6A Math. 20A	Chem. 6B Math. 20B BILD 1	Chem. 6C Chem. 7L Chem. 92 Math. 20C

SOPHOMORE YEAR

Chem. 100A Chem. 140A Math. 20D	Chem. 140B Chem. 143AH Phys. 2A	Chem. 140C Chem. 143B Phys. 2B
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JUNIOR YEAR

Chem. 114A Phys. 2D	Chem. 114B Econ. 1/3 BILD 2	Chem. 114C BILD 3 Phys. 2CL
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SENIOR YEAR

Chem. 127 Lab*	Chem. 126 Bio. lab**	Chem. 118
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*Chem. 108 or 109 or 143C.

**BICD 101, 111, 131, or BIPN 105 or BIMM 121 (some have prerequisites that must be taken in an earlier quarter).

HONORS PROGRAM

The Department of Chemistry and Biochemistry offers an Honors Program to those students who have demonstrated excellence in any of the nine majors. Students are eligible for Departmental Honors at graduation when they have

1. Achieved a GPA of 3.2 overall and 3.4 in chemistry courses.
2. Completed a minimum of eight units of Chem. 199, distributed over at least two quarters. A student who registers for 199 and subsequently fails to complete the Honors Program may apply up to four units to any major that normally allows 199 as elective credit. A student who has successfully petitioned to use a Chem 199 course to fulfill elective credit may not use that course to fulfill honors requirements as well.
3. Submitted a final honors research report to three UCSD faculty members, including their research advisor, for approval.

- Presented an oral report about their research before a group of at least three faculty. This can be at an undergraduate research conference or at a seminar involving honors students and faculty.

Students who are interested in the Honors Program should contact the Undergraduate Advising Office in 4010 York Hall, and are invited to do so at any time.

EDUCATION ABROAD

Majors are encouraged to explore the programs that allow students to study abroad or at other U.S. universities for a term or longer. See an advisor for details.

Chemistry and Biochemistry majors are encouraged to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP). Subject to approval by our faculty, courses taken through EAP/OAP may be accepted for credit toward the major. Students interested in studying abroad should see a departmental program advisor to discuss appropriate courses and programs for their plan of study.

MINOR PROGRAM IN CHEMISTRY AND BIOCHEMISTRY

A typical minor in chemistry consists of three lower-division lecture courses and at least one laboratory course, followed by a minimum of five upper-division courses, including at least one laboratory course, focused in physical, inorganic, organic, environmental chemistry, or biochemistry. Lower-division course requirements may not be satisfied by advanced placement credit, though transfer units may be used to satisfy lower-division minor requirements.

Upper-division courses required by a student's major may not be applied toward a minor.

Upper-division courses for the minor must be taken at UCSD in the Department of Chemistry and Biochemistry, and must be taken for a letter grade. The minimum overall GPA requirement for the minor is a 2.0.

THE GRADUATE PROGRAMS

Graduate students are accepted to the Department of Chemistry and Biochemistry for study toward Plan I (Thesis) and the Plan II (Comprehensive Examination) M.S. in chemistry, the Ph.D. in chemistry, the Ph.D. in chemistry with specialization in bioinformatics, the Ph.D. with specialization in computational science, and the Ph.D. with specialization in multi-scale biology. Students interested in the bioinformatics specialization should contact the Student Affairs Office for more information.

MASTER'S OF SCIENCE

A Plan I (Thesis) M.S. in chemistry and a Plan II (Comprehensive Examination) M.S. in chemistry are offered.

Admissions: UC San Diego students are admitted for fall, winter, and spring quarter entrance; non-UCSD students are normally admitted for fall entrance only. Eligibility requirements for admission include a solid training in the chemical sciences

based on the undergraduate record, a 3.0 GPA in chemistry courses completed, and a 3.0 overall GPA.

The GRE general test is required of all applicants. Foreign applicants must submit a TOEFL score; TWE scores are strongly recommended. Those who wish to apply to the Thesis Plan must have a letter of support from the proposed thesis advisor.

Residency and Time to Degree: Master's students must register at UCSD for a minimum of three quarters, and complete at least twenty units per academic year. Full-time Comprehensive Examination Plan students can complete the degree in three quarters. Thesis Plan students typically take eighteen to twenty-four months to graduate.

Relationship to Doctoral Program: Master's students who wish to continue their studies as doctoral students in chemistry and biochemistry must request to transfer to that program. Application materials are due mid-January and include current letters of recommendation, current UCSD transcript, and statement of purpose. Transfer is for fall quarter only.

Plan I (Thesis)

Purpose: To prepare students for research careers or for doctoral or professional studies; the emphasis is on research.

Advancement to Candidacy: A minimum of thirty-six units with an overall GPA of 3.0 must be completed. The majority of units taken are for thesis research (Chem. 299). At least eight units of graduate level chemistry courses must be completed for a letter grade. Four units of teaching apprenticeship are required (Chem. 500; see Doctoral Program, Teaching and Language Requirement sections). Contact the Student Affairs Office for full information.

Thesis: Students must give an oral presentation and defense of their thesis project to a Thesis Committee. A student graduates after the thesis has been defended and the written dissertation approved by his or her committee, department, and OGSR, and filed with the University Archivist. The Thesis Committee consists of at least three faculty: (1) the thesis advisor, (2) a faculty member from the Department of Chemistry and Biochemistry familiar with the student's research area, and (3) a faculty member from either this or another department whose research is in an area different from that of the thesis.

Plan II (Comprehensive Exam)

Purpose: To prepare students for doctoral or professional studies, teaching at the community college or high school level, or sometimes career work in industry; the emphasis is on course work.

Advancement to Candidacy: A minimum of thirty-six units with an overall GPA of 3.0 must be completed. The majority of units taken are in letter-graded graduate chemistry courses. Four units of teaching apprenticeship are required (Chem. 500; see [Doctoral Program, Teaching and Language Requirement](#) sections). Four units of nonthesis research (Chem. 297) are allowed. Contact the Student Affairs Office for full information.

Comprehensive Examination: The purpose of this requirement is to confirm that students have achieved an advanced understanding of, and a

comprehensive training in, the chemical sciences. The tests cover a wide range of material, so that students will have a chance to show what they have learned. For master's students, the department administers the standardized American Chemical Society exams in biochemistry and in analytical, inorganic, organic, and physical chemistry. Students must pass three of the five exams in order to graduate. For doctoral students earning the M.S. on the way to the Ph.D., the Departmental Examination fulfills this requirement.

DOCTORAL PROGRAM

The goal of the Ph.D. in chemistry is to prepare students for careers in science by expanding their knowledge of chemistry while developing their ability for critical analysis, creativity, and independent study. The program is designed to encourage initiative and to stimulate enjoyment and development of the student's area of research expertise as well as the broader aspects of scientific inquiry and enlightenment.

RESEARCH

Students choose their research concentration from programs in biochemistry, biophysics, bioinformatics, inorganic, organic, physical, analytical, and theoretical chemistry, surface and materials chemistry, and atmospheric and environmental chemistry. Opportunities for scientific discovery are also abundant through the department's extensive collaborations with investigators in the physical, biological, and engineering sciences. This includes on-campus collaborations with faculty in the Materials Science Program, School of Medicine, School of Pharmacy and Pharmaceutical Sciences, and Scripps Institution of Oceanography. There are also off-campus interactions with scientists at nearby research facilities such as the Salk Institute and The Scripps Research Institute. Excellent state-of-the-art facilities and equipment support all the research programs. The department's Industrial Relations Program interfaces with national and local chemical, biotechnology, and pharmaceutical industries to encourage technology transfer and to assist postgraduates interested in industrial careers.

RESEARCH ADVISOR

A first-year faculty advisor guides students until a research advisor is chosen. Most of a student's efforts in graduate school are directed toward research for the doctoral dissertation, and selection of a research advisor is of utmost importance. To assist students with this critical decision, all chemistry and biochemistry faculty present research seminars in the fall quarter. Students then rotate in laboratories or consult with faculty to discuss research opportunities. Although students have until the end of the first year to join a laboratory, most start their research studies by mid-year.

PLACEMENT EXAMINATIONS AND COURSE WORK

Entering students take written placement examinations in analytical, biochemistry, inorganic, organic, and physical chemistry. The purposes of these exams are to assist with advising and to assure that students have the breadth and level

of competence needed for graduate studies. Deficiencies must be remedied in the first year. Three of five exams must be passed, including the one in the student's research area.

First-year students normally take at least six of the graduate courses listed below based on the results of their placement examinations, their research programs, and their specialized interests. Chem. 250 and Chem. 500 are required. Undergraduate courses and courses offered through other departments may also be taken, depending on the student's research area. By the second year, the emphasis is on thesis research, and a lighter load of courses is taken, although participation in seminars and informal study groups continues.

DEPARTMENTAL EXAMINATION

In the winter quarter of the second year, a student's progress in research and graduate studies is evaluated through the departmental examination, which includes presentation and critical discussion of a recent research article. Students are also evaluated on their general knowledge of their particular field of study. Students may also be asked about progress on their dissertation.

QUALIFYING EXAMINATION

By the end of the third year, students defend the topic, preliminary findings, and future research plans of their dissertation. Passing this defense qualifies the student to advance to candidacy for the dissertation. A dissertation committee composed of five faculty, one of whom is the research advisor, provides consultation and evaluation for the dissertation project.

DISSERTATION

The dissertation is normally completed in the fourth or fifth year. This body of research is expected to make an innovative contribution to the field of chemistry. Ph.D. candidates present a seminar summarizing their research accomplishments and defend their thesis in an oral examination before their dissertation committee.

TEACHING

Experience in teaching is a vital and integral part of every graduate student's training, and all students participate in the instructional activities of the undergraduate curriculum. Course credit for the teaching apprenticeship is earned by enrolling in Chem. 500. Excellence in teaching is stressed, and the department provides a thorough training program covering the fundamentals of teaching as well as other useful information and techniques for effective instruction. Further training is provided by the campus's Center for Teaching Development. Faculty and the students taught evaluate the performance of teaching assistants every quarter and awards are bestowed annually for outstanding performance as a teaching assistant.

LANGUAGE REQUIREMENT

Students whose native language is not English must demonstrate a mastery of English adequate to complete the teaching requirement. Deficiencies must be remedied by the end of the first year of

academic residency. For native English speakers, there is no foreign-language requirement.

TIME LIMITS

In accordance with UCSD policy, students must advance to candidacy by the end of four years. Total university support cannot exceed six and one-third years. Total registered time at UCSD cannot exceed seven and one-third years.

SEMINARS

Seminars by researchers from other universities, national laboratories, and industry are another basic and important aspect of the graduate curriculum. Seminars are presented weekly in biochemistry, inorganic, organic, and physical chemistry. Department colloquia are given on topics of general interest to the department. Seminars are also sponsored by many other departments and institutes.

FINANCIAL SUPPORT

The department supports all first-year students in good academic standing from a variety of sources, including teaching and research assistantships, training grants, fellowships, and awards. A stipend is paid in addition to fees and, if applicable, tuition. Continuing students who do not have fellowships or awards are normally supported on training grants or on research assistantships by their thesis advisors.

ADMISSIONS

The department seeks bright, motivated doctoral students and welcomes all such applications. To make admissions decisions, the department considers an applicant's statement of purpose and research interests, GRE scores on the general test plus either the advanced chemistry or advanced biochemistry test, undergraduate record, quality of the undergraduate university, letters of recommendation, and research experience and publications. Applicants whose native language is not English must also submit TOEFL scores; TWE scores are strongly recommended. Admissions to the doctoral program is for fall quarter. Applications received by mid-January receive priority consideration.

Students who have a master's degree with strong course records and with research experience are encouraged to apply. They normally pass the qualifying examination and graduate at an accelerated pace.

PH.D. IN CHEMISTRY WITH SPECIALIZATION IN COMPUTATIONAL SCIENCE

As of fall 2007, the UCSD campus is offering a new comprehensive Ph.D. specialization in Computational Science that will be available to doctoral candidates in participating science, mathematics, and engineering departments at UCSD.

This Ph.D. specialization is designed to allow students to obtain standard basic training in their chosen field of science, mathematics, or engineering with a specialization in computational science integrated into their graduate studies. Prospective students must apply and be admitted into the Ph.D. program in Chemistry/Biochemistry described

previously. (See the [Department of Chemistry & Biochemistry](#) for more information.)

PH.D. IN CHEMISTRY & BIOCHEMISTRY WITH SPECIALIZATION IN MULTI-SCALE BIOLOGY

As of fall 2009, the UCSD campus is offering a new Ph.D. specialization in Multi-Scale Biology that will be available to doctoral candidates in participating programs that span four divisions: Biological Sciences, Physical Sciences, Jacobs School of Engineering, and Health Sciences at UCSD.

The Ph.D. specialization is designed to allow students to obtain standard basic training in their chosen field within the biological sciences, physical sciences, engineering, and health sciences with training in integrative and quantitative analysis across multiple scales of biological organization from molecule to organism in health and disease into their graduate studies. It trains a new cadre of Ph.D. scientists and provides a unique interdisciplinary education at the interfaces between the biological, medical, physical, and engineering sciences. (See the [Department of Chemistry & Biochemistry](#) for more information.)

JOINT DOCTORAL PROGRAM WITH SAN DIEGO STATE UNIVERSITY

The Department of Chemistry and Biochemistry at UCSD and the Department of Chemistry at San Diego State University offer a joint program of graduate study leading to the Ph.D. degree in chemistry. More information is available in the current edition of the Bulletin of the Graduate Division of San Diego State University.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

4. Basic Chemistry (4)

Chemistry 4 is a one-quarter course for science majors with insufficient preparation to start the Chem. 6 sequence. Emphasis is on learning how to solve quantitative problems. Topics include nomenclature, stoichiometry, and the periodic table. Cannot be taken for credit after any other chemistry course. Includes a laboratory/discussion each week. (F)

6A. General Chemistry I (4)

First quarter of a three-quarter sequence intended for science and engineering majors. Topics include: atomic theory, bonding, molecular geometry, stoichiometry, gas laws, solids and solutions, and thermochemistry. (F,W,S)

6AH. Honors General Chemistry I (4)

First quarter of a three-quarter honors sequence intended for well-prepared science and engineering majors. Topics are similar to those in 6A but are taught at a higher level and faster pace. Students completing 6AH may not subsequently take 6A for credit. (F)

6B. General Chemistry II (4)

Second quarter of a three-quarter sequence intended for science and engineering majors. Topics include: three laws of thermodynamics, physical equilibria, chemical equilibria, acids and bases, solubility. **Prerequisites:** Chem. 6A or 6AH, Math. 10A or 20A. (F,W,S)

6BH. Honors General Chemistry II (4)

Second quarter of a three-quarter honors sequence intended for well-prepared science and engineering majors. Topics include: chemical equilibrium, acids and bases, and thermodynamics. Three hours lecture and one hour recitation. Students completing 6BH may not subsequently take 6B for credit. **Prerequisites:** Chem. 6AH and Math. 20A. (W)

6C. General Chemistry III (4)

Third quarter of a three-quarter sequence intended for science and engineering majors. Topics include: electrochemistry, kinetics, coordination chemistry, nuclear chemistry, and an introduction to organic and biochemistry. **Prerequisite:** Chem. 6B or 6BH. (F,W,S)

6CH. Honors General Chemistry III (4)

Third quarter of a three-quarter honors sequence intended for well-prepared science and engineering majors. Topics are similar to those in 6C but are taught at a higher level and faster pace. Students completing 6CH may not subsequently take 6C for credit. **Prerequisites:** Chem. 6BH and Math. 20B. (S)

7L. General Chemistry Laboratory (4)

Condenses a year of introductory training in analytical, inorganic, physical, and synthetic techniques into one intensive quarter. A materials fee is required. A mandatory safety exam must be passed. **Prerequisite:** Chem. 6B or Chem. 6BH. (F,W,S)

11. The Periodic Table (4)

Introduction to the material world of atoms and small inorganic molecules. Intended for nonscience majors. Can be skipped by students with a good knowledge of high school chemistry. Cannot be taken for credit after any other general chemistry course. (F)

12. Molecules and Reactions (4)

Introduction to molecular bonding and structure and chemical reactions, including organic molecules and synthetic polymers. Intended for nonscience majors. **Prerequisite:** Chem. 11 or good knowledge of high school chemistry. Cannot be taken for credit after any organic chemistry course. (W)

13. Chemistry of Life (4)

Introduction to biochemistry for nonscience majors. **Prerequisite:** Chem. 12. Cannot be taken for credit after any biochemistry course. (S)

15. Chemistry of the Universe (4)

This is a one-quarter, nonmathematical chemistry course for nonscience majors covering the origin of the universe, the elements, and the formation of the solar system. The evolution of the Earth's atmosphere, hydrosphere, geosphere, and biosphere will be covered, as well as contemporary problems in environmental chemistry. Cannot be taken for credit after any other chemistry course.

87. Freshman Seminar in Chemistry and Biochemistry (1)

This seminar will present topics in chemistry at a level appropriate for first-year students.

90. Undergraduate Seminar (1)

The seminar will focus on a variety of issues and special areas in the field of chemistry.

91. Undergraduate Honors Seminar (1)

A seminar intended for exposing undergraduate students, especially freshmen and sophomores, to exciting research programs conducted by the faculty. Enrollment is limited.

92. Undergraduate Pharmacology Seminar (1)

Selected topics in pharmacology and toxicology. (S)

96. Introduction to Teaching Science (2)

(Cross-listed with EDS 31.) Explores routine challenges and exceptional difficulties students often have in learning science. Prepares students to make meaningful observations of how K-12 teachers deal with difficulties. Explores strategies that teachers may use to pose problems that stimulate students' intellectual curiosity.

99. Independent Study (2 or 4)

Independent literature or laboratory research by arrangement with and under the direction of a member of the Department of Chemistry and Biochemistry faculty.

Students must register on a P/NP basis. **Prerequisites:** lower-division standing, 3.0 minimum UCSD GPA, consent of instructor and department, completion of thirty units of undergraduate study at UCSD, completed and approved Special Studies form.

99R. Independent Study (1)

Independent study or research under the direction of a member of the faculty. **Prerequisites:** Student must be of first year standing and a Regent's Scholar; approved Special Studies form.

UPPER-DIVISION

100A. Analytical Chemistry Laboratory (4)

Laboratory course emphasizing classical quantitative chemical analysis techniques, including separation and gravimetric methods, as well as an introduction to instrumental analysis. **Prerequisites:** Chem. 6C or 6CH or equivalent, and Chem. 6BL or equivalent; Phys. 2CL or 2BL recommended. A materials fee is required for this course. A mandatory safety exam must be passed within the first two weeks. (F,W,S)

100B. Fundamentals of Instrumental Analysis (2)

Fundamental theoretical principles, capabilities, applications, and limitations of modern analytical instrumentation used for qualitative and quantitative analysis. Students will learn how to define the nature of an analytical problem and how to select and appropriate analytical method. **Prerequisites:** Chem. 100A or graduate standing, and Phys. 2A-B-D or equivalent; Phys. 2CL or 2BL recommended. (Note: Students may not receive credit for both Chem. 100B and Chem. 106.) (F,W,S)

100BL. Instrumental Analysis Laboratory (3)

Hands-on laboratory course focuses on the development of correct laboratory work habits and methodologies for the operation of modern analytical instrumentation. Gas chromatography, gas-chromatography-mass spectrometry, high performance liquid chromatography, ion chromatography, atomic absorption spectroscopy. Chem. 100BL is for undergraduates only. **Prerequisites:** Chem. 100A; Phys. 2A-2B-2D, or equivalent; concurrent enrollment with Chem. 100B. Phys. 2BL or 2CL recommended. (Note: Students may not receive credit for both Chem. 100B and Chem. 106.) (F,W,S)

104. Introduction to X-ray Crystallography (4)

(Conjoined with Chem. 204.) Analysis of macromolecular structures by X-ray diffraction. Topics include symmetry, geometry of diffraction, detection of diffraction, intensity of diffracted waves, phase problem and its solution, heavy atom method, isomorphous replacement, anomalous dispersion phasing methods (MAD), direct methods, molecular replacement. **Prerequisites:** Phys. 2A-B.

105A. Physical Chemistry Laboratory (4)

Laboratory course in experimental physical chemistry. **Prerequisites:** Chem. 100A and Phys. 2CL, Chem. 126 or 127 or 131 or 133. A materials fee is required for this course. (F,W,S)

105B. Physical Chemistry Laboratory (4)

Laboratory course in experimental physical chemistry. **Prerequisite:** Chem. 105A. A materials fee is required for this course. (F,W,S)

108. Protein Biochemistry Laboratory (6)

The application of techniques to study protein structure and function, including electrophoresis, protein purification, column chromatography, enzyme kinetics, and immunochemistry. **Prerequisites:** Chem. 143A and Chem. 114A. (Note: Formerly Chem. 112A. Students may not receive credit for both Chem. 108 and BIBC 103.) A materials fee may be required for this course. (F,W)

109. Recombinant DNA Laboratory (6)

This laboratory will introduce students to the tools of molecular biology and will involve experiments with recombinant DNA techniques. **Prerequisites:** Chem. 143A and Chem. 114A. (Note: Formerly Chem. 112B. Students may not receive credit for both Chem. 109 and BIBM 101.) A materials fee may be required for this course. (S)

113. Physical Chemistry of Biological Macromolecules (4)

(Conjoined with Chem. 213.) A discussion of the physical principles governing biological macromolecular structure and function, and the physicochemical experiments used to probe their structure and function. Chem. 213 students will be required to complete an additional paper and/or exam beyond that expected of students in Chem. 113. **Prerequisites:** Chem. 140C or 140CH; and Chem. 127 or 131 (113); or graduate standing (213).

114A. Biochemical Structure and Function (4)

Introduction to biochemistry from a structural and functional viewpoint. **Prerequisite:** Chem. 140A. (Note: Students may not receive credit for both Chem. 114A and BIBC 100.) (F,W)

114B. Biochemical Energetics and Metabolism (4)

This course is an introduction to the metabolic reactions in the cell which produce and utilize energy. The course material will include energy-producing pathways: glycolysis, Krebs cycle, oxidative phosphorylation, fatty-acid oxidation. Biosynthesis of amino acids, lipids, carbohydrates, purines, pyrimidines, proteins, nucleic acids. **Prerequisite:** Chem. 114A or BIBC 100. (Note: Students may not receive credit for both Chem. 114B and BIBC 102) (W)

114C. Biosynthesis of Macromolecules (4)

Mechanisms of biosynthesis of macromolecules—particularly proteins and nucleic acids. Emphasis is on how these processes are controlled and integrated with metabolism of the cell. **Prerequisite:** Chem. 114A or BIBC 100. (Note: Students may not receive credit for both Chem. 114C and BIBM 100.) (S)

114D. Molecular and Cellular Biochemistry (4)

(Conjoined with Chem. 214.) This course represents a continuation of 114C, or an introductory course for first- and second-year graduate students, and covers topics in molecular and cellular biochemistry. Emphasis will be placed on contemporary approaches to the isolation and characterization of mammalian genes and proteins, and molecular genetic approaches to understanding eukaryotic development and human disease. Chem. 214 students will be required to complete additional course work beyond that expected of students in Chem. 114D. **Prerequisites:** Chem. 114A-C or consent of instructor. (May not be offered every year.)

116. Chemistry of Enzyme Catalyzed Reactions (4)

A discussion of the chemistry of representative enzyme catalyzed reactions is presented. Enzyme reaction mechanisms and their relation to enzyme structure are emphasized. **Prerequisites:** Chem. 140C or 140CH, and Chem. 114A. (May not be offered every year.)

118. Pharmacology and Toxicology (4)

A survey of the biochemical action of drugs and toxins as well as their absorption and excretion.

Prerequisites: Chem. 140C or 140CH; and Chem.

114A and 114B, or consent of instructor. Priority will be given to Pharmacological Chemistry majors. (S)

120A. Inorganic Chemistry I (4)

The chemistry of the main group elements in terms of atomic structure, ionic and covalent bonding. Structural theory involving s, p, and unfilled d orbitals. Thermodynamic and spectroscopic criteria for structure and stability of compounds and chemical reactions of main group elements in terms of molecular structure and reactivity. **Prerequisites:** Chem. 6C or 6CH and Chem. 140A. (F,S)

120B. Inorganic Chemistry II (4)

A continuation of the discussion of structure, bonding, and reactivity with emphasis on transition metals and other elements using filled d orbitals to form bonds. Coordination chemistry in terms of valence bond, crystal field, and molecular orbital theory. The properties and reactivities of transition metal complexes including organometallic compounds. **Prerequisite:** Chem. 120A. (W)

123. Advanced Inorganic Chemistry Laboratory (4)

Synthesis, analysis, and physical characterization of inorganic chemical compounds. A materials fee is required for this course. **Prerequisites:** Chem. 120A and 143AH or 143A. (W,S)

124. Bioinorganic Chemistry (4)

(Conjoined with Chem. 225.) The roles of metal ions in biological systems, with emphasis on transition metal ions in enzymes that transfer electrons, bind oxygen, and fix nitrogen. Also included are metal complexes in medicine, toxicity, and metal ion storage and transport. Chem. 225 students will be required to complete an additional paper and/or exam beyond that expected of students in Chem. 124. **Prerequisite:** Chem. 114A or 120A or graduate standing. (May not be offered every year.)

126. Physical Chemistry (4)

An introduction to physical chemistry with emphasis on biochemical and environmental applications. Quantum mechanics and molecular structure, spectroscopy. **Prerequisites:** Phys. 2D, Math. 20D or 21D; or consent of instructor. (W)

127. Physical Chemistry (4)

An introduction to physical chemistry with emphasis on biochemical and environmental applications. Thermodynamics, first and second laws, thermochemistry, chemical equilibrium, solutions, kinetic theory, reaction kinetics. **Prerequisite:** Chem. 6C or 6CH, and Math. 20C. (F)

131. Physical Chemistry (4)

Thermodynamics, chemical equilibrium, phase equilibrium, chemistry of solutions. **Prerequisites:** Math. 20C or 21C, and Phys. 2B. Recommended: Math. 20D or 21D, and Phys. 2D. (W)

132. Physical Chemistry (4)

Chemical statistics, kinetic theory, reaction kinetics. **Prerequisites:** Math. 20D or 21D, Phys. 2B, and Chem. 131. (S)

133. Physical Chemistry (4)

Quantum mechanics, atomic and molecular spectroscopy, molecular structure. **Prerequisites:** Chem. 132 and Phys. 2D; or Chem. 6C, Math. 20D or 21D, Math. 20F, and Phys. 2AB; or consent of instructor. (F)

135. Molecular Spectroscopy (4)

(Conjoined with Chem. 235.) Time-dependent behavior of systems; interaction of matter with light; selection rules. Radiative and nonradiative processes, coherent phenomena, and the density matrices. Instrumentation, measurement, and interpretation. Chem. 235 students will be required to complete additional course work beyond that expected of students in Chem. 135. **Prerequisites:** Chem. 133 or equivalent; Math. 20D or 21D, or Chem. 190/290. (May not be offered every year.)

140A. Organic Chemistry I (4)

Introduction to organic chemistry, with applications to biochemistry. Bonding theory, isomerism, stereochemistry, chemical and physical properties. Introduction to substitution, addition, and elimination reactions. Students may not receive credit for both Chem. 140A and Chem. 141A. **Prerequisite:** Chem. 6C or equivalent course in general chemistry. (F,W,S)

140B. Organic Chemistry II (4)

Continuation of Organic Chemistry I, 140A. Methods of analysis, chemistry of hydrocarbons, chemistry of the carbonyl group. Introduction to the reactions of biologically important molecules. Students may not receive credit for both Chem. 141B and Chem. 140B. **Prerequisite:** Chem. 140A (a grade of C or higher in Chem. 140A is strongly recommended). (F,W,S)

140BH. Honors Organic Chemistry (4)

Continuation of Organic Chemistry I, Chem. 140A, at honors level. Methods of analysis, chemistry of hydrocarbons, carbonyls, and biologically important molecules. Emphasis on mechanistic aspects of reactions and structure-reactivity relationships. Students may not receive credit for Chem. 140B and Chem. 140BH. **Prerequisite:** Grade of B+ or higher in Chem. 140A.

140C. Organic Chemistry III (4)

Continuation of Organic Chemistry I (140A) and Organic Chemistry II (140B). Organic chemistry of biologically important molecules: carboxylic acids, carbohydrates, proteins, fatty acids, biopolymers, natural products. Students may not receive credit for both Chem. 140C and Chem.

141C. **Prerequisite:** Chem. 140B (a grade of C or higher in Chem. 140B is strongly recommended). (F,W,S)

140CH. Honors Organic Chemistry (4)

Continuation of Organic Chemistry 140B or 140BH, at honors level. Chemistry of carboxylic acids, carbohydrates, proteins, lipids biopolymers, natural products. Emphasis on mechanistic aspects and structure reactivity relationships.

Prerequisites: Grade of B+ or higher in Chem. 140B, or B- higher in Chem. 140BH.

143A. Organic Chemistry Laboratory (4)

Introduction to organic laboratory techniques. Separation, and purification, spectroscopy, product analysis, and effects of reaction conditions. **Prerequisites:** Chem. 6BL and Chem. 140A or Chem. 141A. A materials fee is required. A mandatory safety exam must be passed within the first two weeks. (**Note:** Students may not receive credit for both Chem. 143A and Chem. 143AH.) (F,W,S)

143AH. Honors Organic Chemistry Laboratory (4)

Organic chemistry laboratory for chemistry majors and other honors-level students with strong background in Chem. 140A. Similar to Chem. 143A, but emphasizes instrumental methods of product identification, separation, and analysis. **Prerequisites:** Chem. 6BL and B or better grade in Chem. 140A. A materials fee is required. A mandatory safety exam must be passed within the first two weeks. (**Note:** Students may not receive credit for both Chem. 143A and Chem. 143AH.) (W)

143B. Organic Chemistry Laboratory (4)

Continuation of Chem. 143AH or 143A, emphasizing synthetic methods of organic chemistry. **Prerequisites:** Chem. 143AH or 143A, Chem. 140B (may be taken concurrently). Enrollment is limited to majors in the Department of Chemistry and Biochemistry, unless space is available. A materials fee is required for this course. (W,S)

143C. Organic Chemistry Laboratory (5)

Identification of unknown organic compounds by a combination of chemical and physical techniques. This course is intended for chemistry majors only. **Prerequisites:** Chem. 6CL or 100A and 143 AH or 143A or equivalent (may be taken concurrently); 143B recommended. A materials fee is required for this course. (F)

143D. Molecular Design and Synthesis (4)

Advanced organic synthesis. Relationships between molecular structure and reactivity using modern synthetic methods and advanced instrumentation. Stresses importance of molecular design, optimized reaction conditions for development of practically useful synthesis, and problem-solving skills. **Prerequisites:** Chem. 140C and Chem. 143B. A materials fee is required for this course. (S)

146. Kinetics and Mechanism of Organic Reactions (4)

(Conjoined with Chem. 246.) Methodology of mechanistic organic chemistry; integration of rate expression, determination of rate constants, transition state theory; catalysis, kinetic orders, isotope effects, solvent effects, linear free energy relationship; product studies, stereochemistry; reactive intermediates; rapid reactions. Chem. 246 students will be required to complete an additional term project beyond that expected of students in Chem. 146. **Prerequisites:** Chem. 140C or 140CH (146) or graduate standing (246). (May not be offered every year.)

149A. Environmental Chemistry (4)

The chemical basis of air and water pollution, chlorofluorocarbons and the ozone hole, the environmental impact of radioactive waste disposal, mineral resource usage, and nuclear energy. **Prerequisite:** Chem. 6C or 6CH or equivalent. (F)

149B. Environmental Chemistry (4)

Agricultural productivity, biological impact on the environment, deforestation, environmental disasters (fires, nuclear winter, and volcanoes), and organic waste handling. **Prerequisite:** Chem. 149A. (W)

151. Molecules that Changed the World (4)

A look at some of nature's most intriguing molecules and the ability of man to discover, synthesize, modify, and use them. The role of chemistry in society, and how chemical synthesis—the art and science of constructing molecules—shapes our world. **Prerequisite:** Chem. 140A or equivalent.

152. Synthetic Methods in Organic Chemistry (4)

(Conjoined with Chem. 252; formerly Chem. 148.) A survey of reactions of particular utility in the organic laboratory. Emphasis is on methods of preparation of carbon-carbon bonds and oxidation reduction sequences. Chem. 252 students will be required to complete an additional paper and/or exam beyond that expected of students enrolled in Chem. 152. **Prerequisite:** Chem. 140C or 140CH (152); or graduate standing (252).

154. Mechanisms of Organic Reactions (4)

(Conjoined with Chem. 254; formerly Chem. 147.) A qualitative approach to the mechanisms of various organic reactions; substitutions, additions, eliminations, condensations, rearrangements, oxidations, reductions, free-radical reactions, and photochemistry. Includes considerations of molecular structure and reactivity, synthetic methods, spectroscopic tools, and stereochemistry. The topics emphasized will vary from year to year. This is the first quarter of the advanced organic chemistry sequence. Chem. 254 students will be required to complete an additional paper/exam beyond that expected of students in Chem. 154. **Prerequisite:** Chem. 140C or 140CH (154); or graduate standing (254).

155. Synthesis of Complex Molecules (4)

(Conjoined with Chem. 255; formerly Chem. 144.) This course discusses planning economic routes for the synthesis of complex organic molecules. The uses of specific reagents and protecting groups will be outlined as well as the control of stereochemistry during a synthesis. Examples will be selected from the recent literature. Chem. 255 students will be required to complete an additional paper/exam. (May not be offered every year.) **Prerequisite:** Chem. 152 or 252 or consent of instructor.

156. Structure and Properties of Organic Molecules (4)

(Conjoined with Chem. 256; formerly Chem. 145.) Introduction to the measurement and theoretical correlation of the physical properties of organic molecules. Topics covered include molecular geometry, molecular-orbital theory, orbital hybridization, aromaticity, chemical reactivity, stereochemistry, infrared and electronic spectra, photochemistry, and nuclear magnetic resonance. Chem. 256 students will be required to complete an additional paper and/or exam beyond that expected of students of Chem. 156. **Prerequisites:** Chem. 140C or 140CH (156); or graduate standing (256).

157. Bioorganic and Natural Products Chemistry (4)

(Conjoined with Chem. 257; formerly Chem. 142.) A comprehensive survey of modern bioorganic and natural products chemistry. Topics will include biosynthesis of natural products, molecular recognition, and small molecule-biomolecule interactions. For Chem. 257, students will be required to complete additional course work beyond that expected of students enrolled in Chem. 157. **Prerequisite:** Chem. 140C or 140CH (157); or graduate standing (257).

158. Applied Spectroscopy (4)

(Conjoined with Chem. 258.) Intensive coverage of modern spectroscopic techniques used to determine the structure of organic molecules. Problem solving and interpretation of spectra will be strongly emphasized. Chem. 258 students will be required to write and submit a paper that reviews a recent research publication that reports the structure determination by spectroscopic methods of natural products. **Prerequisites:** Chem. 120A and 120B or equivalent.

161. Supramolecular Coordination Chemistry (4)

(Conjoined with Chem. 261.) An introduction and survey of modern coordination chemistry. Topics will include structure and bonding of alkali, transition, lanthanide and actinide metals, with emphasis on the first row transition metals; stereochemistry, coordination clusters, molecular solids and nanoparticles. **Prerequisites:** Chem. 120A and 120B or equivalent.

164. Structural Biology of Viruses (4)

(Cross-listed with BIMM 164.) An introduction to virus structures, how they are determined, and how they facilitate the various stages of the viral life cycle from host recognition and entry to replication, assembly, release, and transmission to uninfected host cells. (May not be

offered every year.) **Prerequisite:** Chem. 114A or BIBC 100. Recommended preparation: A basic course in cell biology.

165. 3D Electron Microscopy of Macromolecules (4) (Conjoined with Chem. 265; cross-listed with BIMM 162/BGGN 262.) Biological macromolecules and supramolecular complexes as well as organelles, and small cells are being examined in three-dimensions by modern electron cryomicroscopy and image reconstruction techniques. The basic principles of transmission electron microscopy and 3D image reconstruction are discussed. Chem. 265/BGGN 262 students will be required to complete an additional assignment/exam beyond that expected of students in Chem. 165/BIMM 162. **Prerequisites:** Chem. 114A or BIBC 100 or BIBC 110, and Phys. 1A-B-C or Phys. 2A-B-D.

166. Environmental and Molecular Toxicology (4) (Conjoined with Chem. 266.) Molecular and cellular mechanisms underlie the actions of environmental toxicants. This course will investigate approaches to study the impact of environmental toxicants on human health. Other modern approaches that are being implemented to detect and remediate environmental toxicants will also be examined. Chem. 266 students will be required to complete an additional assignment/exam beyond that expected of students in Chem. 166. **Prerequisites:** Chem. 114A-B.

173. Atmospheric Chemistry (4) (Conjoined with Chem. 273.) Chemical principles applied to the study of atmospheres. Atmospheric photochemistry, radical reactions, chemical lifetime determinations, acid rain, greenhouse effects, ozone cycle, and evolution are discussed. Chem. 273 students will be required to complete an additional assignment/exam beyond that expected of students in Chem. 173. **Prerequisites:** Chem. 149A and Chem. 127 or 132 (173); or graduate standing (273). (S)

174. Chemical Principles of Marine Systems (4) (Cross-listed with SIO 141.) Introduction to the chemistry and distribution of the elements in seawater, emphasizing basic chemical principles such as electron structure, chemical bonding, and group and periodic properties and showing how these affect basic aqueous chemistry in marine systems. **Prerequisite:** Chem. 6C with a grade of C- or better, or consent of instructor. (May not be offered every year.)

182. Biological Databases (4) (Cross-listed with BIMM 182/BENG 182/CSE 182.) This course provides an introduction to the features of biological data, how those data are organized efficiently in databases, and how existing data resources can be utilized to solve a variety of biological problems. Object oriented databases, data modeling, and description. Survey of current biological database with respect to above, implementation of database on a biological topic. **Prerequisite:** CSE 100 or Math. 176. Bioinformatics majors only.

184. Computational Molecular Biology (4) (Cross-listed with BIMM 184/BENG 184/CSE 184.) This advanced course covers the application of machine learning and modeling techniques to biological systems. Topics include gene structure, recognition of DNA and protein sequence patterns, classification, and protein structure prediction. Pattern discovery, Hidden Markov models/support vector machines/neural network/profiles, protein structure prediction, functional characterization of proteins, functional genomics/proteomics, metabolic pathways/gene networks. **Prerequisites:** BIMM 181 or BENG 181 or CSE 181; BIMM 182 or BENG 182 or CSE 182 or CHEM 182. Bioinformatics majors only.

185. Introduction to Computational Chemistry (4) (Conjoined with Chem. 285.) Course in computational methods building on a background in mathematics and physical chemistry. Brief introduction and background in computational theory, molecular mechanics, semi-empirical methods, and ab initio-based methods of increasing elaboration. Emphasis on applications and reliability. Chem. 285 students will be required to complete an additional assignment/exam beyond that expected of students in Chem. 185. **Prerequisites:** Chem. 126 or 133 and Math. 20C or 21C. (May not be offered every year.)

187. Foundations of Teaching and Learning Science (4) (Cross-listed with EDS 122.) Examine theories of learning and how they are important in the science classroom. Conceptual development in the individual student, as well as the development of knowledge in the history of science. Key conceptual obstacles in science will be explored. **Prerequisites:** Chem. 6C and Chem. 96.

188. Capstone Seminar in Science Education (4) (Cross-listed with EDS 123.) In the lecture and observation format, students continue to explore the theories of learning in the science classroom. Conceptual development is fostered, as well as continued development of knowledge of science history. Students are exposed to the science of teaching in science in actual practice. **Prerequisites:** Chem. 6C and Chem. 187/EDS 122.

192. Senior Seminar in Chemistry and Biochemistry (1) The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in chemistry or biochemistry. May be taken for credit up to four times, with a change in topic, and permission of the department. **Prerequisites:** department stamp and/or consent of the instructor.

195. Methods of Teaching Chemistry (4) An introduction to teaching chemistry. Students are required to attend a weekly class on methods of teaching chemistry, and will teach a discussion section of one of the lower-division chemistry courses. Attendance at lecture of the lower-division course in which the student is participating is required. (P/NP grades only.) **Prerequisite:** consent of instructor. (F,W,S)

196. Reading and Research in Chemical Education (2 or 4) Independent literature or classroom research by arrangement with, and under the direction of, a member of the Department of Chemistry and Biochemistry faculty. Students must register on a P/NP basis. **Prerequisites:** upper-division standing, 2.5 minimum GPA, consent of instructor and department. (F,W,S)

199. Reading and Research (2 or 4) Independent literature or laboratory research by arrangement with, and under the direction of, a member of the Department of Chemistry and Biochemistry faculty. Students must register on a P/NP basis. **Prerequisites:** upper-division standing, 2.5 minimum GPA, consent of instructor and department. (F,W,S)

GRADUATE

204. Introduction to X-ray Crystallography (4) (Conjoined with Chem. 104.) Analysis of macromolecular structures by X-ray diffraction. Topics include symmetry, geometry of diffraction, detection of diffraction, intensity of diffracted waves, phase problem and its solution, heavy atom method, isomorphous replacement, anomalous dispersion phasing methods (MAD), direct methods, molecular replacement. Chem. 204 students will be required to complete additional paper and/or exam beyond that expected of students in Chem. 104.

207. Protein NMR (4) A broad introduction to the uses of nuclear magnetic resonance to characterize and understand proteins. Not highly mathematical, this course should be accessible to chemistry graduate students working with proteins.

209. Macromolecular Recognition (4) Structures and functions of nucleic acids, folding and catalysis of nucleic acids, motifs and domains of proteins, principles of protein-protein interactions, chemistry of protein/DNA and protein/RNA interfaces, conformational changes in macromolecular recognition. **Prerequisites:** biochemistry background and graduate standing, or approval of instructor.

211. Metabolic Biochemistry (4) A comprehensive course in biochemistry emphasizing metabolic and human biochemistry. **Prerequisites:** physical and organic chemistry; graduate standing. (F)

213. Physical Chemistry of Biological Macromolecules (4) (Conjoined with Chem. 113.) A discussion of the physical principles governing biological macromolecular structure and function, and the physicochemical experiments used to probe their structure and function. Chem. 213 students will be required to complete an additional paper and/or exam beyond that expected of students in Chem. 113. **Prerequisites:** Chem. 140C or 140CH; and Chem. 127 or 131 (113); or graduate standing (213).

214. Molecular and Cellular Biochemistry (4) (Conjoined with Chem. 114D.) This course represents a continuation of 114C, or an introductory course for first- and second-year graduate students, and covers topics in molecular and cellular biochemistry. Emphasis will be placed on contemporary approaches to the isolation and characterization of mammalian genes and proteins, and molecular genetic approaches to understanding eukaryotic development and human disease. Chem. 214 students will be required to complete additional course work beyond that expected of students in Chem. 114D. **Prerequisite:** Chem. 114A-C or consent of instructor. (May not be offered every year.)

215. Modeling Biological Macromolecules (4) (Conjoined with Chem. 115; cross-listed with PHAR 205/BIOM 205.) Use of computer graphics and modeling methods in the study of biological macromolecules. The course will cover basic methods and techniques. The objective is to provide a good working knowledge of the critical features of the methods and to provide a foundation for further study for those who wish to pursue these methods as research topics. Chem. 215/BIOM 205/PHAR 205 students will be required to complete additional course work beyond that expected of students in Chem. 115. **Prerequisite:** Chem. 114A or equivalent. (May not be offered every year.)

216. Chemical Biology (4) A discussion of current topics in chemical biology including mechanistic aspects of enzymes and cofactors, use of modified enzymes to alter biochemical pathways, chemical intervention in cellular processes, and natural product discovery. **Prerequisite:** graduate standing or consent of instructor. (May not be offered every year.)

219. Special Topics in Biochemistry (4) This special topics course is designed for first-year graduate students in biochemistry. Topics presented in recent years have included protein processing, the chemical modification of proteins, the biosynthesis and function of glycoproteins, lipid biochemistry and membrane structure, and bioenergetics. **Prerequisites:** undergraduate courses in biochemistry, Chem. 114A or equivalent. (May not be offered every year.)

220. Regulatory Circuits in Cells (4) Modulation cellular activity and influencing viral fate involve regulatory circuits. Emergent properties include dose response, cross-regulation, dynamic, and stochastic behaviors. This course reviews underlying mechanisms and involves mathematical modeling using personal computer tools.

221. Signal Transduction (4) The aim of this course is to develop an appreciation for a variety of topics in signal transduction. We will discuss several historical developments while the focus will be on current issues. Both experimental approaches and results will be included in our discussions. Topics may vary from year to year. **Prerequisites:** biochemistry and molecular biology. (May not be offered every year.)

222. Structure and Analysis of Solids (4) (Cross-listed with MATS 227.) Key concepts in the atomic structure and bonding of solids such as metals, ceramics, and semiconductors. Symmetry operations, point groups, lattice types, space groups, simple and complex inorganic compounds, structure/property comparisons, structure determination with X-ray diffraction. Ionic, covalent, metallic bonding compared with physical properties. Atomic and molecular orbitals, bands versus bonds, free electron theory.

224. Spectroscopic Techniques (4)

Application of physical techniques to the elucidation of the structure of inorganic complex ions and organometallic compounds. Topics covered include group theory, and its application to vibrational, magnetic resonance and Raman spectroscopy. (May not be offered every year.)

225. Bioinorganic Chemistry (4)

(Conjoined with Chem. 125.) The role of metal ions in biological systems, with emphasis on transition metal ions in enzymes that transfer electrons, bind oxygen, and fix nitrogen. Also included are metal complexes in medicine, toxicity, and metal ion storage and transport. Chem. 225 students will be required to complete an additional paper and/or exam beyond that expected of students in Chem. 125. **Prerequisite:** Chem. 114A or 120A, or graduate standing. (May not be offered every year.)

226. Transition Metal Chemistry (4)

Advanced aspects of structure and bonding in transition metal complexes with major emphasis on Molecular Orbital Theory. Electronic structure descriptions are used to rationalize structure/reactivity relationships. Other topics include computational chemistry, relativistic effects, metal-metal bonding, and reaction mechanisms. **Prerequisite:** Graduate standing or consent of instructor.

227. Seminar in Inorganic Chemistry (2)

Seminars presented by faculty and students on topics of current interest in inorganic chemistry, including areas such as bioinorganic, organometallic and physical-inorganic chemistry. The course is designed to promote a critical evaluation of the available data in specialized areas of inorganic chemistry. Each quarter three or four different topics will be discussed. **Prerequisite:** graduate standing or consent of instructor. (S/U grades only.)

228. Solid State Chemistry (4)

Survey of the chemistry of semiconductors, superconductors, molecular magnetic materials, zeolites, fast ion conductors, electronically conducting polymers and ceramics. Synthetic techniques such as molecular precursor design, the sol-gel process, electrosynthesis, and high-temperature thermolysis will be covered. (May not be offered every year.)

229. Special Topics in Inorganic Chemistry (2-4)

Selection of topics of current interest. May be repeated for credit when topics vary. (May not be offered every year.)

230A. Quantum Mechanics I (4)

Theoretical basis of quantum mechanics; postulates; wave packets; matrix representations; ladder operators; exact solutions for bound states in 1, 2, or 3 dimensions; angular momentum; spin; variational approximations; description of real one and two electron systems. Recommended background: Chem. 133 and Math. 20D or their equivalents.

230B. Quantum Mechanics II (4)

Continuation of theoretical quantum mechanics: evolution operators and time dependent representations, second quantization, Born-Oppenheimer approximation, electronic structure methods, selected topics from among density operators, quantized radiation fields, path integral methods, scattering theory. **Prerequisite:** Chem. 230A or consent of instructor.

231. Chemical Kinetics and Molecular Reaction Dynamics (4)

Classical kinetics, transition state theory, unimolecular decomposition, potential energy surfaces; scattering processes and photodissociation processes. (May not be offered every year.)

232A. Statistical Mechanics I (4)

Derivation of thermodynamics from atomic descriptions. Ensembles, fluctuations, classical (Boltzmann) and quantum (Fermi-Dirac and Bose-Einstein) statistics, partition functions, phase space, Liouville equation, chemical equilibrium, applications to weakly interacting systems, such as ideal gases, ideal crystals, radiation fields. Recommended background: Chem. 132 or its equivalent. Classical and quantum mechanics, thermodynamics, and mathematical methods will be reviewed as needed, but some background will be necessary.

232B. Statistical Mechanics II (4)

Interacting systems at equilibrium, both classical (liquids) and quantum (spins). Phase transitions. Non-equilibrium systems: glasses, transport, time correlation functions, Onsager relations, fluctuation-dissipation theorem, random walks, Brownian motion. Applications in biophysics. **Prerequisite:** Chem. 232A or consent of instructor.

235. Molecular Spectroscopy (4)

(Conjoined with Chem. 135.) Time-dependent behavior of systems; interaction of matter with light; selection rules. Radiative and nonradiative processes, coherent phenomena and the density matrices. Instrumentation, measurement, and interpretation. Chem. 235 students will be required to complete additional course work beyond that expected of students in Chem. 135. **Prerequisites:** Chem. 133 or equivalent; Math. 20D or 21D; or Chem. 190/290. (May not be offered every year.)

239. Special Topics in Chemical Physics (2 or 4)

Topics of special interest will be presented. Examples include NMR, solid-state chemistry, phase transitions, stochastic processes, scattering theory, nonequilibrium processes, tensor transformations, and advanced topics in statistical mechanics, thermodynamics, and chemical kinetics. (May not be offered every year.)

240. Electrochemistry (4)

(Cross-listed with MATS 230.) Application of electrochemical techniques to chemistry research. Basic electrochemical theory and instrumentation: the diffusion equations, controlled potential, and current methods. Electro-chemical kinetics, Butler-Volmer, Marcus-Hush theories, preparative electrochemistry, analytical electrochemistry, solid and polymer electrolytes, semiconductor photoelectrochemistry. (May not be offered every year.)

246. Kinetics and Mechanism (4)

Methodology of mechanistic organic chemistry: integration of rate expressions, determination of rate constants, transition state theory; catalysis, kinetic orders, isotope effects, substituent effects, solvent effects, linear free energy relationship; product studies, stereochemistry; reactive intermediates; rapid reactions. (May not be offered every year.)

250. Seminar in Chemistry (2)

Regularly scheduled seminars by first-year graduate students provide opportunities for practice in seminar delivery and for the exploration of topics of general interest. (S/U grades only.) (S)

251. Research Conference (2)

Group discussion of research activities and progress of the group members. **Prerequisite:** consent of instructor. (S/U grades only.) (F,W,S)

252. Synthetic Methods in Organic Chemistry (4)

(Conjoined with Chem. 152; formerly Chem. 248.) A survey of reactions of particular utility in the organic laboratory. Emphasis is on methods of preparation of carbon-carbon bonds and oxidation reduction sequences. For Chem. 252, students would be required to complete an additional paper and/or exam beyond that expected of students enrolled in Chem. 152. **Prerequisite:** Chem. 140C or 140CH (152), or graduate standing (252).

254. Mechanisms of Organic Reactions (4)

(Conjoined with Chem. 154; formerly Chem. 247.) A qualitative approach to the mechanisms of various organic reactions; substitutions, additions, eliminations, condensations, rearrangements, oxidations, reductions, free-radical reactions, and photochemistry. Includes considerations of molecular structure and reactivity, synthetic methods, spectroscopic tools, and stereochemistry. The topics emphasized will vary from year to year. This is the first quarter of the advanced organic chemistry sequence. Chem. 254 students will be required to complete an additional paper and/or exam beyond that expected of students in Chem. 154. **Prerequisite:** Chem. 140C or 140CH (154), or graduate standing (254).

255. Synthesis of Complex Molecules (4)

(Conjoined with Chem. 155; formerly Chem. 244.) This course discusses planning economic routes for the synthesis of complex organic molecules. The uses of specific reagents and protecting groups will be outlined as well as

the control of stereochemistry during a synthesis. Examples will be selected from the recent literature. Chem. 255 students will be required to complete an additional paper and/or exam beyond that expected of students in Chem. 155. (May not be offered every year.) **Prerequisite:** Chem. 152 or 252 or consent of instructor.

256. Structure and Properties of Organic Molecules (4)

(Conjoined with Chem. 156; formerly Chem. 245.) Introduction to the measurement and theoretical correlation of the physical properties of organic molecules. Topics covered include molecular geometry, molecular-orbital theory, orbital hybridization, aromaticity, chemical reactivity, stereochemistry, infrared and electronic spectra, photochemistry, and nuclear magnetic resonance. Chem. 256 students will be required to complete an additional paper and/or exam beyond that expected of students in Chem. 156. **Prerequisite:** Chem. 140C or 140CH (156), or graduate standing (256).

257. Biorganic and Natural Products Chemistry (4)

(Conjoined with Chem. 157; formerly Chem. 242.) A comprehensive survey of modern bioorganic and natural products chemistry. Topics include biosynthesis of natural products, molecular recognition, and small molecule-biomolecule interactions. Chem. 257 students will be required to complete additional course work beyond that expected of students in Chem. 157. **Prerequisite:** Chem. 140C or 140CH (157), or graduate standing (257).

258. Applied Spectroscopy (4)

(Conjoined with Chem. 158.) Intensive coverage of modern spectroscopic techniques used to determine the structure of organic molecules. Problem solving and interpretation of spectra will be strongly emphasized. Chem. 258 students will be required to write and submit a paper that reviews a recent research publication that reports the structure determination by spectroscopic methods of natural products. **Prerequisite:** Chem. 154 or 254 or consent of instructor.

259. Special Topics in Organic Chemistry (2-4)

(Formerly Chem. 249.) Various advanced topics in organic chemistry. Includes but is not limited to: advanced kinetics, advanced spectroscopy, computational chemistry, heterocyclic chemistry, medicinal chemistry, organotransition metal chemistry, polymers, solid-phase synthesis/combinatorial chemistry, stereochemistry, and total synthesis classics.

260. Light and Electron Microscopy of Cells and Tissue (4)

Students will review basic principles of light and electron microscopy and learn a variety of basic and advanced microscopy methods through lecture and hands-on training. Each student will have his or her own project. Additional supervised instrument time is available. **Prerequisite:** consent of instructor.

261. Supramolecular Coordination Chemistry (4)

(Conjoined with Chem. 161.) An introduction and survey of modern coordination chemistry. Topics will include structure and bonding of alkali, transition, lanthanide, and actinide metals, with emphasis on the first row transition metals; stereochemistry, coordination clusters, molecular solids and nanoparticles. Chem. 261 students will be required to complete additional course work beyond that expected of students in Chem. 161. **Prerequisites:** Chem. 120A, 120B or equivalent; or graduate standing.

262. Inorganic Chemistry and NMR (4)

A survey of inorganic chemistry to prepare for graduate research in the field, including a detailed introduction to nuclear magnetic resonance (NMR), followed by applications of NMR to structural and mechanistic problems in inorganic chemistry.

264. Structural Biology of Viruses (4)

(Cross-listed with BGGN 264.) An introduction of virus structures, how they are determined, and how they facilitate the various stages of the viral life cycle from host recognition and entry to replication, assembly, release, and transmission to uninfected host cells. Students will be required to complete a term paper. (May not be offered every year.) Recommended: Elementary biochemistry as treated in

Chem. 114A or BIBC 100 and a basic course in cell biology or consent of the instructor.

265. 3D Electron Microscopy of Macromolecules (4)
(Cross-listed with BGGN 262.) Biological macromolecules and supramolecular complexes as well as organelles, and small cells are being examined in three-dimensions by modern electron cryomicroscopy and image reconstruction techniques. The basic principles of transmission electron microscopy and 3D image reconstruction are discussed. Chem. 265/BGGN 262 students will be required to complete an additional oral presentation or paper or exam beyond that expected of students in Chem. 165/BGGN 162. (May not be offered every year.) Recommended: Elementary biochemistry as treated in Chem. 114A or BIBC 100 and a basic course in cell biology or consent of instructor.

266. Environmental and Molecular Toxicology (4)
(Conjoined with Chem. 166; cross-listed with BMM 166/BGGN 256/BIOM 266.) Molecular and cellular mechanisms underlie the actions of environmental toxicants. This course will investigate approaches to study the impact of environmental toxicants on human health. Other modern approaches that are being implemented to detect and remediate environmental toxicants will also be examined. Chem. 266 students will be required to complete an additional paper and/or exam beyond that expected of students in Chem. 166. (W)

270A-B-C. Current Topics in Environmental Chemistry (2-2-2)

Seminar series on the current topics in the field of environmental chemistry. Emphasis is on current research topics in atmospheric, oceanic, and geological environments. **Prerequisite:** consent of instructor. (S/U grades only.) (May not be offered every year.)

271. Special Topics in Analytical Chemistry (4)
Topics of special interest in analytical chemistry. May include, but is not limited to, chemical separation, sample introductions, mass analyzers, ionization schemes, and current state-of-the-art applications in environmental and biological chemistry.

273. Atmospheric Chemistry (4)
(Conjoined with Chem. 173.) Chemical principles applied to the study of atmospheres. Atmospheric photochemistry, radical reactions, chemical lifetime determinations, acid rain, greenhouse effects, ozone cycle, and evolution are discussed. Chem. 273 students will be required to complete additional assignment/exam beyond that expected of students in Chem. 173. **Prerequisites:** Chem. 149A and Chem. 127 or 132 (173), or graduate standing (273). (S)

276. Numerical Analysis in Multiscale Biology (4)
Introduces mathematical tools to simulate biological processes at multiple scales. Numerical methods for ordinary and partial differential equations (deterministic and stochastic), and methods for parallel computing and visualization. Hands-on use of computers emphasized; students will apply numerical methods in individual projects. **Prerequisite:** consent of instructor. (S)

280. Applied Bioinformatics (4)
Publicly available databases and bioinformatics tools are now an indispensable component of biomedical research. This course offers an introductory survey of selected tools and databases; the underlying concepts, the software, and advice on using them. Practical exercises will be included.

283. Supramolecular Structure Determination Laboratory (4)
A laboratory course combining hands-on mass spectrometry and bioinformatics tools to explore the relationship between structure and function in macromolecules. Tools for peptide sequencing, analysis of post-translational modification, and fragmentation analysis by mass spectrometry are examples of experiments students will run. **Prerequisite:** consent of instructor.

285. Introduction to Computational Chemistry (4)
(Conjoined with Chem. 185.) Course in computational methods building on a background in mathematics and physical chemistry. Brief introduction and background in computational theory, molecular mechanics, semi-empirical methods, and ab initio-based methods of increasing elaboration. Emphasis on applications and reliability. Chem.

285 students will be required to complete an additional paper and/or exam beyond that expected of students in Chem. 185. **Prerequisites:** Chem. 126 or 133 and Math. 20C. (May not be offered every year.)

288. Algorithms in Contemporary Computational Biology (4)
Course will focus on several topics in contemporary computational biology, including inference of gene modules, reconstructing gene regulatory network, and predicting signal transduction network. Algorithms that will be discussed include Bayesian network, hidden Markov model, and Markov chain Monte Carlo. Recommended preparation: Chem. 184 and basic concepts of probability, statistics, and molecular biology.

294. Organic Chemistry Seminar (2)
Formal seminars or informal puzzle sessions on topics of current interest in organic chemistry, as presented by visiting lecturers, local researchers, or students. **Prerequisite:** advanced graduate-student standing. (S/U grades only.) (F,W,S)

295. Biochemistry Seminar (2)
Formal seminars or informal puzzle sessions on topics of current interest in biochemistry, as presented by visiting lecturers, local researchers, or students. **Prerequisite:** advanced graduate-student standing. (S/U grades only.)

296. Chemical Physics Seminar (2)
Formal seminars or informal sessions on topics of current interest in chemical physics as presented by visiting lecturers, local researchers, or students. **Prerequisite:** advanced graduate-student standing. (S/U grades only.) (F,W,S)

297. Experimental Methods in Chemistry (4)
Experimental methods and techniques involved in chemical research are introduced. Hands-on experience provides training for careers in industrial research and for future thesis research. **Prerequisite:** graduate-student standing. (S/U grades only.)

298. Special Study in Chemistry (1-4)
Reading and laboratory study of special topics for first-year graduate students under the direction of a faculty member. Exact subject matter to be arranged in individual cases. (S/U grades only.) **Prerequisite:** first-year graduate-student standing. (F,W,S)

299. Research in Chemistry (1-12)
Prerequisites: graduate-student standing and consent of instructor. (S/U grades only.) (F,W,S)

500. Teaching in Chemistry (4)
A doctoral student in chemistry is required to assist in teaching undergraduate chemistry courses. One meeting per week with instructor, one or more meetings per week with assigned class sections or laboratories, and attendance at the lecture of the undergraduate course in which he or she is participating. **Prerequisites:** graduate-student standing and consent of instructor. (S/U grades only.) (F,W,S)

The Chicano/a– Latino/a Arts and Humanities Minor (CLAH)

OFFICE: Literature Building, Room 131
(858) 822-4059

http://minors.ucsd.edu/clah/clah_portal

AFFILIATED FACULTY

Marisa Abrajano, Ph.D., *Political Science*
Luis Alvarez, Ph.D., *History*
Roberto Alvarez, Ph.D., *Ethnic Studies*
Robert Castro, Ph.D., *Theatre and Dance*
Jaime Concha, Ph.D., *Literature*
Ross Frank, Ph.D., *Ethnic Studies*
David Gutiérrez, Ph.D., *History*
Sara Johnson, Ph.D., *Literature*
Jorge Mariscal, Ph.D., *Literature; CLAH Director*
Natalia Molina, Ph.D., *Ethnic Studies*
Max Parra, Ph.D., *Literature*
Beatrice Pita, Ph.D., *Literature*
Rosaura Sánchez, Ph.D., *Literature*
Olga Vásquez, Ph.D., *Communication*
Patrick Velasquez, Ph.D., *Director of OASIS*
Daniel Widener, Ph.D., *History*
Elana Zilberg, Ph.D., *Communication*

THE MINOR

The Chicano/a~Latino/a Arts and Humanities minor is an interdisciplinary minor that provides a broad introduction to the histories and cultural artifacts produced by Spanish-speaking communities in the United States. Through a coordinated course of study drawing upon course offerings in the Departments of Theatre and Dance, Ethnic Studies, Communication, History, Literature, and other departments, students will gain an understanding of this important segment of the U.S. population.

REQUIREMENTS

Students will have a minimum of two years or the equivalent of Spanish language instruction (Satisfactory completion of Lit/Spanish 2A, B, C or Lit/Span 2D will satisfy this requirement). Students may count one lower-division language course (four units) towards the total unit requirement.

Students will complete twenty-eight total units of which at least twenty (five courses) must be upper-division. Students may take no more than three upper-division courses in any one department. The required distribution of the five upper-division courses may be selected from among the following courses. Students may petition to receive credit for courses not listed below.

COURSES

(Partial List)

ETHNIC STUDIES

Note: Many ETHN courses are cross-listed courses from other departments.

- ETHN 101. *Ethnic Images in Film*
- ETHN 105. *Ethnic Diversity and the City*
- ETHN 140. *Language and American Ethnicity*
- ETHN 141. *Language, Culture, and Inequality*
- ETHN 189. *Special Topics in Ethnic Studies*

HISTORY

- HILD 7C. *History of Race and Ethnicity in the U.S.*
- HIUS 167. *Topics in Mexican American History*
- HIUS 180. *Colloquium on the Recent History of Immigration, Ethnicity, and Citizenship in the Twentieth-Century U.S.*
- HILA 158. *Social and Economic History of the Southwest I*
- HILA 159. *Social and Economic History of the Southwest II*
- HILA 131. *History of Mexico*
- HILA 132. *Contemporary Mexico*
- HILA 122. *Cuba*

LITERATURE

The following courses are taught in Spanish–Literature Spanish (LTSP):

- LTSP 130B. *Introduction to Latin American Literature*
- LTSP 135B. *Modern Mexican Literature*
- LTSP 136. *Andean Literature*
- LTSP 137. *Caribbean Literature*
- LTSP 150A. *Early Latino/a and Chicano/a Cultural Production 1848-1960*
- LTSP 150B. *Contemporary Latino/a and Chicano/a Cultural Production 1960 to present*
- LTSP 151. *Topics in Chicano/a and Latino/a Cultures*
- LTSP 153. *Chicano/a and Latino/a Poetry*
- LTSP 154. *Chicano/a and Latino/a Literatures*
- LTSP 162. *Spanish Language in the U.S.*

The following courses are taught in English–Literature English (LTEN) and Literature of the Americas (LTAM):

- LTEN 180. *Chicano Literature in English*
- LTAM 100. *Latino/a Cultures in the United States*
- LTAM 101. *Early Latino/a and Chicano/a Cultures: 1848-1960*
- LTAM 102. *Contemporary Latino/a and Chicano/a Cultural Production 1960 to present*
- LTAM 105. *Gender and Sexuality in Chicano/a and Latino/a Cultural Production*
- LTAM 106. *Modern Chicana and Mexican Women Writers*
- LTAM 107. *Comparative Latino/a and U.S. Ethnic Cultures*

LTAM 108. *Chicano/a and Latino/a Cultures: Intellectual and Political Traditions*

LTAM 109. *Cultural Production of the Latino/a Diasporas*

LTAM 110. *Latin American Literature in Translation*

LTAM 120. *Mexican Literature in Translation*

MUSIC

MUS 13AM. *World Music/Multicultural America*

THEATRE AND DANCE

TDHT 108. *Luis Valdez*

TDHT 110. *Chicano Dramatic Literature*

TDHT 111. *Hispanic-American Dramatic Literature*

TDHT 112. *Gay and Lesbian Themes in U.S. Latino Theater*

VISUAL ARTS

VIS 126AN. *Pre-Columbian Art of Ancient Mexico and Central America*

VIS 126BN. *The Art and Civilization of the Ancient Maya*

VIS 126G. *Problems in Mesoamerican Art History*

VIS 126H. *Problems in Ancient Maya Iconography and Inscriptions*

Chinese Studies

PROFESSORS

Joseph C.Y. Chen, Ph.D., *Physics, Emeritus*
Matthew Chen, Ph.D., *Linguistics, Emeritus*
Joseph W. Esherick, Ph.D., *History*
Germaine A. Houston, Ph.D., *Political Science*
David K. Jordan, Ph.D., *Anthropology, Emeritus*
Ping-hui Liao, Ph.D., *Literature*
Richard P. Madsen, Ph.D., *Sociology*
Barry J. Naughton, Ph.D., *Graduate School of
International Relations and Pacific Studies*
Paul G. Pickowicz, Ph.D., *History*
Kuiyi Shen, Ph.D., *Visual Arts*
Susan L. Shirk, Ph.D., *Graduate School of International
Relations and Pacific Studies*
Wai-Lim Yip, Ph.D., *Literature*
Yingjin Zhang, Ph.D., *Literature*

ASSOCIATE PROFESSORS

Nancy Guy, Ph.D., *Music*
Larissa Heinrich, Ph.D., *Literature*
Weijing Lu, Ph.D., *History*
Sarah Schneewind, Ph.D., *History*

ADJUNCT PROFESSOR

Suzanne Cahill, Ph.D., *History*

ASSISTANT PROFESSOR

Lei Liang, Ph.D., *Music*

LECTURER WITH POTENTIAL FOR SECURITY OF EMPLOYMENT

Jane Kuo, Ph.D., *History; Chinese Language*

LECTURERS

Qin Hong Anderson, M.A., *History; Chinese Language*
Samuel Cha, M.A., *History; Chinese Language*
Pei-Chia Chen, M.A., *History; Chinese Language*
Qian He, *History; Chinese Language*
Huai Li, M.F.A., *Visual Arts*
Xiao Wang, M.A., *History; Chinese Language*
Ye Wa, Ph.D., *History; Chinese Language*

ADMINISTRATIVE OFFICE:

3084 Humanities and Social Sciences Building
Muir College
(858) 534-6477
chinesestudies@ucsd.edu
<http://chinesestudies.ucsd.edu>

Chinese Studies is an interdisciplinary program that allows the student interested in China to utilize the university's offerings in various departments to build a major leading to a B.A. degree. In addition to coordinating courses in the various departments, the Program in Chinese Studies offers courses directly under its own auspices to round out the available offerings.

The Chinese Studies Program combines historical understanding with an emphasis on modern and contemporary China. The Department of History has a strong specialization in late imperial and

modern China. A full spectrum of courses on the politics, economics, society, and culture of today's China are offered via other departments at UC San Diego. Another focal point of research interest is visual culture and cultural history in modern and premodern China. The interdisciplinary nature of the program (see departmental affiliation of the participating faculty) can accommodate students of a wide range of interests. In addition to our local resources, the University of California Education Abroad Program (EAP) and Opportunities Abroad Program (OAP) are affiliated with various universities and language institutes in China, Taiwan, Hong Kong, and Singapore. This, together with other academic exchange programs with a number of Chinese universities, provides the possibility of a junior year abroad, to take both Mandarin Chinese courses and non-language courses dealing with various aspects of Chinese studies. Such courses are subject to final approval via Student Petition by the program chair. Please note that at least six of the upper-division courses for the major must be taken at UCSD.

THE MAJOR PROGRAM

The student choosing a major in Chinese studies must meet the following requirements:

- Two years of Mandarin Chinese (CHIN 10 A-B-C and 20 A-B-C or equivalent) or equivalent Chinese knowledge.
- History 10-11-12 (a one year sequence in East Asian History or equivalent)
- Twelve upper-division four unit courses in Chinese studies topics.
 - Courses must be taken from at least three departments or programs.
 - One of those courses should be a four-unit seminar or colloquium in which students are expected to write a substantial term paper. Typically the Department of History offers at least one colloquium per academic year, which are usually numbered HIEA 161-171. The student will need to request and receive permission from the professor and the Department of History before enrolling in such a course.
 - No more than six of those upper-division may be language acquisition courses.
 - A minimum of six upper-division courses must be taken at UCSD.
- As a rule, all courses must be taken and completed for a letter grade for both the major and minor. Exceptions are granted for CHIN 198 and CHIN 199.

In principle, the courses that the Chinese Studies Program accepts are lower- and upper-division courses that study China or Mandarin Chinese. Only six upper-division courses may be taken abroad (or at another institution) and only three of those may be language acquisition courses. All courses not taken at UCSD must be reviewed and approved as compatible with the Program in Chinese Studies guidelines via a Student Petition upon returning from EAP, OAP, or from another U.S. academic institution. Due to the interdisciplinary nature of the Chinese Studies Program, a majority of the courses listed below are planned by participating

departments or programs for the current academic year.

HONORS PROGRAM

Requirements for admission to the program are

- Junior standing
- A GPA of 3.5 or better in the major
- Overall GPA of 3.2 or better
- Recommendation of a faculty sponsor familiar with the student's work
- Completion of at least four upper-division courses approved by the Chinese Studies Program
- Completion of at least one year of Chinese language study

Students who qualify for honors must consult with a faculty mentor, submit a proposal, complete the appropriate form(s), take a two-quarter sequence of directed study during which they define a research project, carry out the research, and complete a senior thesis.

The completed thesis will be evaluated by a committee consisting of the student's thesis advisor and one other faculty member appointed by the Chinese Studies Program chair.

THE MINOR PROGRAM

A minor in Chinese studies consists of at least three lower-division courses (a minimum of twelve units) and four upper-division courses (a minimum of sixteen units) taken for a letter grade. These courses must be selected from three departments or programs. No more than three language courses may apply toward the minor. For students wishing to apply courses taken abroad to the minor, please see the program coordinator for more information and guidance with the petition process.

COURSES APPLICABLE FOR THE CHINESE STUDIES MAJOR AND/OR MINOR OFFERED BY VARIOUS DEPARTMENTS AND PROGRAMS

For description of courses listed below, see appropriate departmental listing. All graduate-level courses require consent of the instructor for undergraduate students. Some departmental offerings have content that varies from year to year. In those cases, Chinese Studies approval is given only when content relates primarily to China.

LOWER-DIVISION

History

HILD 10. *East Asia: The Great Tradition* (staff)
HILD 11. *East Asia and the West* (staff)
HILD 12. *Twentieth-Century East Asia* (staff)

Literature

LTWL 4C. *Fiction and Film in Twentieth-Century Societies: Asian Societies* (Zhang)

Music

MUS 13AS. *World Music: Asia and Oceania* (Guy)

Third World Studies

TWS 23. Third World Literatures: Chinese Literature (staff)

UPPER-DIVISION

I. CHINESE CULTURE AND SOCIETY

Anthropology

ANSC 136. Traditional Chinese Society (Jordan)

History

HIEA 119. Religion and Popular Culture in East Asia (Cahill)

HIEA 128. History of Material Culture in China (Cahill)

HIEA 134. History of Thought and Religion in China: Confucianism (Cahill)

HIEA 135. History of Thought and Religion in China: Buddhism (Cahill)

HIEA 136. History of Thought and Religion in China: Daoism (Cahill)

HIEA 137. Women and Family in Chinese History (staff)

HIRE 115. Women in Chinese Religious Traditions (Cahill)

HITO 102. Religious Traditions: East Asian Religious Traditions (Cahill)

Music

MUS 111. Topics/World Music Traditions (Guy) (Topic must be music of China)

Sociology

SOC/B 162R. Religion and Popular Culture in East Asia (staff)

SOC/D 158J. Religion and Ethics in China and Japan (staff)

SOC/D 189. Special Topics in Comparative-Historical Sociology (Madsen)

Visual Arts

VIS 105D. The Aesthetics of Chinese Calligraphy (staff)

VIS 127B. Arts of China (Shen)

VIS 127C. Arts of Modern China (Shen)

VIS 127D. Early Chinese Painting (Shen)

VIS 127E. Later Chinese Painting (Shen)

VIS 127G. Twentieth-Century Chinese Art (Shen)

II. CONTEMPORARY CHINA

History

HIEA 132. History of the People's Republic of China (Pickowicz)

International Relations and Pacific Studies, School of

IRGN 400. International Relations of the Pacific (staff)

IRGN 404. Chinese Politics (staff)

IRGN 461. Doing Business in China (Naughton)

IRGN 486. Economic and Social Development of China (Naughton)

Political Science

POLI 113B. Chinese and Japanese Political Thought I (staff)

POLI 113C. Chinese and Japanese Political Thought II (staff)

POLI 130B. Politics in the People's Republic of China (Shirk)

POLI 131C. The Chinese Revolution (Hoston)

POLI 232. The Chinese Political System (staff)

Sociology

SOC/D 188B. Chinese Society (Madsen)

III. LANGUAGE AND LITERATURE

Linguistics

LIGN 141. Language Structures (staff)

Literature

LTCH 101. Readings in Contemporary Chinese Literature (staff)

LTEA 100A. Classical Chinese Poetry (Yip)

LTEA 100B. Modern Chinese Poetry (Yip)

LTEA 100C. Contemporary Chinese Poetry (Yip)

LTEA 110A. Classical Chinese Fiction (staff)

LTEA 110B. Modern Chinese Fiction (staff)

LTEA 110C. Contemporary Chinese Fiction (staff)

LTEA 120A. Chinese Films (staff)

LTEA 120B. Taiwan Films (staff)

LTEA 120C. Hong Kong Films (staff)

LTEA 120D. Filming Chinese Literature (staff)

LTEN 159B. Chinese Poetry and American

Imagination (Yip)

LTCO 274. Genre Studies—Intercultural Poetics (Yip)

LTWL 176. Literature and Ideas: Taoism (Yip)

LTWR 113. Intercultural Writing: Chinese (Yip)

IV. CHINESE HISTORY

Chinese Studies

CHIN 170: History of Science in China (Chen)

History

HIEA 120. The History of Chinese Culture and Society: The Ancient Imperial Period (staff)

HIEA 121. The History of Chinese Culture and Society: The Middle Imperial Period (staff)

HIEA 122. The History of Chinese Culture and Society: The Late Imperial Period (staff)

HIEA 124/HISC 110. Science in China and the West from Ancient Times to the Seventeenth Century (staff)

HIEA 126. The Silk Road in Chinese and Japanese History (Cahill)

HIEA 130. History of the Modern Chinese Revolution: 1800–1911 (Esherrick)

HIEA 131 (IP/GEN 408). History of the Modern Chinese Revolution: 1911–1949 (Pickowicz)

HIEA 132. History of the People's Republic of China (Pickowicz)

HIEA 133. Cultural History of Twentieth-Century China (Pickowicz)

HIEA 162. History of Women in China (staff)

HIEA 164. Seminar in Late Imperial Chinese History (staff)

HIEA 165. History of Material Culture in China (Cahill)

HIEA 167. Special Topics on Modern Chinese History (Esherrick)

HIEA 168. Special Topics in Classical and Medieval Chinese History (Cahill)

HIEA 170. Colloquium on Science, Technology, and Medicine in China (staff)

Visual Arts

VIS 128DN. Asian Art History (staff)

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

CHINESE LANGUAGE ACQUISITION COURSES

The Chinese language program offers Mandarin Chinese language acquisition courses in year-long sequences that begin in the fall quarter. Students interested in enrolling in Chinese courses must be evaluated via a Placement Interview and authorized at the Chinese Studies Program prior to enrollment. Contact the program at chinesestudies@ucsd.edu for more information.

Chinese language courses are divided into three tracks based on students' familiarity with the language. N track is for students with no Chinese language background; M track is for students with some Mandarin Chinese language background; and D track is for students with Chinese language background other than Mandarin. By the third year of Chinese language acquisition courses the M and D tracks converge.

FIRST YEAR CHINESE COURSES (LOWER-DIVISION)

CHIN 10AN. First Year Chinese—Non-native speakers I (5)

Introductory course of basic Chinese for students with no background in Chinese. First quarter of a one-year curriculum for entry-level Chinese in communicative skills. Covers pronunciation, fundamentals of Chinese grammar, and vocabulary. Topics include greetings, family affairs, numbers, and daily exchanges. Students may not receive duplicate credit for CHIN 11 and CHIN 10AN. **Prerequisite:** department approval.

CHIN 10AM. First Year Chinese—Mandarin speakers I (5)

Introductory course of basic Chinese for students with background in Mandarin Chinese. First quarter of one-year curriculum for entry-level Chinese in communicative skills. Covers pronunciation, fundamentals of Chinese grammar, and vocabulary. Topics include greetings, family affairs, numbers, and daily exchanges. Students may not receive duplicate credit for CHIN 11 and CHIN 10AM. **Prerequisite:** department approval.

CHIN 10AD. First Year Chinese—Dialect speakers I (5)

Introductory course of basic Chinese for students with background in a dialect of Chinese. First quarter of one-year curriculum for entry-level Chinese in communicative skills. Covers pronunciation, fundamentals of Chinese grammar, and vocabulary. Topics include greetings, family affairs, numbers, and daily exchanges. Students may not receive duplicate credit for CHIN 11 and CHIN 10AD. **Prerequisite:** department approval.

CHIN 10BN. First Year Chinese—Non-native speakers II (5)

Continuation of basic Chinese for students with no background in Chinese. Second course of one-year curriculum for entry-level Chinese communicative skills. Covers pronunciation, more elaborate grammar, and vocabulary. Focus on goal-oriented tasks: school life, shopping, and transportation. Students may not receive duplicate credit for CHIN 12 and CHIN 10BN. **Prerequisite:** CHIN 11, CHIN 10AN, or department stamp.

**CHIN 10BM. First Year Chinese—
Mandarin speakers II (5)**

Continuation introduction of basic Chinese for students with background in Mandarin Chinese. Second course of one-year curriculum for entry-level Chinese communicative skills. Covers pronunciation, more elaborate Chinese grammar, and expanded vocabulary. Focus on goal-oriented tasks such as school life, shopping, and transportation. Students may not receive duplicate credit for CHIN 12 and CHIN 10BM. **Prerequisite:** CHIN 11, CHIN 10AM, or department stamp.

**CHIN 10BD. First Year Chinese—
Dialect speakers II (5)**

Continuation introduction of basic Chinese for students with background in a dialect of Chinese. Second course of one-year curriculum for entry-level Chinese communicative skills. Covers pronunciation, more elaborate Chinese grammar, and expanded vocabulary. Focus on goal-oriented tasks such as school life, shopping, and transportation. Students may not receive duplicate credit for CHIN 12 and CHIN 10BD. **Prerequisite:** CHIN 11, CHIN 10AM, or department stamp.

**CHIN 10CN. First Year Chinese—
Non-native speakers III (5)**

Continuation course of basic Chinese for students with no background in Chinese. Third course of one-year curriculum for entry-level Chinese communicative skills. Expansion on pronunciation and more elaborate Chinese grammar and increasing vocabulary. Topics include dining, direction, and social life. Students may not receive duplicate credit for CHIN 13 and CHIN 10CN. **Prerequisite:** CHIN 12, CHIN 10BN, or department stamp.

**CHIN 10CM. First Year Chinese—
Mandarin speakers III (5)**

Further continuation course of basic Chinese for students with background in Mandarin Chinese. Third course of one-year curriculum for entry-level Chinese communicative skills. Expansion on pronunciation and more elaborate Chinese grammar and increasing vocabulary. Topics include dining, direction, and social life. Students may not receive duplicate credit for CHIN 13 and CHIN 10CM. **Prerequisite:** CHIN 12, CHIN 10BM, or department stamp.

**CHIN 10CD. First Year Chinese—
Dialect speakers III (5)**

Further continuation course of basic Chinese for students with background in a dialect of Chinese. Third course of one-year curriculum for entry-level Chinese communicative skills. Expansion on pronunciation and more elaborate Chinese grammar and increasing vocabulary. Topics include dining, direction, and social life. Students may not receive duplicate credit for CHIN 13 and CHIN 10CD. **Prerequisite:** CHIN 12, CHIN 10BD, or department stamp.

**SECOND YEAR CHINESE COURSES
(LOWER-DIVISION)**

**CHIN 20AN. Second Year Chinese—
Non-native speakers I (4)**

Second year of basic Chinese for students with no background. First course of second year of a one-year curriculum for Chinese in intermediate communicative skills. Covers sentence structure, idiomatic expression, development of listening, speaking, reading, and written competence in Chinese. Topics include sports, travel, and special events. Students may not receive duplicate credit for both CHIN 21 and CHIN 20AN. **Prerequisite:** CHIN 13, CHIN 10CN, score of 3 on AP Chinese Language and Culture Exam, or department stamp.

**CHIN 20AM. Second Year Chinese—
Mandarin speakers I (4)**

Second year of basic Chinese for students with background in Mandarin. First course of second year of one-year curriculum for Chinese in intermediate communicative skills. Covers sentence structure and idiomatic expression, development of listening, speaking, reading, and written competence. Topics include sports, travel, and special events. Students may not receive duplicate credit for both CHIN 21 and CHIN 20AM. **Prerequisite:** CHIN 13, CHIN 10CM, score of 3 on AP Chinese Language and Culture Exam, or department stamp.

**CHIN 20AD. Second Year Chinese—
Dialect speakers I (4)**

Second year of basic Chinese for students with background in a dialect of Chinese. First course of second year of one-year curriculum for Chinese in intermediate communicative skills. Covers sentence structure and idiomatic expression, development of listening, speaking, reading, and written competence in Chinese. Topics include sports, travel, and special events. Students may not receive duplicate credit for both CHIN 21 and CHIN 20AD. **Prerequisite:** CHIN 13, CHIN 10CD, score of 3 on AP Chinese Language and Culture Exam, or department stamp.

**CHIN 20BN. Second Year Chinese
– Non-native speakers II (4)**

Continuation of second year of basic Chinese for students with no background. Second course of one-year curriculum for Chinese intermediate communicative skills. Covers sentence structure and idiomatic expressions, development of listening, speaking, reading and written competence in Chinese. Topics focus on China, population and other nationalities. Students may not receive duplicate credit for both CHIN 22 and CHIN 20BN. **Prerequisite:** CHIN 21, CHIN 20AN, score of 4 on AP Chinese Language and Culture Exam or department stamp.

**CHIN 20BM. Second Year Chinese—
Mandarin speakers II (4)**

Continuation of second year of basic Chinese for students with background in Mandarin. Second course of one-year curriculum for Chinese intermediate communicative skills. Covers sentence structure and idiomatic expressions, development of listening, speaking, reading, and written competence. Topics focus on China, population, and other nationalities. Students may not receive duplicate credit for both CHIN 22 and CHIN 20BM. **Prerequisite:** CHIN 21, CHIN 20AM, score of 4 on AP Chinese Language and Culture Exam, or department stamp.

**CHIN 20BD. Second Year Chinese—
Dialect speakers II (4)**

Continuation of second year of basic Chinese for students with background in a dialect of Chinese. Second course of one-year curriculum for Chinese intermediate communicative skills. Covers sentence structure and idiomatic expressions, development of listening, speaking, reading, and written competence in Chinese. Topics focus on China, population, and other nationalities. Students may not receive duplicate credit for both CHIN 22 and CHIN 20BD. **Prerequisite:** CHIN 21, CHIN 20AD, score of 4 on AP Chinese Language and Culture Exam, or department stamp.

**CHIN 20CN. Second Year Chinese—
Non-native speakers III (4)**

Final course of second year Chinese for students with no background. Third course of a one-year curriculum for Chinese intermediate communicative skills. Expansion on pronunciation and more elaborate Chinese grammar and increasing vocabulary. Topics include food, physical actions, and culture. Students may not receive duplicate credit for both CHIN 23 and CHIN 20CN. **Prerequisite:** CHIN 22, CHIN 20BN, score of 5 on AP Chinese Language and Culture Exam, or department stamp.

**CHIN 20CM. Second Year Chinese—
Mandarin speakers III (4)**

Final course of second year Chinese for students with background in Mandarin. Third course of one-year curriculum for Chinese intermediate communicative skills. Expansion on pronunciation and Chinese grammar and increasing vocabulary. Topics include food, physical actions, and culture. Students may not receive duplicate credit for both CHIN 23 and CHIN 20CM. **Prerequisite:** CHIN 22, CHIN 20BM, score of 5 on AP Chinese Language and Culture Exam, or department stamp.

**CHIN 20CD. Second Year Chinese—
Dialect speakers III (4)**

Final course of second year Chinese for students with background in a dialect of Chinese. Third course of one-year curriculum for Chinese intermediate communicative skills. Expansion on pronunciation and more elaborate Chinese grammar and increasing vocabulary. Topics include food, physical actions, and culture. Students may not receive duplicate credit for both CHIN 23 and CHIN

20CD. **Prerequisite:** CHIN 22, CHIN 20BD, score of 5 on AP Chinese Language and Culture Exam, or department stamp.

**THIRD YEAR CHINESE COURSES
(UPPER-DIVISION)**

**CHIN 100AN. Third Year Chinese—
Non-native speakers I (4)**

Intermediate course of Chinese for students with no background. First course of third year of one-year curriculum that focuses on listening, reading, and speaking. Emphasizing the development of advanced oral, written competence, and aural skills in Mandarin. Topics include education, literature, history of Chinese language and society. Students may not receive duplicate credit for both CHIN 111 and CHIN 100AN. **Prerequisite:** CHIN 23, CHIN 20CN, or department stamp.

**CHIN 100AM. Third Year Chinese—
Mandarin speakers I (4)**

Intermediate course of Chinese for students with background in Mandarin and other dialects. First course of third year of one-year curriculum that focuses on listening, reading, and speaking. Topics include education, literature, history of Chinese language and society. Students may not receive duplicate credit for both CHIN 111 and CHIN 100AM. **Prerequisite:** CHIN 23, CHIN 20CM or CHIN 20CD, or department stamp.

**CHIN 100BN. Third Year Chinese—
Non-native speakers II (4)**

Intermediate course of Chinese for students with no background. Second course of third year of Chinese that emphasizes the development of advanced oral, written competence and aural skills in Mandarin. Topics include various cultural aspects of the Chinese language, additional family issues and society. Students may not receive duplicate credit for both CHIN 112 and CHIN 100BN. **Prerequisite:** CHIN 111, CHIN 100AN or department stamp.

**CHIN 100BM. Third Year Chinese—
Mandarin speakers II (4)**

Intermediate course of Chinese for students with background in Mandarin and other dialects. Second course of third year of Chinese that emphasizes the development of advanced oral, written competence, and aural skills in Mandarin. Topics include cultural aspects of the Chinese language, additional family issues and society. Students may not receive duplicate credit for both CHIN 112 and CHIN 100BM. **Prerequisite:** CHIN 111, CHIN 100AM, or department stamp.

**CHIN 100CN. Third Year Chinese—
Non-native speakers III (4)**

Intermediate course of Chinese for students with no background. Third course of third year of one-year curriculum in Chinese language acquisition. Continue to develop proficiency at intermediate level. Improves students' Chinese language skills and knowledge of the culture with an emphasis of reading and writing. Students may not receive duplicate credit for both CHIN 113 and CHIN 100CN. **Prerequisite:** CHIN 112, CHIN 100BN, or department stamp.

**CHIN 100CM. Third Year Chinese—
Mandarin speakers III (4)**

Intermediate course of Chinese for students with background in Mandarin and other dialects. Third course of third year of one-year curriculum in Chinese language acquisition. Continue to develop proficiency at intermediate level. Improves students' Chinese language skills and knowledge of the culture with an emphasis of reading and writing. Topics include economic development in China. Students may not receive duplicate credit for both CHIN 113 and CHIN 100CM. **Prerequisite:** CHIN 112, CHIN 100BM, or department stamp.

Students wishing to take more than one Chinese language class in the same quarter must obtain approval from the director of the Chinese language program prior to enrolling in a second CHIN course.

UPPER-DIVISION CHINESE COURSES

CHIN 160/260. Late Imperial and Twentieth-Century Chinese Historical Texts (4)

This course introduces the primary sources used by historians of Late Imperial and Twentieth-Century Chinese history. Reading material includes diaries, newspaper articles, Qing documents, gazetteers, essays, speeches, popular fiction, journal articles, scholarly prose, and field surveys. May be repeated for credit. (P/NP grades only.) **Prerequisite:** advanced knowledge of Chinese language and consent of instructor.

CHIN 165A. Business Chinese (4)

Basic training in oral and written communication skills for business, including introduction to modern business terminology and social conventions. **Prerequisite:** CHIN 113, CHIN 100CM, CHIN 100CN or department stamp.

CHIN 165B. Business Chinese (4)

Continuation of CHIN 165A. Basic training in oral and written communication skills for business, including introduction to modern business terminology and social conventions. **Prerequisite:** CHIN 165A or equivalent.

CHIN 165C. Business Chinese (4)

Continuation of CHIN 165B. Basic training in oral and written communication skills for business, including introduction to modern business terminology and social conventions. **Prerequisite:** CHIN 165B or equivalent.

CHIN 181A. Introduction to Classical Chinese (4)

Introduction to the classical language through Confucius, Mencius, and the other Great Books. The emphasis will be on comprehension and reading ability. **Prerequisite:** CHIN 23 or equivalent.

CHIN 181B. Introduction to Classical Chinese (4)

Continuation of Chinese Studies 181A. **Prerequisite:** CHIN 181A or equivalent.

CHIN 181C. Introduction to Classical Chinese (4)

This course is a continuation of 181A and B. Short passages from major historical, literary, and philosophical works are introduced. **Prerequisite:** CHIN 181B or equivalent.

CHIN 182A. Introduction to Classical Chinese—Advanced I (4)

An introduction to classical Chinese for students with advanced Chinese background. Basic structures and function words are taught through fables of the pre-Qing period. **Prerequisite:** CHIN 113, CHIN 100C, or department approval.

CHIN 182B. Introduction to Classical Chinese—Advanced II (4)

Continuation of CHIN 182A. Selections from Kongzi, Mengzi, and other philosophers' work will be taught. Focus is on structures, function words, and overall comprehension of a text. **Prerequisite:** CHIN 182A or departmental approval.

CHIN 182C. Introduction to Classical Chinese—Advanced III (4)

Continuation of CHIN 182B. Selections from later periods like Shiji and poetry will be introduced. Upon completion of this year-long curriculum, students should be able to read classical Chinese texts on their own with the help of a dictionary. **Prerequisite:** CHIN 182B or department approval.

CHIN 185A-B-C. Readings in Chinese Culture and Society (4-4-4)

Designed for students who want advanced language skills, this course will enlarge students' vocabulary and improve students' reading skills through studies of original writings and other media on Chinese culture and society, past and present. **Prerequisite:** CHIN 113, CHIN 100CM, CHIN 100CN, or department stamp.

CHIN 186A-B-C. Readings in Chinese Economics, Politics, and Trade (4-4-4)

Introduction to the specialized vocabulary and verbal forms relating to Chinese politics, trade, development and society. Designed for students in the social sciences or with career interests in international trade, the course will stress rapid vocabulary development, reading and

translating. **Prerequisite:** CHIN 113, CHIN 100CN, CHIN 100CM, or department stamp.

CHIN 196. Directed Thesis Research (4)

Bachelor's thesis, under the direction of a faculty member in Chinese studies. **Prerequisite:** consent of instructor. (F,W,S)

CHIN 198. Directed Group Study in Chinese Studies (2 or 4)

Study of specific aspects in Chinese civilization not covered in regular course work, under the direction of faculty members in Chinese studies. (P/NP grades only.) **Prerequisite:** consent of instructor.

CHIN 199. Independent Study in Chinese Studies (2 or 4)

The student will undertake a program of research or advanced reading in selected areas in Chinese studies under the supervision of a faculty member of the Program in Chinese Studies. (P/NP grades only.) **Prerequisite:** consent of instructor.

CHIN 260. Late Imperial and Twentieth-Century Chinese Historical Texts (4)

This course introduces the primary sources used by historians of the Late Imperial and twentieth-century Chinese history. Reading material includes diaries, newspaper articles, Qing documents, gazetteers, essays, speeches, popular fiction, journal articles, scholarly prose, and field surveys. May be repeated for credit. (P/NP grades only) **Prerequisites:** department stamp, advanced knowledge of Chinese language, and consent of instructor.

CHIN 269. Conversational Mandarin for Medical Students—Beginning (2)

(Cross-listed with MED 269.) This introductory course is designed to develop a working knowledge of medical Mandarin that will enable the student to communicate with Mandarin-speaking patients. There will be instruction in basic medical vocabulary and grammar, with a focus on taking a medical history. This is only a conversational course and no previous knowledge of Mandarin is required. (S/U only.)

CHIN 296. Directed Thesis Research (2-12)

Graduate thesis research under the guidance of a faculty member affiliated with the Program in Chinese Studies.

CHIN 299. Independent Study in Chinese Studies (2-12)

Independent graduate research under the guidance of a faculty member affiliated with the Program in Chinese Studies. **Prerequisites:** graduate standing and consent of instructor.

CHIN 500. Apprentice Teaching (2-4)

A course in which graduate teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty, handling of discussions, assistance in the preparation and grading of exams and other written exercises, and student relations. **Prerequisite:** graduate standing.

Classical Studies

PROFESSORS

Georgios H. Anagnostopoulos, Ph.D., *Philosophy*
Page Ann duBois, Ph.D., *Classical and Comparative Literature*
Anthony T. Edwards, Ph.D., *Classical Literature and Languages*
Edward N. Lee, Ph.D., *Philosophy, Emeritus*
Marianne McDonald, Ph.D., *Theatre and Dance*
Alden A. Mosshammer, Ph.D., *History, Emeritus*
Sheldon A. Nodelman, Ph.D., *Visual Arts*

LECTURERS

Charles Chamberlain, Ph.D., *Classical Literature and Languages*
Leslie Collins Edwards, Ph.D., *Classical Literature and Languages*
Eliot Wirshbo, Ph.D., *Classical Literature and Languages*

ASSISTANT PROFESSORS

Monte Johnson, Ph.D., *Philosophy*
Dayna Kalleres, Ph.D., *Literature*

UC TRI-CAMPUS CLASSICS PROGRAM FACULTY

Georgios Anagnostopoulos, Ph.D., Brandeis University, *Professor of Philosophy, UCSD* (ancient Greek philosophy, ethics, metaphysics)
Luci Berkowitz, Ph.D., Ohio State University, *Professor Emerita of Classics, UCI* (Greek literary history, computer applications to literature)
Cynthia L. Claxton, Ph.D., University of Washington, *Lecturer in Classics, Graduate and Undergraduate Advisor, UCI* (Greek prose, historiography)
Page duBois, Ph.D., University of California, Berkeley, *Professor of Classics and Comparative Literature, UCSD* (Greek literature, rhetoric, critical theory, cultural studies)
Anthony Edwards, Ph.D., Cornell University, *Professor of Classics and Comparative Literature, UCSD* (epic, Greek comedy, critical theory)
Richard I. Frank, Ph.D., University of California, Berkeley, *Associate Professor Emeritus of History and Classics, UCI* (Roman history, Latin elegy and satire, classical tradition)
Zina Giannopoulou, Ph.D., University of Illinois, *Assistant Professor of Classics, UCI* (literary theory and Platonic hermeneutics, classical and Hellenistic philosophy, Greek tragedy and epic)
David Glidden, Ph.D., Princeton University, *Professor of Philosophy, UCR* (Greek and Roman philosophy)
Anna Gonosová, Ph.D., Harvard University, *Associate Professor of Art History, UCI* (Byzantine and Medieval art)
Dayna Kalleres, Ph.D., Brown University, *Assistant Professor, UCSD* (Late antiquity, religious studies, critical theories of religion)

Andromache Karanika, Ph.D., Princeton University, *Assistant Professor of Classics, UCI* (Greek epic poetry, Greek lyric, folklore)
Edward N. Lee, Ph.D., Princeton University, *Professor Emeritus of Philosophy, UCSD* (Greek philosophy, Plato)
Marianne McDonald, Ph.D., University of California, Irvine, *Professor of Theatre and Classics, UCSD* (Greek and Roman theatre, ancient drama in modern plays, film, and opera)
Margaret M. Miles, Ph.D., Princeton University, *Professor of Art History and Classics, UCI* (Greek and Roman art and archaeology, ancient Sicily, Greek religion)
Alden A. Mosshammer, Ph.D., Brown University, *Professor Emeritus of History, UCSD* (early Christian thought, Greek chronography, early Greek history)
Sheldon Nodelman, Ph.D., Yale University, *Professor of Visual Arts, UCSD* (classical art and architecture, Roman portraiture, critical theory)
Maria C. Pantelia, Ph.D., Ohio State University, *Associate Professor of Classics and Director Thesaurus Linguae Graecae, UCI* (Greek epic poetry, Hellenistic poetry, computer applications to classics)
James Porter, Ph.D. University of California, Berkeley, *Professor of Classics and Comparative Literature, UCI* (philosophy, literary and cultural criticism and aesthetics, history of the classical disciplines, reception of Homer)
Lisa Raphals, Ph.D. University of Chicago, *Professor of Chinese and Comparative Ancient Civilizations, UCR* (comparative philosophy, religion, history of science, gender)
Wendy Raschke, Ph.D., State University of New York, Buffalo, *Lecturer in Classics, UCR* (Roman satire, Greek art and archaeology)
B. P. Reardon, D.U. Université de Nantes, *Professor Emeritus of Classics, UCI* (late Greek literature, ancient novel)
Michele Salzman, Ph.D., Bryn Mawr College, *Professor of History, UCR. Chair of the Joint Executive Committee of the Tri-Campus Program* (late antiquity; Roman history and literature, religion, women's studies)
Gerasimos Santas, Ph.D., Cornell University, *Professor Emeritus of Philosophy, UCI* (ancient philosophy, history of philosophy, ethics)
Thomas F. Scanlon, Ph.D. Ohio State University, *Professor of Classics and Chair, Department of Literature and Foreign Languages, UCR.* (Greek and Roman historiography, ancient athletics)
Thomas Sizgorich, Ph.D. UC Santa Barbara, *Assistant Professor of History, UCI* (late antiquity, early Islamic history)
Dana F. Sutton, Ph.D., University of Wisconsin, *Professor Emeritus of Classics, UCI* (Greek and Latin drama, Greek poetry, Anglo-Latin literature)
Andrew Zissos, Ph.D., Princeton University, *Associate Professor of Classics and Chair, Department of Classics, UCI* (Latin epic, medieval Latin, Roman culture)

OFFICE:

History Department Undergraduate Advising
Humanities and Social Sciences Building, Fifth Floor
Muir College

<http://history.ucsd.edu/programs/caesar-programs/classical-stud/>

Classical studies is concerned with the cultures of ancient Greece and Rome—roughly from the time of Homer through the time of St. Augustine—in all of their aspects. This program thus offers undergraduates an opportunity to study the cultures of Greece and Rome through the combined resources of the Departments of History, Literature, Visual Arts, Theatre and Dance, and Philosophy. The study of the ancient Greek and Latin languages themselves serves as the starting point for the broader consideration of specific texts in their literary, intellectual, and historical context. Moreover, in cooperation with the Judaic Studies Program, students are provided the opportunity to link the study of ancient Greece and Rome to that of the ancient Near East.

THE MAJOR PROGRAMS

The Classical Studies Program offers four different degree paths, three within classical studies and one in cooperation with Judaic studies. The majors are Greek, Latin, classics, and Greek and Hebrew. Each consists of a choice of twelve upper-division courses (forty-eight units) approved for the program and listed below. All courses used to meet requirements for a major in classical studies must be taken for a letter grade and be passed with a grade of C– or better.

Graduate courses may be taken by undergraduates with consent of the instructor. The faculty of the program welcome qualified undergraduates in graduate courses.

Additional courses counting toward a major in classical studies are offered on a year-to-year basis, both at the undergraduate and graduate levels. As these often cannot be listed in advance, interested students should consult the program faculty for an up-to-date list.

GREEK

LTWL 19A-B-C are prerequisites to the Greek major. Six of the twelve upper-division courses must be LTGK courses numbered 100 and above, but exclusive of LTGK 101. The remaining six courses may be in classical civilization (in English translation), selected from the list of approved courses from history, Lit/World, philosophy, political science, and visual arts, though additional LTGK courses numbered 100 and above (including LTGK 101) are acceptable here. These must be from at least two departments and selected in consultation with the advisor; courses dealing with Greek civilization are strongly preferred.

LATIN

LTWL 19A-B-C are prerequisites to the Latin major. Six of the twelve upper-division courses must be LTLA courses numbered 100 and above, but exclusive of LTLA 101 and 102. The remaining six courses may be in classical civilization (in English translation), selected from the list of approved courses from history, Lit/World, philosophy, political science, and visual arts, though additional LTLA courses numbered 100 and above (including LTLA 101 and 102) are acceptable here. These must be from at least two departments and selected in

consultation with the advisor; courses dealing with Roman civilization are strongly preferred.

CLASSICS

LTWL 19A-B-C are prerequisites to the classics major. Nine of the twelve upper-division courses must be distributed between LTLA and LTGK courses numbered 100 and above (but exclusive of LTLA 101 and 102 and LTGK 101), six in one literature and three in the other according to the student's emphasis. The remaining three courses may be in classical civilization (in English translation), selected from the list of approved courses from history, Lit/World, philosophy, political science, and visual arts, though additional LTLA or LTGK courses numbered 100 and above (including LTLA 101 and 102 and LTGK 101) are acceptable here. These must be from at least two departments and selected in consultation with the advisor to reflect the relative emphasis upon the Greek and Latin literatures, but with at least one focusing upon each culture.

GREEK AND HEBREW

Three courses from LTWL 19A-B-C and Cultural Traditions, Judaic 1A-B, to be selected in consultation with the advisor, are prerequisites to the Greek and Hebrew major. Nine of the twelve upper-division courses must be distributed between LTGK courses numbered 100 and above (but exclusive of LTGK 101) and Judaic Studies 101-102-103 or LTNE courses numbered 100 through 112, six in one literature and three in the other according to the student's emphasis. The remaining three courses may be in ancient Greek and Judaic civilization (in English translation), selected from the list of courses approved for classical studies and from the list of courses approved for Judaic studies, though additional LTGK courses numbered 100 and above (including LTGK 101) or Judaic Studies 101-102-103 or LTNE courses numbered 100 through 112 are acceptable here. These must be from at least two departments and selected in consultation with the advisor (who is selected in accordance with the student's emphasis) to reflect the relative emphasis upon the Greek and Hebrew literatures, but with at least one course from each program.

THE MINOR PROGRAMS

CLASSICAL STUDIES

A minor in classical studies consists of seven courses (twenty-eight units) from those listed below, of which at least four must be upper-division. A knowledge of the ancient languages is not required. The minor will normally include LTWL 19A-B-C. The Greco-Roman World, and four other courses from the participating departments. All courses used to meet requirements for the minor in Classical Studies must be taken for a letter grade and passed with a grade of C- or better.

Greek

See Literature: "[The Minor in Literature](#)"

Latin

See Literature: "[The Minor in Literature](#)"

WARREN COLLEGE

A Warren College program of concentration in classical studies normally consists of LTWL 19A-B-C and three of the upper-division courses listed below.

HONORS IN GREEK, LATIN, AND CLASSICS

Honors is intended for the most talented and motivated students majoring in Greek, Latin, classics, or Greek and Hebrew. Requirements for admission to the honors program are

- Junior standing
- An overall GPA of 3.5
- A GPA in the major of 3.7

Qualified students majoring in Greek, Latin, or classics may apply at the end of their junior year to the program faculty on the basis of 1) a thesis proposal (three to four pages) worked out in advance with a classical studies faculty member and 2) a recommendation from that faculty member. It is strongly advised that the proposal be based upon a class paper or project from a course taken toward completion of the major.

The core of the honors program is an honors thesis. The research and writing of the thesis will be conducted over the winter or fall and winter terms of the senior year. Up to four units of 196 course credit to this end may be counted toward the major in place of one of the courses in English translation. A thesis completed by the end of the winter quarter of the senior year will be read and evaluated by the thesis advisor and another member of the program faculty. If the thesis is accepted and the student maintains a 3.7 GPA, departmental honors will be awarded. The level of honors—distinction, high distinction, or highest distinction—will be determined by the program faculty.

Students choosing a major in Greek and Hebrew may complete an honors major as follows: Those with an emphasis on Greek must meet the requirements for honors in the Classical Studies Program and work with a thesis advisor from classical studies, but select a second advisor for the thesis from Judaic studies. Those with an emphasis on Hebrew must meet the requirements for honors in the Judaic Studies Program and work with a thesis advisor from Judaic studies, but select a second advisor for the thesis from classical studies.

TRANSFER STUDENTS

UC San Diego's Program in Classical Studies welcomes transfer students. Students planning to transfer from two-year colleges should try to complete as many of the lower-division prerequisites for the major as possible: specifically, a course equivalent in duration and content to UCSD's Literatures of the World 19A-B-C and, if possible, elementary Greek and/or Latin, as appropriate for the planned classical studies major. Students with questions about transferring into UCSD's Program in Classical Studies should review the "Admission Information for Transfer Students" on the UCSD Web site (go to <http://www.ucsd.edu> and choose Prospective Students, then Admissions, then For

Transfer Students) and feel free to contact the faculty advisor for the program with any questions.

THE UNIVERSITY OF CALIFORNIA TRI-CAMPUS PROGRAM IN CLASSICS

UC Irvine, UC Riverside, and UC San Diego

What is the UC Tri-Campus Program? This graduate program joins together into a single faculty more than twenty experts in classics and related disciplines from the three southernmost University of California campuses (Irvine, Riverside, and San Diego). It features an innovative curriculum and program of study that address the practical and theoretical questions confronting the humanities and classics in particular as both enter the twenty-first century.

What are the program's goals? The aim of the Tri-Campus Program is to provide an educational environment for pursuing a graduate career in classics that is closely integrated into the main currents of humanistic and social scientific scholarship. The program's faculty recognizes that today and in the future, teachers of the classics must possess and develop expertise beyond the standard specialties of the traditional classics Ph.D. degree. Classics programs, in both large research universities and small liberal arts colleges, increasingly feel the pressure to break down the boundaries between disciplines.

To achieve these goals, the program and curriculum are designed around five principles:

- Study the ancient texts and objects in their wider social, cultural, and historical contexts.
- Bring the culture of the ancient Greeks and Romans into the purview of contemporary literary and sociological theory.
- Examine the reception of ancient literature and culture by later cultures and the appropriation of the ancient world by the modern world.
- Pay particular attention to the intersections of Greek and Roman society and culture with each other and with the other cultures of the ancient world.
- Utilize, to the fullest the potential, new computing technologies as tools for research and teaching.

These five interdisciplinary principles are embodied in the four Core Courses (Classics 200A, 200B, 200C, and 201). Graduate seminars (Classics 220) and reading courses in Greek and Latin authors (Classics 205) round out the program of studies. This curriculum has been in effect at UC Irvine since 1995, taught by faculty members from all three campuses.

Where do I apply? The Tri-Campus Program uniquely does not belong to a particular campus but to the University of California. Students who are accepted into the program may enroll at any of the three campuses. Because instruction and administrative functions take place on the Irvine campus, students will normally enroll at UC Irvine. Applications to the Tri-Campus Graduate Program will be reviewed by an admissions committee composed of members from all three campuses.

Where is the Tri-Campus Program located? UC Irvine is located five miles inland from the Pacific Ocean, fifty miles south of metropolitan Los Angeles, forty-five miles southwest of UC Riverside, and seventy-four miles north of UC San Diego. In addition to its beaches, mountains, and deserts, Southern California offers excellent cultural amenities such as museums, theater, dance, opera, and music.

What are the requirements for admission?

Applicants to the program should have a B.A. or equivalent in classics or classical civilization, which normally means that you have had at least three years of one classical language and two of the other. Majors in other disciplines (e.g., comparative literature, history, philosophy, or interdisciplinary fields such as women's studies) are welcome, provided they have sufficient background in Greek and Latin. All applicants must submit Graduate Record Exam (GRE) scores and must have a minimum GPA of 3.0 or the equivalent. If you have completed an M.A. in classics at another institution, you may be admitted with advanced standing and may have the course requirements reduced from the normal three years to two or one. The level of course reduction will be determined by progress evaluation exams administered in the spring quarter of each year.

The Role of the Joint Executive Committee

The Tri-Campus Program is administered by a joint executive committee (JEC), which consists of six representatives, two from each campus, serving staggered, two-year terms. The JEC's responsibilities include reviewing graduate applications and admitting students to the program; overseeing the formation of examination and dissertation committees; reviewing and deciding on student petitions; making policy decisions concerning the program, including changes in the program's requirements and procedures; and interpreting the program's requirements and procedures. The JEC elects from its members a chair to serve a three-year term. It is the chair's responsibility to manage budgetary issues, schedule and set the agenda for quarterly JEC meetings, identify faculty to teach graduate courses, and generally look after the smooth operation of the program.

The Role of the Graduate Advisor

The graduate advisor is a faculty member responsible for supervising graduate study in the department and monitoring the academic progress of graduate students. The graduate advisor coordinates the various elements of the academic program and advises students and other faculty members about program requirements and university policies. The graduate advisor keeps records for each student and for the whole program, ensures that each student meets all requirements and makes satisfactory progress toward attainment of the degree, and is instrumental in the nomination of students for fellowship support and assistantship appointments. The graduate advisor also provides general help to students as they attempt to negotiate the academic and administrative hurdles on their way to completion of their degrees. The graduate advisor is

an ex-officio member of the Tri-Campus JEC for the duration of his or her tenure, normally two years.

Election of Student Representative

Graduate students elect a representative who attends JEC meetings as a regular voting member. Graduate students are also invited to attend meetings as observers and to participate where appropriate. The voting rights and attendance of the graduate student representative are circumscribed by the requirements of confidentiality.

The Ph.D. and the M.A. Program student's career may be thought of as covering three stages: course work, preparation for qualifying exams, and candidacy (dissertation). For Ph.D. students the normative limits for completion of the program are four years to advancement to candidacy, two years to final approval of the dissertation, and a maximum of seven years in total. Students are only admitted into the Ph.D. program. Entering students who do not already hold a master's degree in classics from another institution will be required to complete M.A. requirements while pursuing the Ph.D.

COURSE WORK FOR THE M.A.

The M.A. degree in classics may be awarded either upon completing the Ph.D. course requirements and passing the written Ph.D. examinations or upon completing the M.A. course requirements and master's paper and passing the M.A. translation examinations and general exam. The latter path to the M.A. is intended for Ph.D. students who decide to leave the program before completing the requirements for a Ph.D.

M.A. students must successfully complete a minimum of twelve approved seminar-level courses. The twelve courses must be distributed as follows:

- Nine quarters of Classics 220.
- At least three quarters of Classics 200A-B-C and 201; a fourth quarter may be substituted for a Classics 220.
- Up to one quarter of Classics 290 for research and writing of the master's paper may be substituted for a Classics 220.
- If remedial work is required in Greek or Latin, with the graduate advisor's approval, one enhanced upper-division Greek or Latin course enrolled as a Classics 280 may be substituted for a Classics 220.
- With the graduate advisor's approval, M.A. students may substitute one external graduate seminar in a relevant area outside of classics (at any of the three participating campuses) for a Classics 220.

A SAMPLE M.A. PROGRAM

FALL	WINTER	SPRING
YEAR 1		
200A (200C)	Classics 220	200B (201)
Classics 220	Classics 220	Classics 220
Classics 399	Classics 399	Classics 399
YEAR 2		
200C (200A)	Classics 220	201 (200B)
Classics 220	Classics 220	Classics 290
Classics 399	Classics 399	Classics 399
		M.A. Exams

COURSE WORK FOR THE PH.D.

Ph.D. students must successfully complete a minimum of eighteen approved seminar-level courses. The eighteen courses must be distributed as follows:

- Four quarters of Classics 200A-B-C, and 201.
- Twelve quarters of Classics 220.
- Two external graduate seminars, from departments or programs outside of classics. These may be taken from the offerings of any of the three campuses.
- Students may take up to two quarters of enhanced upper-division Greek or Latin courses (enrolled as 280s) in place of Classics 220s, with permission of the graduate advisor if remedial work is required in Greek or Latin.
- Where appropriate, in the third year of course work, a second Classics 200A, B, or C, may be substituted for a 220.
- Classics 280, Independent Study (supervised research) may be substituted for Classics 220s only with the permission of the graduate advisor.
- Up to twelve equivalent graduate-level courses completed elsewhere may be substituted for Tri-Campus Program courses with approval of the JEC.

Classics 280 may be used, normally in the fourth year, to provide time to work on the Greek and Latin reading lists and to prepare for qualifying exams, but these courses do not count towards the required eighteen courses. Ph.D. students must meet with the graduate advisor early every fall quarter to discuss their progress through the curriculum and their plans for the coming academic year. A student who accumulates more than one outstanding grade of incomplete is considered to be at risk.

For student files, faculty teaching graduate courses will submit to the graduate advisor a brief written evaluation for each student, commenting on the student's performance and noting whether the student wrote a seminar paper for the course. The graduate advisor will lead the JEC in an annual review of all active graduate students in the program at the JEC's spring meeting.

A SAMPLE PH.D. PROGRAM

FALL	WINTER	SPRING
YEAR 1		
200A (200C)	Classics 220	200B (201)
Classics 220	Classics 220	Classics 220
Classics 399	Classics 399	Classics 399
YEAR 2		
200C (200A)	Classics 220	201 (200B)
Classics 220	Classics 220	Classics 220
Classics 399	Classics 399	Classics 399
YEAR 3		
Classics 220	Classics 220	Classics 220
Classics 399	Classics 399	Classics 220
Seminar (External)	Seminar (External)	Classics 399
YEAR 4		
Classics 280	Classics 280	Classics 280
Qualifying Exams	Qualifying Exams	Qualifying Exams
YEAR 5		

Classics 299 Dissertation Writing	Classics 299 Dissertation Writing	Classics 299 Dissertation Writing
YEAR 6		
Classics 299 Dissertation Writing	Classics 299 Dissertation Writing	Classics 299 Dissertation Defense

EXAMINATIONS

Diagnostic Exams: Immediately upon entering the program, the student takes diagnostic translation examinations in both Greek and Latin to establish his or her level of competency and to determine where effort should be directed. In the second year of course work, students will take as diagnostic exams the Latin and Greek translation exams administered as part of the qualifying exam battery.

Exams for the M.A.

Foreign Language Requirement: Students must demonstrate reading knowledge of German, French, Italian, or an equivalent research language either through appropriate course work or by examination.

Translation Exams: Each student must pass a set of translation examinations in Greek and in Latin administered by the master's committee (two hours each).

The JEC, in consultation with the graduate advisor and the student, recommends to the graduate dean a three-member master's committee composed of program faculty from at least two campuses to set and evaluate the translation exams and to evaluate the master's paper. Normally this committee is established in the quarter preceding completion of the master's paper.

Exams for the Ph.D.

1. Foreign Language Requirements: Ph.D. students must demonstrate reading proficiency in one modern research language (normally German, French, or Italian) by the end of their second year either through appropriate course work or by examination. Proficiency in a second modern research language is expected by the end of the third year.

2. Ph.D. Qualifying Exams: In order to advance to candidacy for the Ph.D. and to enter the dissertation stage, a student must pass a set of seven qualifying exams. The translation exams, history exams, and history of the literatures exam are administered and evaluated on a regular schedule over the academic year by examination boards composed of one faculty member from each campus and appointed for that purpose by the JEC at the graduate advisor's recommendation. The JEC, in consultation with the graduate advisor and the student, recommends to the graduate dean a five-member candidacy committee composed of four program faculty (from at least two campuses) and one outside member holding tenure on one of the participating campuses (i.e., not a member of the program faculty) to organize and administer the special-area exam and the oral exam taken by the candidate after successful

completion of the other exams. All committee members for both candidacy and doctoral committees should normally be voting members of the Academic Senate of the Irvine, Riverside, or San Diego divisions. Any exceptions must hold a Ph.D., be qualified for a UC faculty appointment, and be supported by a memo of justification and a CV submitted by the graduate advisor to the graduate dean for approval at least two weeks prior to an exam. The qualifying examinations include written examinations and a final oral examination:

- Greek and Latin translation (three hours each)
- Greek and Roman history (two hours each)
- History of Greek and Roman literature (three hours)
- A "special area" that can be fulfilled by either an extensive research paper or a three-hour written exam
- Oral examination to be administered by the candidacy committee and taken only after the other exams have been passed (two hours: one hour general knowledge and one hour special-area exam paper or research paper)

These exams are based on the Tri-Campus Reading Lists and should be completed by the end of the fourth year. The exams on Greek and Roman history are based on up to six books each, three prescribed on the reading list for this exam and up to three agreed to by the student and graduate advisor. The exam on the history of Greek and Roman literature is based on the Greek and Latin Reading Lists and the books prescribed on the reading list for this exam. Students are expected to read, in the original, all works on the Greek and Latin Reading Lists, whether or not they have appeared in courses. (Students may negotiate with the graduate advisor substitutions on the Greek and Latin Reading Lists comprising up to twenty percent of their total length in order to accommodate the particular interests of the individual student.) Upon successful completion of the written examinations, the oral exam will be scheduled. Students failing segments of the qualifying exams may normally retake those sections only once after the interval of one quarter or the summer break, as the case may be. Students may retake segments of the qualifying exams more than once only at the discretion of the JEC. A grade of Pass in all examinations is required for admission to candidacy.

Thesis and Defense for the M.A.

The master's paper comprises a substantial piece of original research. It should exceed the breadth and depth expected for a seminar paper, which can provide a good foundation for the master's paper. The master's paper must be submitted to members of the master's committee three weeks in advance of the general exam.

If the master's paper is found to be of passing quality by the committee, the student may take the general exam, a one-hour oral exam covering the broader implications of the master's paper and the classical world generally.

Thesis and Defense for the Ph.D.

When the student has advanced to candidacy, the JEC—in consultation with the candidate, the

graduate advisor, and the proposed chair of the doctoral committee—will recommend to the dean of the Graduate Division a doctoral committee composed of at least three program faculty (from at least two of the three campuses) and one outside member who holds tenure at one of the participating campuses. The doctoral committee will serve as the examination committee for the thesis defense. Within the first quarter after completion of the qualifying exams and all other prerequisites, the candidate will submit a dissertation proposal for discussion and evaluation to the doctoral committee.

A public oral defense of the dissertation will be scheduled upon its submission to the doctoral committee. Members of the committee must be supplied with a copy of the dissertation at least three weeks before the exam date.

THE EMPHASIS IN COMPARATIVE LITERATURE

Course Work

For the emphasis in comparative literature, students must take at least five graduate courses in the Department of English and Comparative Literature. One course should be Criticism 222A or C, or Comparative Literature 200. At least three of the courses should have a Comparative Literature designation. One of the courses could be Humanities 270 (Critical Theory). Classics students can devote the required outside seminars to this emphasis and may, with the graduate advisor's approval, make appropriate substitutions of courses.

Qualifying Exams

One topic on the Ph.D. qualifying examination must be on a comparative literature topic and should be prepared with a professor from the Comparative Literature Program who would serve as a member of the student's exam committee. The student should be able to demonstrate some expertise in comparative critical methodologies as well as knowledge of a literature and tradition other than classics. Normally classics students will fulfill this requirement by selecting the research-paper option for the oral-exam stage of the qualifying examinations.

Dissertation

One member of the student's doctoral committee must be from the Program in Comparative Literature.

Students must submit an application for the emphasis to the graduate advisor in classics, and the department will track the students' progress and fulfillment of the emphasis requirements. Upon graduation, students will receive a letter from the graduate advisor certifying completion of the emphasis.

ATTENDANCE AT COLLOQUIA AND OTHER DEPARTMENTAL ACTIVITIES

Seminars, colloquia, and other activities of interest to classics graduate students are organized regularly by the Tri-Campus Graduate Program. Since these activities are considered part of the student's professional training, all students are required to

attend them. Students are also urged to acquaint themselves with colloquia offered in other fields.

SUPPORT FOR GRADUATE STUDENTS

A variety of fellowships and teaching assistantships is available to classics graduate students on a competitive basis. They include Chancellor's Fellowships, Regents' Fellowships, and Dissertation Fellowships, as well as the Thesaurus Linguae Graecae Fellowship. Several teaching and research assistantships are also available and provide a stipend in addition to tuition and fees. Some fourth- and fifth-year teaching assistantships are held at UC Riverside and UC San Diego. Continuation of support is contingent upon satisfactory academic progress. Support from various sources is normally extended to students in good standing for up to six years.

RESOURCES OF THE TRI-CAMPUS PROGRAM

The Department of Classics at UC Irvine, which is the administrative center of the Tri-Campus Program, is housed in pleasant quarters in Humanities Office Building 2. Tri-Campus graduate students avail themselves of

- Superior library holdings in classics and related fields in the combined collections of all nine University of California research libraries, access to the holdings of the California Digital Library, and expeditious Interlibrary Loan Services with other U.S. and international libraries.
- The facilities of the Thesaurus Linguae Graecae Project (TLG) at UC Irvine, including the complete TLG data bank, the Classics/TLG Computing Lab, and the large collection of primary texts, commentaries, and reference materials housed in the TLG's Marianne Eirene McDonald Library. Formal (Classics 201) and informal instruction in computer-related methodologies for research and teaching are conducted at the Classics/TLG Computing Lab.
- The Consortium for Latin Lexicography (CLL) at UC Irvine, a collaborative research group whose primary goal is to create a computerized Latin dictionary based on the Thesaurus Linguae Latinae (TLL) in Munich.
- The faculty and program in comparative ancient civilizations at UC Riverside, which are dedicated to a cross-cultural and cross-disciplinary approach to the study of ancient cultures.
- Combined UCI-UCSD Ph.D. Program in theatre, which has a strong classics component, and the nationally renowned regional theatre in La Jolla.
- Seminars, colloquia, and lectures regularly offered by the Critical Theory Institute at UC Irvine and by the University of California Humanities Research Institute that is housed on the UC Irvine campus. Tri-Campus doctoral students may add an emphasis in critical theory under the supervision of the Committee on Critical Theory. The Tri-Campus Program also has its own colloquia series of lectures by visiting scholars on the three campuses.
- The Southern California Graduate Resource-Sharing Consortium, a cooperative association

of the Tri-Campus Program and the graduate classics programs of UCLA and the University of Southern California. Every year a faculty member from each of these units offers a graduate seminar in his or her area of expertise at one of the other units. In the spring of every year faculty and graduate students conjoin at an annual consortium luncheon and lecture by a distinguished visiting scholar.

For further information and an online application to the program, please see the Tri-Campus Program's Web site at <http://www.humanities.uci.edu/classics/Tricampus/index.php>.

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LINKS

Following is a list of Web sites for professional organizations that may be of interest to Classical Studies students:

- The American Philological Association: the national professional association for classics <http://www.apaclassics.org/>
- The California Classical Association: the West Coast regional professional association for classics
 - Northern Section: <http://www.ccanorth.org/>
 - Southern Section: <http://www.csulb.edu/colleges/cla/departments/complitclassics/programs/cca-south/>
- The American Classical League: the national association for secondary teachers of Latin and Greek: <http://www.aclassics.org/>

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

UNDERGRADUATE

Classical Studies 196A-B. Honors Thesis (2-4)

Cultural Traditions. Judaic 1A-B (4-4)

Humanities 1. The Foundations of Western Civilization: Israel and Greece (6)

Humanities 2. Rome, Christianity, and the Medieval World (6)

Humanities 3. Renaissance, Reformation, and Early Modern Europe (4)

HIEU 101. Greece in the Classical Age (4)

HIEU 102. The Roman Republic (4)

HIEU 103. The Roman Empire (4)

HIEU 133. Gender in Antiquity and the Early Medieval Mediterranean (4)

HIEU 160. Topics in the History of Greece (4)

HIEU 161. Topics in Roman History (4)

HIEU 199. Independent Study in European History (4)

HISC 101A. Science in the Greek and Roman World (4)

LTGK 1-2-3. Beginning and Intermediate Greek (4-4-4)

LTGK 110. Archaic Period (4)

LTGK 112. Homer (4)

LTGK 113. Classical Period (4)

LTGK 120. New Testament Greek (4)

LTGK 130. Tragedy (4)

LTGK 131. Comedy (4)

LTGK 132. History (4)

LTGK 133. Prose (4)

LTGK 135. Lyric Poetry (4)

LTGK 198. Directed Group Study (4)

LTGK 199. Special Studies (2 or 4)

LTLA 1-2-3. Beginning and Intermediate Latin (4-4-4)

LTLA 4. Intensive Elementary Latin (12)

LTLA 100. Introduction to Latin Literature (4)

LTLA 111. Pre-Augustan (4)

LTLA 114. Vergil (4)

LTLA 116. Silver Latin (4)

LTLA 131. Prose (4)

LTLA 132. Lyric and Elegiac Poetry (4)

LTLA 133. Epic (4)

LTLA 134. History (4)

LTLA 135. Drama (4)

LTLA 198. Directed Group Study (4)

LTLA 199. Special Studies (2 or 4)

LTWL 19A-B-C. The Greco-Roman World (4-4-4)

LTWL 100. Mythology (4)

LTWL 102. Women in Antiquity (4)

LTWL 106. Classical Tradition (4)

Previously LGTN 100, LTEU 100 (may be repeated as topics vary).

LTWL 131A. Topics in Early Christian Literature: The New Testament (4)

LTWL 131B. Topics in Early Christian Literature: Paul and the Invention of Christianity (4)

LTWL 131C. Topics in Early Christian Literature: Reinventing Jesus (4)

LTWL 131D. Topics in Early Christian Literature: The Fourth Gospel (4)

LTWL 131E. Topics in Early Christian Literature: The History of Heresy (4)

LTWL 131F. Topics in Early Christian Literature: Christianity and the Roman Empire (4)

LTWL 131G. Topics in Early Christian Literature: Against the Christians (4)

Philosophy 100. Plato (4)

Philosophy 101. Aristotle (4)

Philosophy 102. Hellenistic Philosophy (4)

Philosophy 199. Directed Individual Study (4)

Pol. Sci. 110A. Citizens and Saints: Political Thought from Plato to Augustine (4)

TDHT 116. Old Myths in New Films (4)

Visual Arts 120A. Greek Art (4)

Visual Arts 120B. Roman Art (4)

Visual Arts 120C. Late Antique Art (4)

GRADUATE

HIEU 260. Topics in the History of Greece (4)

HIEU 261. Topics in the History of Rome (4)

LTCO 210. Classical Studies (4)

LTGK 297. Directed Studies (1-12)

LTGK 298. Special Projects (4)

LTLA 297. Directed Studies (1-12)

LTLA 298. Special Projects (4)

Philosophy 210. Greek Philosophy (4)

Philosophy 290. Directed Independent Study (1-4)

UC TRI-CAMPUS GRADUATE PROGRAM IN CLASSICS COURSES

Classics 200A. Contemporary Literary Theory and the Classics (4)

An introduction to contemporary literary theory, focusing on important critical approaches to the literary texts. May be repeated for credit as topics vary.

Classics 200B. Historical Perspectives on Classical Antiquity (4)

Examines ways in which classical texts and ideas have been received and appropriated for the diverse purposes of ancient and subsequent cultures. May be repeated for credit as topics vary.

Classics 200C. Greece and Rome in Their Contemporary Cultural Contexts (4)

An introduction to the methods and perspectives of social scientific theory that can be used to study the material and social dimensions of the cultures of ancient Greece and Rome. May be repeated for credit as topics vary.

Classics 201. Research and Pedagogical Tools for Classicists (4)

Covers various technical skills essential for research and pedagogy in classics, including use of digital resources (e.g., bibliographical databases). Provides an introduction to important disciplinary subfields, such as textual criticism and epigraphy. Selection of topics will be at instructor's discretion.

Classics 205. Concurrent Readings (2)

Concurrent enrollment with advanced undergraduate courses (either Greek 105 or Latin 105) with enhanced readings and separate examinations. May be repeated for credit as topics vary.

Classics 220. Classics Graduate Seminar (4)

Subject matter variable; mainly but not exclusively major literary topics. May be repeated for credit as topics vary. Same as Art History 295 when topic is appropriate.

Classics 280. Independent Study (4)

Supervised independent research. Subject varies.

Classics 290. Research in Classics (4-4-4)

F,W,S.

Classics 299. Dissertation Research (4-12)

F,W,S. May be repeated for credit. Satisfactory/Unsatisfactory only.

Classics 399. University Teaching (4-4-4)

F,W,S. Required of and limited to teaching assistants.

Clinical Psychology

PROFESSORS

Sonia Ancoli-Israel, Ph.D., *In-Residence/Psychiatry*
Mark I. Appelbaum, Ph.D., *Psychology*
J. Hampton Atkinson, Jr., M.D., *In-Residence/Psychiatry*
Ursula Bellugi, Ed.D., *Adjunct/Psychology*
Mark W. Bondi, Ph.D., *In-Residence/Psychiatry*
David L. Braff, M.D., *Psychiatry*
Gregory G. Brown, Ph.D., *In-Residence/Psychiatry*
Sandra A. Brown, Ph.D., *Psychology/Psychiatry*
Sandra J. Brown, Ph.D., *H.S. Clinical Psychiatry*
Michael P. Caligiuri, Ph.D., *In-Residence/Psychiatry*
Jody Corey-Bloom, M.D., Ph.D., *Neurosciences*
Eric Courchesne, Ph.D., *Neurosciences*
Dean C. Delis, Ph.D., *In-Residence/Psychiatry*
Joel E. Dimsdale, M.D., *In-Residence/Psychiatry*
Ann F. Garland, Ph.D., *In-Residence/Psychiatry*
Mark A. Geyer, Ph.D., *In-Residence/Psychiatry*
Eric L. Granholm, Ph.D., *In-Residence/Psychiatry*
Igor Grant, M.D., *Psychiatry*
Deborah Harrington, Ph.D., *Adjunct/Radiology*
Robert K. Heaton, Ph.D., *Psychiatry, Program Director*
Terry L. Jernigan, Ph.D., *In-Residence/Psychiatry*
Dilip V. Jeste, M.D., *In-Residence/Psychiatry*
Lewis L. Judd, M.D., *Psychiatry, Chair*
Patricia A. Judd, Ph.D., *H.S. Clinical Psychology*
John R. Kelsoe, Jr., M.D., *Psychiatry*
William S. Kremen, Ph.D., *In-Residence/Psychiatry*
Daniel F. Kripke, M.D., *Emeritus, Psychiatry*
James A. Kulik, Ph.D., *Psychology*
Marta Kutas, Ph.D., *Cognitive Science*
Saul Levine, M.D., *Clinical Psychiatry*
James B. Lohr, M.D., *In-Residence/Psychiatry*
Jeffrey E. Max, MBBch, *Psychiatry*
Paul J. Mills, Ph.D., *In-Residence/Psychiatry*
Mark G. Myers, Ph.D., *In-Residence/Psychiatry*
Lawrence A. Palinkas, Ph.D., *Family and Preventive Medicine*
Barbara L. Parry, M.D., Ph.D., *In-Residence/Psychiatry*
Thomas L. Patterson, Ph.D., *In-Residence/Psychiatry*
Martin P. Paulus, M.D., *In-Residence/Psychiatry*
William Perry, Ph.D., *In-Residence/Psychiatry*
Georgia R. Sadler, Ph.D., *H.S. Clinical Surgery*
David P. Salmon, Ph.D., *In-Residence/Neurosciences*
Laura Schreibman, Ph.D., *Psychology*
Marc A. Schuckit, M.D., *Psychiatry*
Larry R. Squire, Ph.D., *Psychiatry*
Murray B. Stein, M.D., *In-Residence/Psychiatry*
Joan Stiles, Ph.D., *Cognitive Science*
Steffanie Strathdee, Ph.D., *Family and Preventive Medicine*
Neal R. Swerdlow, M.D., Ph.D., *Psychiatry*
Doris A. Trauner, M.D., *Neurosciences/Pediatrics*
Tamara L. Wall, Ph.D., *In-Residence/Psychiatry*
Shu-Hong Zhu, Ph.D., *In-Residence/Family and Preventive Medicine*
Sidney Zisook, M.D., *Psychiatry*

ASSOCIATE PROFESSORS

Angela M. Ballantyne, Ph.D., *Project Scientist/Neurosciences*
Kerri Boutelle, Ph.D., *Clinical Pediatrics*
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J. Vincent Filoteo, Ph.D., *In-Residence/Psychiatry*
Ariel J. Lang, Ph.D., *In-Residence/Psychiatry*
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Julie Wetherell, Ph.D., *In-Residence/Psychiatry*

ASSISTANT PROFESSORS

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Sean Drummond, Ph.D., *In-Residence/Psychiatry*
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Kristen McCabe, Ph.D., *Adjunct/Psychiatry*
David J. Moore, Ph.D., *Adjunct/Psychiatry*
Gregory J. Norman, Ph.D., *Assistant Adjunct, Family and Preventive Medicine*
Sonya B. Norman, Ph.D., *Adjunct/Psychiatry*
Thomas Rutledge, Ph.D., *In-Residence/Psychiatry*
Michael J. Taylor, Ph.D., *Adjunct/Psychiatry*
Elizabeth W. Twamley, Ph.D., *Adjunct/Psychiatry*
Steven P. Woods, Psy.D., *In-Residence/Psychiatry*
Maria Luisa Zuñiga, Ph.D., *Adjunct/Family and Preventive Medicine*

PROFESSIONAL RESEARCHER

Jeanne Townsend, Ph.D., *Associate Research Scientist/Neurosciences*

OFFICE: Biomedical Sciences Building, Room 2056
(858) 534-4044

THE JOINT DOCTORAL PROGRAM

The interdisciplinary partnership of the Department of Psychiatry at the UCSD School of Medicine and the Department of Psychology at San Diego State University greatly extends the range of perspectives and furnishes unusual opportunities for graduate study leading to the Ph.D. degree in clinical psychology. The Joint Doctoral Group in Clinical Psychology currently consists of faculty from the UCSD Department of Psychiatry, School of Medicine, and the Departments of Neurosciences, Cognitive Science, Family and Preventive Medicine, and Psychology, and the SDSU Department of Psychology and School of Public Health.

Information regarding admission is found in the current edition of the Bulletin of the Graduate Division of San Diego State University and at our Web site: <http://www.psychology.sdsu.edu/doctoral>.

The program goal is to train clinical psychologists who are accomplished both as clinicians and as research scientists. The curricula and training provide a strong foundation in clinical psychological concepts, methods, theories, and data, together with intensive concentrations in specialized areas of clinical psychology. Currently our program has three areas of specialization: behavioral medicine, neuropsychology, and experimental psychopathology.

The scientist-practitioner model on which this program is based requires that students receive ongoing supervised research experience, including planning, design, implementation, analysis, and communication of findings. Equally important is extensive supervised experience aimed at developing sound general and specialized clinical skills. Students are expected to be actively involved in all these activities throughout their tenure in the program.

The program is designed as a five-year curriculum, including a one-year clinical internship. The curriculum is based on a twelve-month academic year. The program is accredited by the American Psychological Association.

Specific courses currently required as part of the core at UCSD include: Clinical Psychology 294A,B,C, (required for neuropsychology track majors only); Clinical Psychology 296 (independent study, lab practicum); Clinical Psychology 299 (independent study project); School of Medicine 202E (Psychopathology).

PH.D. TIME LIMIT POLICIES

Students must be advanced to candidacy by the end of five years. Total University support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

CLINICAL PSYCHOLOGY COURSES

Clinical Psychology 205. Neuroanatomy (6)

Fundamental anatomy/physiology of human nervous system, emphasizing higher cortical functions. Methods of clinical problem solving in neurology; background in basic neuropsychological skills.

Clinical Psychology 209. Child Development and Neuropsychology (3)

Basic aspects of behavioral and neuropsychological development, including guest lectures from program faculty on developmental disorders and clinical assessment issues specific to children. Some emphasis on practical techniques relevant to assessments of minor patients. **Prerequisites:** completion of two-year core curriculum in the Joint Doctoral Program in Clinical Psychology.

Clinical Psychology 294. Pro-Seminar in Neuropsychology (3)

Year-long course (294A,B,C), each for three credits, offered sequentially fall, winter, spring. Provides a fundamental knowledge of brain-behavior relationships as well as strategies and methods of neuropsychological assessment and rehabilitation.

School of Medicine 202E. Social and Behavioral Sciences–Psychopathology (3)

This sequence will acquaint students with techniques of interviewing, concepts of mental illness and normality, basic research in causality of behavioral disorders, and

approaches to treatment, all in the context of a bio-psycho-social frame of reference. Format combines a lecture followed by smaller group sessions with a faculty leader. The groups enable students to meet patients with behavioral disorders, to practice interviewing, to develop observational skills, and to discuss material presented in lectures and assigned readings. (S/U grades only.) **Prerequisite:** SOM 202A,C,D or consent of instructor.

Clinical Psychology 296. Independent Study (1-12)

Independent survey of basic concepts in clinical psychology using various sources of material, including scientific papers in clinical psychology and behavioral science and other sources as seem indicated.

Clinical Psychology 299. Graduate Research (1-12)

Individual study course under one or more of the joint doctoral program faculty to develop certain research questions, design a methodology to answer the questions, and then carry out actual research, data reduction, and analysis.

Clinical Research

PROGRAM DIRECTOR

Ravindra L. Mehta, M.D., *Professor of Clinical Medicine*

ASSOCIATE PROGRAM DIRECTORS

Gerry R. Boss, M.D., *Professor of Medicine*

J. Allen McCutchan, M.D., *Professor of Medicine in Residence*

ASSOCIATED FACULTY

Gloria E. Bader, Ed.D., *President, The Bader Group*
Stephan Bera, Ph.D., *Clinical Instructor, Family and Preventive Medicine*

Theodore Ganiats, M.D., *Professor, Family and Preventive Medicine*

W. Christopher Mathews, M.D., *Professor of Clinical Medicine*

Angela Fornataro McMahon, J.D., *Director, Research Compliance and Clinical Trials Administrative Services Office*

Joe W. Ramsdell, M.D., *Professor of Clinical Medicine*

Florin Vaida, Ph.D., *Associate Adjunct Professor, Division of Biostatistics and Bioinformatics*

Deborah L. Wingard, M.D., *Professor, Family and Preventive Medicine*

Michael G. Ziegler, M.D., *Professor of Medicine*

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E-mail: clre@ucsd.edu
<http://www.clre.ucsd.edu>

PROGRAM DESCRIPTION

The Master of Advanced Studies (MAS) in Clinical Research offers a broad-based curriculum in clinical research methodology and integrates classroom instruction with practical training to provide students with the knowledge and skills necessary to produce valid, credible research. Linking the academic and professional scientific communities, the program is appropriate for physicians, pharmacists, nurses with advanced training, psychologists, and biomedical scientists employed in biomedical firms, hospitals, and pharmacies. The program aims to accommodate the varying needs of the students through its modular approach to instruction, a part-time year-round schedule, and a choice of general electives organized by tracks.

The MAS in Clinical Research is a part-time, self-supporting degree program with a flexible course schedule designed for working professionals and academics. The UC San Diego graduate division confers the MAS degree and the Department of Medicine in the UCSD School of Medicine is responsible for the academic management of the curriculum. UCSD Extension administers the program and provides student advising and career counseling services.

ADMISSION

New students are admitted in the winter and summer quarter of each academic year. Prospective candidates should submit and complete the official UCSD online graduate application for admission, the application fee, one set of official transcripts from each institution attended after high school, three letters of professional letters of recommendation, and a current resume or c.v. The GRE/GMAT is not required; however, it is strongly recommended that candidates possess, or currently be pursuing, a graduate degree in a scientific or healthcare related field and also have some level of experience in scientific or clinical research. In some instances candidates without an advanced degree may be admitted to the program if they have demonstrated substantial professional experience in the field at increasing levels of responsibility. The application deadlines are September 17 (winter) and April 15 (summer).

PROGRAM OF STUDY

The part-time master's degree program is designed to be completed in eighteen to thirty months, depending upon a participant's time to devote to the program. Classes are typically scheduled in the late afternoons and evenings. The thirty-six-unit degree is comprised of eighteen units of core clinical modules, four units of seminar courses, four units of directed studies, four units of advanced statistics electives, and six units of an independent study project.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

CLRE 250. Patient-Oriented Research I (2)

This course will develop and apply the theory of clinical trials design and analysis, discuss the practical issues of financing and implementing clinical trials, and describe issues of monitoring trials and working in cooperative groups. The scholar will design and present to a group of peers a concept sheet for a phase I/II and phase II/III clinical trial.

CLRE 251. Epidemiology I (2)

Scholars will recognize and understand different types of study designs, the relative strengths and limitations of each, and the proper choice of study design in conducting their own research. They will also be able to identify and calculate the correct measure of risk for each study design. Participants will recognize major sources of bias, confounding and misclassification, and understand design and analysis methods of dealing with each. They will also be familiar with criteria to differentiate association from causation.

CLRE 252. Health Services Research (2)

Scholars will evaluate relevant outcomes in patient-oriented research from the patient (quality of life) and societal (economic) perspectives and locate potential resources for assessing the relevant outcomes in a wide variety of study designs. They will also be able to describe the relative strengths of different health services research approaches to a clinical problem. Finally, they will understand the components of clinical practice guidelines, including patient preferences, and how these guidelines both depend upon as well as inform patient-oriented research.

CLRE 253. Biostatistics I (2)

Scholars will understand principles of measurement of clinical data, recognize data types, and correctly identify statistical methods appropriate for analysis of a given clinical data set. They will gain experience in assembling

a clinical dataset in formats suitable for analysis by STATA or other comparable statistical packages. They will learn skills to conduct graphical and numerical exploratory data analysis, comparative tests of categorical, ordinal, and continuous data, linear and logistic regression analysis, and survival analysis by life table and Kaplan-Meier techniques.

CLRE 254. Biostatistics II (2)

Scholars will understand and conduct advanced biostatistical analyses including: multiple linear and logistic regression, survival analysis, and Cox and extended Cox regression. The scholar will also be familiar with person-time rate analysis with Poisson regression and longitudinal data analysis in the presence of missing values and varying measurement times. **Prerequisites:** Biostatistics I, CLRE 253.

CLRE 255. Data Management and Informatics (2)

This course provides an orientation to database design and management and covers key issues regarding data handling for clinical research and clinical trials. Scholars will also become familiar with technology assessment and decision-making methods and analysis.

CLRE 256. Patient-Oriented Research II (2)

This course will review the ethics and basic regulatory issues for research involving human subjects; the principles of data management for clinical research, including architecture, access and confidentiality, and integrity of databases; and skills in graphic and verbal presentation of research data. Scholars will prepare a mock submission to an IRB for peer review and practice presenting graphic and tabular data. **Prerequisites:** Patient-Oriented Research I, CLRE 250.

CLRE 257. Epidemiology II (2)

Scholars will select the appropriate sampling method and determine the sample size necessary for specific projects and adjust for confounding. Participants will be familiar with several specialized analytic techniques, including matched, cluster, and meta-analyses. They will also be familiar with methodological issues, unique to ecological, behavioral, and genetic studies. **Prerequisites:** Epidemiology I, CLRE 251.

CLRE 258. Professional Development in Clinical Research (2)

Students participate in a series of seminars on professional development topics that will focus on skills and knowledge to enhance the ability of clinical researchers to be successful. Seminar topics may include research management, team building and collaboration, leadership skills, career development in the clinical research field, negotiation skills, research project management, and research budgeting/financial management. **Prerequisite:** MAS Program or permission of department.

CLRE 259. Scientific Communication Skills (2)

This course covers the key elements of scientific communication skills that are designed to enhance the clinical researcher's ability to be successful. Topics include secrets of making good oral presentations and engaging the audience, how to write and prepare abstracts, basics of grant writing and submission, and how grants are reviewed. Course includes mock grant study section. **Prerequisite:** MAS Program or permission of department.

CLRE 260. Directed Studies in Clinical Research (2)

Faculty member will direct a student's study in selected professional development topics in clinical research. Specific content will be tailored to the student's particular needs and interests. Students must make arrangements with the program and individual faculty member prior to enrolling in the course. **Prerequisite:** MAS Program or permission of department.

CLRE 261. Applied Quantitative Analysis (4)

Students will understand and conduct advanced statistical analyses for clinical research. The course will develop the students' technical and conceptual skills in cost effectiveness analysis and decision analysis including the creation and evaluation of decision trees, use of sensitivity analysis and the incorporation of patient preferences through utility analysis. **Prerequisites:** CLRE 253, CLRE 254.

CLRE 296. Independent Study Project (6)

The Independent Study Project (ISP) is the cornerstone of the MAS program. Students will be involved in a high-level clinical research project that integrates what they have learned in their formal course work. The ISP will be an independent and creative scholarly activity in an area related to one or more of the topics covered in the formal curriculum. Students' work will be evaluated by a committee of faculty, and, in some cases, industry advisors.

Cognitive Science

PROFESSORS

Richard C. Atkinson, Ph.D., *Emeritus*
Richard K. Belew, Ph.D.
Aaron V. Cicourel, Ph.D., *Emeritus*
Jeffrey L. Elman, Ph.D.
Gilles R. Fauconnier, Ph.D., *Emeritus*
James D. Hollan, Ph.D.
Edwin Hutchins, Ph.D.
Terry L. Jernigan, Ph.D.
David J. Kirsh, Ph.D.
Marta Kutas, Ph.D., *Chair*
Jean M. Mandler, Ph.D., *Emerita*
Donald A. Norman, Ph.D., *Emeritus*
Joan Stiles, Ph.D.
David Zipser, Ph.D., *Emeritus*

ASSOCIATE PROFESSORS

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Andrea A. Chiba, Ph.D.
Seana Coulson, Ph.D.
Virginia de Sa, Ph.D.
Gedeon O. Deák, Ph.D.
Rafael Nuñez, Ph.D.
Jaime A. Piñeda, Ph.D.
Emanuel Todorov, Ph.D.

ASSISTANT PROFESSORS

Sarah Creel, Ph.D.
Douglas A. Nitz, Ph.D.
Ayse Saygin, Ph.D.
Angela J. Yu, Ph.D.

ADJUNCT PROFESSORS

Anders Dale, Ph.D., *Professor, Neurosciences and Radiology*
Howard Poizner, Ph.D.
Terrence J. Sejnowski, Ph.D., *Biological Sciences—Neurobiology, Computer Science and Engineering, and Neurosciences*
Martin I. Sereno, Ph.D.

Associate Adjunct Professor

Jeanne Townsend, Ph.D.

THE INTERDISCIPLINARY PH.D. PROGRAM

PROFESSORS

Farrell Ackerman, Ph.D., *Linguistics*
Stuart Anstis, Ph.D., *Psychology*
Richard C. Atkinson, Ph.D., *UC President, Emeritus, Cognitive Science and Psychology*
William Bechtel, Ph.D., *Philosophy*
Richard K. Belew, Ph.D., *Cognitive Science*
Ursula Bellugi, Ph.D., *Adjunct/Psychology*
Gregory Brown, Ph.D., *In-Residence, Psychiatry*
Gert Cauwenberghs, Ph.D., *Bioengineering*

Patricia S. Churchland, B.Phil., *Philosophy*
Paul M. Churchland, Ph.D., *Philosophy*
Aaron V. Cicourel, Ph.D., *Emeritus, Cognitive Science and Sociology*
Jonathan Cohen, Ph.D., *Philosophy*
Michael Cole, Ph.D., *Communication*
Garrison W. Cottrell, Ph.D., *Program Director, Computer Science and Engineering*
Eric Courchesne, Ph.D., *Neurosciences*
Diana Deutsch, Ph.D., *Psychology*
Karen R. Dobkins, Ph.D., *Psychology*
Charles P. Elkan, Ph.D., *Computer Science and Engineering*
Jeffrey L. Elman, Ph.D., *Cognitive Science*
Yoav Freund, Ph.D., *Computer Science and Engineering*
Philip M. Groves, Ph.D., *Emeritus, Psychiatry and Neurosciences*
Rick Grush, Ph.D., *Philosophy*
Gail Heyman, Ph.D., *Psychology*
Steven A. Hillyard, Ph.D., *Neurosciences*
James D. Hollan, Ph.D., *Cognitive Science*
Edwin Hutchins, Ph.D., *Cognitive Science*
Andrew Kehler, Ph.D., *Linguistics*
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Donald Macleod, Ph.D., *Psychology*
George Mandler, Ph.D., *Emeritus, Psychology*
Jean M. Mandler, Ph.D., *Emerita, Cognitive Science*
Lev Z. Manovich, Ph.D., *Visual Arts*
Rachel Mayberry, Ph.D., *Linguistics*
Craig McKenzie, Ph.D., *Rady School of Management*
Hugh B. Mehan, Ph.D., *Sociology*
John C. Moore, Ph.D., *Linguistics*
Dennis D. M. O'Leary, Ph.D., *Adjunct/Neurosciences and Biological Sciences*
Carol Padden, Ph.D., *Communication*
Steven Parish, Ph.D., *Anthropology*
Harold E. Pashler, Ph.D., *Psychology*
Vilayanur S. Ramachandran, Ph.D., *Psychology*
Timothy Rickard, Ph.D., *Psychology*
David P. Salmon, Ph.D., *In-Residence, Neurosciences*
Lawrence Saul, Ph.D., *Computer Science and Engineering*
Terrence J. Sejnowski, Ph.D., *Biological Sciences—Neurobiology*
Larry R. Squire, Ph.D., *In-Residence, Psychiatry, Psychology, and Neurosciences*
Joan Stiles, Ph.D., *Cognitive Science*
Shirley Strum, Ph.D., *Anthropology*
Doris Trauner, M.D., *Neurosciences and Pediatrics*
Piotr Winkielman, Ph.D., *Psychology*
John Wixted, Ph.D., *Psychology*

ASSOCIATE PROFESSORS

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Gerald J. Balzano, Ph.D., *Music*
Serge Belongie, Ph.D., *Computer Science and Engineering*
Leslie Carver, Ph.D., *Psychology*
Andrea A. Chiba, Ph.D., *Cognitive Science*
Seana Coulson, Ph.D., *Cognitive Science*
Sanjoy Dasgupta, Ph.D., *Computer Science and Engineering*
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Katerina Semendeferi, Ph.D., *Anthropology*
Nuno Vasconcelos, Ph.D., *Electrical and Computer Engineering*

ASSISTANT PROFESSORS

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Timothy Gentner, Ph.D., *Psychology*
Gert Lanckriet, Ph.D., *Electrical and Computer Engineering*
Roger Levy, Ph.D., *Linguistics*

LECTURER

Christine M. Johnson, Ph.D., *Cognitive Science*
OFFICE: 140 Cognitive Science Building
<http://www.cogsci.ucsd.edu>

INTRODUCTION

Cognitive science is a diverse field which is unified and motivated by a single basic inquiry: What is cognition? How do people, animals, or computers “think,” act, and learn? In order to understand the mind/brain, cognitive science brings together methods and discoveries from neuroscience, psychology, linguistics, philosophy, and computer science. UC San Diego has been at the forefront of this exciting field and our Department of Cognitive Science was the first of its kind in the world. It is part of an exceptional scientific community and remains a dominant influence in the field it helped create.

In addition to preparing undergraduates for careers in a variety of sciences, the major also provides an excellent background for many professional fields, including medicine, clinical psychology, and information technology.

The concerns of cognitive science fall into three broad categories: the brain—the neurological anatomy and processes underlying cognitive phenomena; behavior—the cognitive activity of individuals and their interaction with each other and their sociocultural environment, including the use of language, information, and media; and computation—the capacity of mathematical and computer systems to model cognitive and neural phenomena and represent information, and the role of computers as cognitive tools.

The department collaborates closely with other academic departments and research communities, including the Center for Research in Language, the Center for Human Development, the Salk Institute for Biological Studies, the UCSD Medical Center, the San Diego Supercomputer Center, the Center for Functional Magnetic Resonance Imaging Center, and the new Kavli Institute for Brain and Mind, providing many outstanding resources and opportunities.

Students are encouraged to participate actively in the department by sharing their ideas about curriculum, research, and other topics with faculty and staff. Undergraduate students may join the Students in Cognitive and Neurosciences (SCANS) organization, which provides opportunities for undergraduates to meet students and faculty from UCSD and other institutes, visit research laboratories, and make job

contacts. Graduate students take an especially active role in shaping the department, both academically and administratively, while they gain experience in research, teaching, and managing both labs and department affairs.

THE UNDERGRADUATE PROGRAMS

The department offers both a B.A. and a B.S. degree. The B.S. requires completion of more rigorous lower-division course work and three additional courses at the upper-division level. The B.S. Degree may be taken optionally with a specified area of specialization. There is also an honors program for exceptional students in both degree programs. Major Code: CG25.

Please note: Students who officially declared the major before fall 2001 may choose to follow the old major requirements or the new major requirements, but not a combination of both. See department advisor for more information.

GRADE REQUIREMENTS FOR THE MAJOR

A minimum grade-point average of 2.0 is required for admittance to and graduation from the B.A. or B.S. Degree program. Students must receive a grade of C- or better in any course to be counted toward fulfillment of the major requirements. All courses must be taken for a letter grade, with the exception of Cognitive Science 195, 198, and 199, which are taken Pass/Not Pass.

FOUR-YEAR PLAN OF STUDY

The four-year plan of study below assures that all prerequisites and requirements for the cognitive science major are completed. The department does enforce course prerequisites and several courses are offered only once a year, so careful planning is important. It is recommended that lower-division courses be taken in the first two years, core courses in the third year, and electives in the final year. Check with a departmental advisor about which quarter cognitive science courses will be offered each academic year. Check with a college advisor about course planning to meet college requirements.

Freshman Year

Twelve units of math (B.A.) Or sixteen units of math (B.S.) Students intending to take Cognitive Science 118A and/or 118B should take Mathematics 20A-B-C. College requirements

Sophomore Year

Cognitive Science 1. Cognitive Science 14. Cognitive Science 18. Students intending to take Cognitive Science 118A and/or 118B should take Mathematics 20E-F and Mathematics 180A.

Junior Year

Nine core courses, chosen from a list of twelve (see "[Core Sequences](#)")

Senior Year

Electives for the major

LOWER-DIVISION REQUIREMENTS

All majors must complete lower-division courses in introductory cognitive science, mathematics, statistics, and computer programming.

Mathematics Requirement

The cognitive science major requires twelve units of mathematics courses (for the B.A. degree), or sixteen units of mathematics courses (for the B.S. degree), chosen from the following list:

Mathematics 10A-B-C

Mathematics 11

Mathematics 20A-B-C-D-E-F

Mathematics 15A or CSE 20

Mathematics 15B or CSE 21

(Students should check with the Department of Mathematics for rules governing duplication of credit between the 10 and 20 series.)

Lower-Division Requirements for the B.A. Degree

Twelve units of mathematics courses chosen from the list above, in addition to the lower-division cognitive science course requirements.

Lower-Division Requirements for the B.S. Degree

Sixteen units of mathematics courses chosen from the list above, in addition to the lower-division cognitive science course requirements.

Lower-Division Cognitive Science Course Requirements

The following lower-division courses in Cognitive Science are required for all majors:

Cognitive Science 1

Cognitive Science 14

Cognitive Science 18

Students intending to take Cognitive Science 118A and/or 118B are advised to take Mathematics 20-A-B-C-E-F and Mathematics 180A before their junior year.

UPPER-DIVISION REQUIREMENTS

The cognitive science major requires the completion of nine core sequence courses, plus three elective courses (for the B.A. degree), or six elective courses (for the B.S. degree). Students are advised to complete these core courses in their junior year, especially if they intend to apply to the honors program. The remainder of the upper-division requirement is fulfilled by completing electives.

CORE SEQUENCES

The core sequences courses in the Department of Cognitive Science are

Cognitive Science 101A-B-C (Cognitive Theory and Phenomena)

Cognitive Science 102A-B-C (Distributed Cognition, Everyday Cognition, Cognitive Engineering)

Cognitive Science 107A-B-C (Cognitive Neuroscience)

Cognitive Science 109, 118A-B (Computational Models of Cognition)

The cognitive science major requires the completion of nine courses from the core sequences, which must include two courses in the Cognitive Science 101 series, two in the Cognitive Science 102 series, two in the Cognitive Science 107 series, Cognitive Science 109, and two additional courses from any of the core sequences.

ELECTIVES

At least half of the electives for the major must be taken in the department. Courses in the Cognitive Science 19X series (190A, 190B, 190C, 198, 199) may not be used as an elective to satisfy the major requirements for the B.A. degree. One course in the Cognitive Science 19X series may be used as an elective to satisfy the requirements for the B.S. degree, but only with the approval of both the instructor who supervised the course and the undergraduate advisor. A course taken outside the department must meet the following criteria:

1. The course must deal with topics and issues that are clearly part of cognitive science.
2. The material must not be available in a course offered inside the department.

This policy permits students and their advisors to be responsive to changes in course offerings. Majors must obtain departmental approval for electives taken outside of the department.

AREAS OF SPECIALIZATION

A major may elect to receive a B.S. in cognitive science with a specified area of specialization. The areas of specialization are intended to provide majors with guidance in choosing elective courses and to make the specific interests and training of a major clear to prospective employers and graduate schools. Specifying an area of specialization is optional; however, students should take into consideration when planning for their specialization that approved courses are not necessarily offered every year.

To major in cognitive science with an area of specialization, the student must fulfill the requirements for the B.S. Degree and must choose four of the required six elective courses from a list of approved electives for that area of specialization. (The lists of approved electives for each area of specialization are available in the department office.)

The following areas of specialization are currently offered by the department:

Specialization in Clinical Aspects of Cognition

This area of specialization is intended for majors interested in cognitive neuropsychology, psychiatry, cognitive disorders, and the effects of drugs and brain-damage on cognitive functions. Allowed electives include courses in those topics, as well as organic chemistry, biochemistry, and physiology. Major code: CG31

Specialization in Computation

This area of specialization is intended for majors interested in software engineering or research in computational modeling of cognition. Allowed electives include advanced courses in neural networks, artificial intelligence, and computer science. Students interested in this specialization will most likely select courses from the computer science and engineering course offerings, as courses offered within the cognitive science department are limited. Major code: CG27

Specialization in Human Cognition

This area of specialization is intended for majors whose primary interests include human psychology and applications of cognitive science in design and engineering. Allowed electives include courses in cognitive development, language, laboratory research of cognition, anthropology, and sociology. Major code: CG28

Specialization in Human Computer Interaction

This area of specialization is intended for majors interested in human computer interaction; Web; visualization; and applications of cognitive science in design and engineering. Additional electives may be petitioned from communication, computer science, computer engineering, and visual arts. Major code: CG30

Specialization in Neuroscience

This area of specialization is intended for majors interested in neuroscience research or medicine. Allowed electives include courses in cognitive neuroscience, organic chemistry, biochemistry, and physiology. Major code: CG29

COGNITIVE SCIENCE HONORS PROGRAM

The Department of Cognitive Science offers an honors program for a limited number of majors who have demonstrated excellence, talent, and high motivation.

Eligibility Requirements

Students are eligible for admission to the program when they

1. Complete all core courses
2. Have at least junior level standing
3. Have at least a 3.5 GPA in upper-division major courses and at least a 3.0 overall GPA

Eligible students will enroll in four units of 190A (Pre-Honors Project in Cognitive Science) under a faculty member who has agreed to advise them on a potential honors project. Students may apply the COGS 190A course as an elective toward major requirements whether or not they enter the Honors Program. At the end of the 190A course, students will submit to their faculty mentor a written project proposal. The proposal will define the question to be investigated, survey existing literature, describe the approach and methods that will be used, explain how data will be collected if it is an empirical study, detail how human subjects requirements will be met if necessary, discuss expected results, and provide a timeline for project completion.

Acceptance in Honors Program

To formally enter the Honors Program, students must meet the eligibility requirements above, receive a grade of A- or better in COGS 190A, establish an honors committee of at least two faculty and one graduate student to review the proposal and advise them during the process of completing the honors project, and have their project proposal approved by their honors committee.

The honors committee must be kept informed of any deviations from the original approved project proposal and timeline. Students who fail to make satisfactory progress may be asked to withdraw from the program at any point the advisor or the department chair deems necessary.

Successful completion of the Honors Program requires

1. Maintenance of a 3.5 GPA in upper-division major courses, and a 3.0 overall GPA
2. Completion of one cognitive science (or related) graduate level course (may be taken P/NP). Students may use the required graduate course as one of their electives for the major whether or not they complete the honors project
3. Completion of COGS 190B, 190C and 160 with letter grades of A- or better
4. Completion of COGS 190D (Preparation for Thesis Presentation), a 1-unit seminar given each spring (P/NP)
5. Completion of a written honors thesis describing the project
6. Approval of the thesis by the honors committee and the department chair
7. Satisfactory presentation of the honors thesis to the cognitive science community at the Honors Thesis Presentation Conference, spring quarter

Students who successfully complete all of the requirements for the Honors Program will graduate with Distinction in Cognitive Science recorded on their transcripts.

MINORS AND PROGRAMS OF CONCENTRATION

Each college has specific requirements, and students should consult with an academic advisor in their provost's office as well as a cognitive science advisor to be sure they fulfill requirements of the college and of the department.

To receive a minor from the Department of Cognitive Science, a student must complete a total of seven (four unit) courses; five of which must be upper-division. Lower-division requirements are normally fulfilled by completing (one of) Cognitive Science 1, 3, 10 or 11 and (one of) Cognitive Science 14, 17 or 18. Upper-division requirements are normally fulfilled by completing two cognitive science electives and one of the following sequences:

Cognitive Science 101A-B-C

Cognitive Science 102A-B-C

Cognitive Science 107A-B-C

Cognitive Science 109, 118A-B

All courses must be taken for a letter grade. No grade below C- is acceptable.

TRANSFER CREDIT

Students who wish to transfer from another institution to UCSD as cognitive science majors should work closely with university advisors to ensure that all lower-division requirements have been completed and are equivalent to those offered at UCSD. It is extremely important for students to have completed lower-division requirements by the end of their sophomore year so they are prepared for core courses in their junior year. Advanced UCSD

students who wish to transfer to the department should consult with the departmental advisors about credit for courses already completed.

Education Abroad Students majoring in cognitive science are encouraged to participate in the Education Abroad Programs (EAP), and to investigate other options of foreign study through the Opportunities Abroad Program (OAP). By petition, credits earned through EAP/OAP can fulfill UCSD degree and major requirements. Please visit the Web site at <http://programsabroad.ucsd.edu> for further details. Financial aid is applicable and special study abroad scholarships are readily available.

THE GRADUATE PROGRAMS

There are two Ph.D. programs, each with different admissions and graduation requirements. The Department of Cognitive Science offers a Ph.D. in cognitive science. Students are admitted to UC San Diego directly into the department and fulfill degree requirements of the department. The Interdisciplinary Program in Cognitive Science offers a joint Ph.D. in cognitive science and a home department (anthropology, communication, computer science and engineering, linguistics, neurosciences, philosophy, psychology, or sociology). Students are admitted to UCSD through the home department and fulfill the requirements of both the interdisciplinary program and the home department.

PH.D. IN COGNITIVE SCIENCE

This program provides broad training in neurological processes and phenomena; the experimental methods, results, and theories from the study of psychology, language, and social and cultural issues; and the studies of computational mechanisms. The first year is devoted to familiarizing the student with the findings and current problems in cognitive science through courses in foundations and issues.

By the second year, basic courses and laboratory rotations are completed, with the major emphasis on the completion of a year-long research project. Future years are spent completing the advancement to candidacy requirements and doing the thesis research. Throughout the program, there are frequent faculty-student interactions, including special lectures by the faculty or invited speakers and the weekly informal research discussions and cognitive science seminar.

ADMISSIONS

The admissions committee reviews each applicant's statement of purpose, letters of recommendation, GRE scores, previous education and work experience, and grade-point averages, then recommends candidates for admission to the entire faculty, who make the final decision.

ADVISING

An interim advisor is appointed to serve as general advisor and counselor for each entering student. The advisor helps chart a set of courses that fulfill the content area requirements, taking into account the student's prior training and interests. Students may change the interim advisor at any time (as long as the new interim advisor is willing). At the time of advancement to candidacy, students choose

a permanent advisor who also functions as the chair of the dissertation committee.

All entering students are assumed to have basic prerequisite knowledge, and a list of basic readings will be provided to incoming students. Students who do not have this background can acquire it through self-study in the summer preceding arrival at UCSD or by taking self-paced study courses or relevant undergraduate courses at UCSD.

Summary of Requirements

1. Foundations courses
2. Approved study plan, which includes issues courses, methods courses, and laboratory rotations
3. Second-year project
4. Language requirement
5. Advancement to candidacy
6. Teaching
7. Cognitive Science 200 seminar
8. Participation in departmental events and committees
9. Ph.D. dissertation and defense

DESCRIPTION OF REQUIREMENTS

- 1. Foundations Courses (Cognitive Science 201, 202, 203).** Students complete foundations courses in the areas of brain, behavior, and computation by the end of the second year. The department may waive some or all courses for students who already have the required knowledge.
- 2. Study Plan.** Students complete a study plan recommended by their advisor. The normal plan includes
 - a. Issues Courses.** A minimum of six issues courses are required, at least one in each of the areas of brain, behavior, and computation. At least four of the issues courses should be taken within the department. Department recommends completion by the end of the second year. Issues courses taken outside the department require the approval of the advisor in conjunction with the Graduate Committee. Five of the six issues courses must be taken for a letter grade.
 - b. Methods Courses.** Three methods courses are required, one of which must be an approved statistics course. Students should obtain approval for all three courses from their advisor. An approved list of courses is on file with the department to assist students in selecting courses. Students may petition courses not on the approval list. Such petitions must be approved by the student's advisor and graduate committee. All three courses must be taken for a letter grade.
 - c. Laboratory Rotations (Cognitive Science 290).** A total of three quarters of laboratory rotations in at least two different faculty laboratories are required. Each rotation is for one to two full quarters as required by the faculty

laboratory. All rotations should be completed by the end of fall quarter of the second year.

Students can meet this requirement in the following ways:

- Three one-quarter rotations in three different laboratories, or
- One one-quarter rotation and one two-quarter rotation in two different laboratories, or
- Two two-quarter rotations in two different laboratories for a total of four quarters enrolled in COGS 290.

Department recommends that student and advisor negotiate a topic and activity, then put the agreement in writing, sign, and give to the graduate coordinator.

3. Second-Year Research Project (Cognitive Science 210A-B-C and 211A-B-C). In the summer between the first and second year, students work with their advisor and a faculty committee to develop a prospectus for a research project. The yearlong project culminates with written and oral presentations to the faculty at the end of spring quarter. During the second year, concurrent enrollment in Cognitive Science 210A-B-C and Cognitive Science 211A-B-C is required as part of the Second Year Project.

4. Language Requirement. The main goal of the language requirement is to give all students firsthand experience with some of the differences in structure and usage of languages and the several issues involved in the learning of second languages. This requirement can be satisfied by demonstrating satisfactory proficiency, by prior study in a language (e.g., two years of high school study), or by satisfactory completion of one quarter of study in a language course approved by the department.

5. Advancement to Candidacy/Qualifying Paper and Oral Exam. There are three components to advancement to candidacy:

- a. **Competency.** This requirement is met by satisfactorily completing items 1–4 above.
- b. **Depth.** This requirement is met by satisfactorily completing a talk to the entire department on their thesis topic by the end of the third year. A first draft of the thesis proposal must be submitted to the student's advisor by the end of the third year. Students enroll in COGS 205 during winter and spring quarter of the third year.
- c. **Dissertation Topic/Advancement Exam.** The student prepares a proposal of the dissertation topic that must be approved by the student's doctoral committee. A final written proposal is submitted to the committee at least two weeks prior to an oral defense of the proposal. The doctoral committee consists of at least five faculty members: three from the department and two from outside the department; one of the outside members must be tenured.

6. Teaching (Cognitive Science 500). All graduate students must serve as a teaching assistant at least one quarter of each academic year in residence. The undergraduate program offers a

special challenge to instructor and student alike, and experience with the teaching of that program can provide a valuable part of the education of a cognitive scientist. Teaching assistantships performed in other departments must be approved by formal petition to the graduate committee to count toward the requirement. The department works closely with the Center for Teaching Development to design effective training and development programs for its teaching assistants. At the end of each quarter, instructors prepare written evaluations of all teaching assistants.

7. Cognitive Science 200 Seminar. Students must enroll in this seminar for at least three quarters while in residence; frequent participation is encouraged.

8. Participation in Departmental Events and Committees. Students participate in departmental special events and committees and serve as student representatives for faculty meetings and the campuswide Graduate Student Association. Students present their research in the undergraduate SCANS series.

9. Completion of the Ph.D. Dissertation and Defense. Candidates prepare a written dissertation demonstrating a substantive contribution to our understanding of cognition. An oral defense follows.

MASTER'S DEGREE

The Department of Cognitive Science does not offer admissions to a master's program. However, candidates for the Ph.D. who do not hold a master's degree from another institution may be granted the M.S. degree after fulfilling the first three requirements listed above. This is usually at the end of the second year. Duplication of advanced academic degrees, e.g., one at the same level, is not permitted at UCSD. Likewise, a professional degree at the master's or doctoral level, e.g., M.Ed., M.P.I.A., M.D., or Pharm.D., is not regarded as a duplicate of an academic degree.

EVALUATION OF PERFORMANCE AND PROGRESS

A formal evaluation of performance and progress for all students takes place at the end of spring quarter every year, with special attention given to the first and second years of study and at the time of qualification. The first-year evaluation is based in large part on the performance in foundations and issues courses. The second-year evaluation is based on the student's total performance, with heavy weight given to the student's second-year research project. The third-year evaluation focuses on the competency and depth requirements, and the following years on the progress made toward completion of the dissertation.

SPECIAL EVENTS

The department intends to enhance student-faculty interaction and current awareness of active research issues by special "events":

- Lectures by invited speakers or faculty members
- A full day of faculty/student overview and information at the start of each year, with emphasis

on ongoing research activity

- Presentations of second-year research projects and third-year thesis topics to the entire faculty at the end of each year
- Final defense of the dissertation accompanied by a public lecture and celebration

TIME LIMITS TO PH.D.

Students must be advanced to candidacy by the end of spring quarter of their fourth year. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

FINANCIAL AID

Financial support is available to qualified students in the form of fellowships, loans, and assistantships. Students are encouraged to seek fellowships and research awards from outside the university. Please refer to the Graduate Studies section for more information.

THE INTERDISCIPLINARY PH.D. PROGRAM

The interdisciplinary Ph.D. program is distinct from the departmental Ph.D. Program (see previous section) both in admissions and graduation requirements. There are four aspects to graduate study in the interdisciplinary program: (a) a primary specialization in one of the established disciplines of cognitive science; (b) a secondary specialization in a second field of study; (c) familiarity with general issues in the field and the various approaches taken to these issues by scholars in different disciplines; and (d) an original dissertation project of an interdisciplinary character. The degree itself reflects the interdisciplinary nature of the program, being awarded jointly to the student for studies in cognitive science and the home department. Thus, students in linguistics or psychology will have degrees that read "Ph.D. in Linguistics and Cognitive Science" or "Ph.D. in Psychology and Cognitive Science."

ADMISSION TO THE PROGRAM

Students enter UCSD through admission to one of the affiliated departments, which then serves as their home department, and which specifies their primary specialization. The affiliated departments are anthropology, communication, computer science and engineering, linguistics, neurosciences, philosophy, psychology, and sociology. Students may apply for admission to the interdisciplinary program anytime after entering UCSD, typically in the second or third year. Students must have an advisor from their home department who is a member of the interdisciplinary program faculty. If a student does not have such an advisor, a member of the Instructional Advisory Committee will be appointed as interim advisor. The Instructional Advisory Committee is made up of one interdisciplinary program faculty person from each of the home departments. The committee member that will serve as interim advisor for a student will come from the same home department as the student.

Note: Admission to the interdisciplinary Ph.D. Program is contingent upon applying to and being accepted in a home department.

PRIMARY SPECIALIZATION

Primary specialization is accomplished through the home department. Students are expected to maintain good standing within their home departments and to complete all requirements of their home departments through qualification for candidacy for the Ph.D. degree.

SECONDARY SPECIALIZATION

The power of an interdisciplinary graduate training program lies in large measure in its ability to provide the student the tools of inquiry of more than one discipline. Students in the cognitive science interdisciplinary program are expected to gain significant expertise in areas of study outside of those covered by their home departments. Such expertise can be defined in several ways. The second area might coincide with that of an established discipline, and study within that discipline would be appropriate. Alternatively, the area could be based upon a substantive issue of cognitive science that spans several of the existing disciplines, and study within several departments would be involved. In either case, students work with their advisor and the Instructional Advisory Committee to develop an individual study plan designed to give them this secondary specialization. A list of courses in cognitive studies at UCSD is available. This requirement takes the equivalent of a full year of study, possibly spread out over several years. Often it is valuable to perform an individual research project sponsored by a faculty member in a department other than the student's home department.

The following list demonstrates some ways to fulfill the secondary specialization requirement. It should be emphasized that these programs are only examples. Students will devise individual plans by working with their advisors and the advisory committee. Ideally, students who elect to do research in their areas of secondary interest will be able to accomplish a substantive piece of work, either one of publishable quality or one that will be of significant assistance in their dissertation projects.

Cognitive Psychology. Get a basic introduction to cognitive psychology through the Cognitive Psychology Seminar (Psychology 218A-B) and acquire or demonstrate knowledge of statistical tools and experimental design (this can be done either by taking the graduate sequence in statistics, Psychology 201A-B, or through the standard "testing out" option offered to all psychology graduate students). Finally, and, perhaps of most importance, the student should do a yearlong project of empirical research in psychology with the guidance of a member of the Department of Psychology.

Cognitive Social Sciences. A course sequence from sociology and anthropology, including one or two courses in field methods and a research project under the direction of a cognitive social sciences faculty member. The course sequence and project should be worked out with the advisory committee to reflect the interests and background of the student. Examples of courses include Distributed Cognition (Cognitive Science 234), Text and Discourse Analysis (Sociology 204), and the Anthropology of Language and Discourse (Anthropology 263). In addition, courses on field

methods are offered by both anthropology and sociology.

Computer Science and Artificial Language.

This specialization requires a thorough background in computer science. For those who enter the program without much formal training in this area, the secondary specialization in computer science includes some upper-division undergraduate courses (CSE 100, 102, 105) and a minimum of two graduate courses (CSE 250AB). (Note that these courses require basic knowledge of programming and discrete mathematics areas that may require some additional undergraduate courses for those who lack these skills.) Students with stronger backgrounds in computer science may go straight to graduate courses. For all students interested in this specialization, the course sequences and any projects should be worked out on an individual basis with the student's advisor.

Discourse Structure and Processing. This specialization is highly interdisciplinary, spanning linguistics, computer science, psychology, sociology, philosophy, and anthropology. Research within this specialization depends upon which discipline is given emphasis. Therefore, the specialization will have to be developed according to the interests of the student. All students will have to demonstrate awareness and knowledge of relevant studies and the approaches of the various disciplines.

Linguistics. Students who elect a secondary specialization in linguistics should specialize either in the general area of syntax/semantics or in the general area of phonetics/phonology. Those who specialize in syntax/semantics should plan to take three courses in this area and one course in phonetics/phonology. Conversely, those who specialize in phonetics/phonology should plan to take three courses in this area and one course in syntax/semantics. The specific courses recommended will depend on the individual student's interests and should be arranged in conjunction with the Department of Linguistics faculty liaison to the Cognitive Science Interdisciplinary Program.

In addition, students will prepare a research paper (preferably originating in one of the above courses) that demonstrates control of the methodology and knowledge of important issues in their area of specialization.

Neurosciences. A student specializing in neurosciences would take a program of courses emphasizing brain-behavior relationships, including Behavioral Neuroscience (Neurosciences 264) and the Physiological Basis of Human Information (Neurosciences 243). In addition, depending upon the student's individual interests, one or more of the neurosciences core courses would be taken in the areas of Mammalian Neuroanatomy (Neurosciences 256), Neuro-psychopharmacology (Neurosciences 277), and/or Neurochemistry (Neurosciences 234). In most cases, the student would also take a research rotation in the laboratory of a member of the neurosciences faculty.

Philosophy. Students who elect a secondary specialization in philosophy will focus on philosophy of science, philosophy of mind, philosophy of psychology, philosophy of neuroscience, or philosophy of language, depending on their area of primary specialization. Courses suitable for this program

include Philosophy of Language (Philosophy 234), Philosophy of Mind (Philosophy 236), Philosophy of the Cognitive Sciences (Philosophy 250A), and Seminar on Special Topics (Philosophy 285), which will frequently focus on issues relevant to cognitive science. The course sequence should be worked out with the student's advisor.

ACQUISITION OF PERSPECTIVE ON THE FIELD

The cognitive science faculty offers a special seminar, Cognitive Science 200, that emphasizes the interdisciplinary approach to the field and that covers a variety of different problems, each from the perspective of several disciplines. All students are required to enroll in this seminar a total of six quarters while in residence; most students regularly attend the seminar even after fulfilling the requirement. Students may substitute a Cognitive Science Foundations course for a Cognitive Science 200. A maximum of two quarters may be substituted.

PREQUALIFYING EXAMINATIONS

Students must complete any prequalifying and field requirements of their home department.

QUALIFYING EXAMINATIONS

The Dissertation Advisory Committee. As soon as possible, students form a dissertation committee consisting of

- At least three members from the student's home department, including the student's advisor; and at least three members of the Cognitive Science Program, at least two of whom are not members of the student's home department.
- University regulations require that at least one of the faculty members of the committee from outside the home department must be tenured.
- The committee must be approved by the interdisciplinary program, the home department, and by the dean of Graduate Studies. The dissertation committee is expected to play an active role in supervising the student and to meet with the student at regular intervals to review progress and plans.
- In the qualifying examination, the student must demonstrate familiarity with the approaches and findings from several disciplines relevant to the proposed dissertation research and must satisfy the committee of the quality, soundness, originality, and interdisciplinary character of the proposed research.

INTERDISCIPLINARY DISSERTATION

It is expected that the dissertation will draw on both the primary and secondary areas of expertise, combining methodologies and viewpoints from two or more perspectives, and that the dissertation will make a substantive contribution to the field of cognitive science.

OVERVIEW

The program can be summarized in this way:
In the first years, basic training within the student's primary specialization, provided by the home departments.

In the middle years, acquisition of secondary specialization and participation in the Cognitive Science Seminar.

In the final years, dissertation research on a topic in cognitive science, supervised by faculty from the program.

Time Limits: Time limits for precandidacy, financial support, and registration are those established for the home department. Normative time is six years.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

1. Introduction to Cognitive Science (4)

A team-taught course highlighting development of the field and the broad range of topics covered in the major. Example topics include addiction, analogy, animal cognition, human-computer interaction, language, neuroimaging, neural networks, reasoning, robots, and real-world applications.

3. Introduction to Computing (4)

A practical introduction to computers. Designed for undergraduates in the social sciences. Topics include: basic operations of personal computers (MAC, PC), UNIX, word processing, e-mail, spreadsheets, and creating web pages using the World Wide Web. No previous background in computing required.

8. Hands-on Computing (4)

Introductory-level course that will give students insight into the fundamental concepts of algorithmic thinking and design. The course will provide the students with first-person, hands-on experience programming a Web crawler and simple physical robots.

10. Cognitive Consequences of Technology (4)

The role of cognition and computation in the development of state-of-the-art technologies such as human computational interaction in aviation, air traffic control, medical diagnosis, robotics and telerobotics, and the design and engineering of cognitive artifacts.

11. Minds and Brains (4)

How damaged and normal brains influence the way humans solve problems, remember or forget, pay attention to things; how they affect our emotions, and the way we use language in daily life.

14. Design and Analysis of Experiments (4)

Design, statistical analysis, and interpretation of experiments in the main areas of cognitive science: brain, behavior, and computation. Introduction to mathematical foundations of probability and statistical decision theory. Decision theory is applied to the problem of designing and analyzing experiments. Students will participate in a group project in which they must design scientific experiments, collect data and analyze results. May fulfill general education requirements; ask a college advisor. **Prerequisite:** Mathematics 10A or equivalent.

17. Neurobiology of Cognition (4)

Introduction to the organization and functions of the nervous system. Topics include molecular, cellular, developmental, systems, and behavioral neurobiology. Specifically, structure and function of neurons, peripheral and central nervous systems, sensory, motor, and control systems, learning and memory mechanisms. (Students may not receive credit for both Biology 12 and Cognitive Science 17. This course fulfills general-education requirements for Marshall and Roosevelt Colleges as well as Warren by petition.)

18. Introduction to Programming for Cognitive Science (4)

Fundamentals of computer programming are introduced. Topics include: fundamentals of computer architecture, variables, functions, and control structures; writing, testing, and debugging programs; programming style and basic software design. Examples and exercises focus on cognitive science applications. **Prerequisite:** Mathematics 10A or 20A.

25. Introduction to Web Programming (4)

Introduction to Web programming languages and their real-world applications. Concepts and languages covered include document structure (XHTML). A basic background in computing is required, but no prior programming experience.

87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

91. SCANS Presents (1)

The department faculty and the Students for Cognitive and Neurosciences (SCANS) offer this seminar exploring issues in cognitive science. It includes informal faculty research presentations, investigations of topics not covered in the curriculum, and discussions on graduate school and careers. (May be repeated when topics vary.)

99. Independent Study (2 or 4)

Independent literature or laboratory research by arrangement with and under direction of a Department of Cognitive Science faculty member. **Prerequisites:** lower-division standing, completion of thirty units of UCSD undergraduate study, a minimum UCSD GPA of 3.0, and a completed and approved "Special Studies" form.

UPPER-DIVISION

101A. Sensation and Perception (4)

An introduction to the experimental study of cognition with a focus on sensation and perception. **Prerequisite:** Cognitive Science 1.

101B. Learning, Memory, and Attention (4)

A survey of the experimental study of learning, memory, and attention. Topics include conditioning, automaticity, divided attention, memory systems, and the nature of mental representation. **Prerequisite:** Cognitive Science 1. Recommended: Cognitive Science 101A.

101C. Language (4)

An introduction to structure of natural language, and to the cognitive processes that underline its acquisition, comprehension, and production. This course covers findings from linguistics, computer science, psychology, and cognitive neuroscience to provide an integrated perspective on human language abilities. **Recommended:** Cognitive Science 101A.

102A. Distributed Cognition (4)

Distributed cognition extends beyond the boundaries of the person to include the environment, artifacts, social interactions, and culture. Major themes are the study of socially distributed cognition and the role of artifacts in human cognition. **Prerequisite:** upper-division standing. Recommended: Cognitive Science 1 or Cognitive Science 10.

102B. Cognitive Ethnography (4)

This course examines memory, reasoning, language understanding, learning, and planning directly in everyday, real-world settings. The course work will include discussions of both the findings and the methodology of naturalistic studies of cognition. **Prerequisite:** Cognitive Science 102A.

102C. Cognitive Design Studio (6)

This is a project-based course focused on the process of cognitive design. Students work in teams to design and evaluate a prototype application or redesign an existing system. Three hours of lecture and two hours of design

laboratory. **Prerequisite:** Cognitive Science 102B or consent of instructor.

107A. Neuroanatomy and Physiology (4)

This first course in the sequence focuses on principles of brain organization, from neurons to circuits to functional networks. It explores developmental plasticity, neuronal connectivity, cellular communication, complex signaling, and how these various dimensions form functional brain systems. **Prerequisite:** Cognitive Science 1 or Cognitive Science 17.

107B. Systems Neuroscience (4)

A rigorous introduction to the neurophysiological and neuroanatomical basis of human and animal cognition, covering cellular neurophysiology and circuit modeling; development, visual, somatosensory, auditory, motor, and limbic systems; neuroimaging and language. **Prerequisite:** Cognitive Science 107A.

107C. Cognitive Neuroscience (4)

This course studies brain systems implicated in attention, language, object recognition, and memory. Neurobiological evidence for functional subsystems within these processes and the way specialized systems develop are considered using findings from animal studies, human development, and behavioral and brain imaging. **Prerequisites:** Cognitive Science 107B and its prerequisites.

108D. Programming Methods for Cognitive Science (4)

(Course previously offered as COGS 108A, fall 2001.) The design, implementation, and analysis of algorithms and data structures. Applications include: symbolic artificial intelligence, neural networks, genetic algorithms, computer graphics, and human computer interaction. **Prerequisites:** Cognitive Science 1 and Cognitive Science 18 or CSE 9A or CSE 10, or permission of instructor. (Not offered in 2010–11.)

108E. Neural Network Models of Cognition I (4)

(Course previously offered as COGS 108B, winter 2002.) This course is an elementary introduction to neural networks and their use in cognitive science. Students will learn how to construct and train neural networks to solve problems at both the psychological and neurological levels of cognition. **Prerequisite:** Cognitive Science 108D. (Not offered in 2010–11.)

108F. Advanced Programming Methods for Cognitive Science (4)

(Course previously offered as COGS 108C, spring 2002.) This course focuses on providing students with additional programming experience in the design of cognitive science applications and modeling. Each time it is offered a specific application or modeling area will be covered. **Prerequisites:** Cognitive Science 108E and Mathematics 20F. (Not offered in 2010–11.)

109. Modeling and Data Analysis (4)

Exposure to the basic computational methods useful throughout cognitive science. Computing basic statistics, modeling learning individuals, evolving populations, communicating agents, and corpus-based linguistics will be considered. **Prerequisite:** Cognitive Science 18 or equivalent programming course or consent of instructor.

110. The Developing Mind (4)

(Cross-listed with HDP 121.) This course examines changes in thinking and perceiving the physical and social world from birth through childhood. Evidence of significant changes in encoding information, forming mental representations, and solving problems is culled from psychological research, cross-cultural studies, and cognitive science. **Prerequisite:** HDP 1 or Cognitive Science 1.

113. Cognitive Development (4)

(Cross-listed with Psychology 136) This course examines the foundations and growth of mind, discussing the development of perception, imagery, concept formation, memory, and thinking. Emphasis is placed on the representation of knowledge in infancy and early childhood. (Credit may not be received for both Psychology 136 and Cognitive Science

113.) **Prerequisite:** Cognitive Science 101B or Psychology 105 or Psychology 101. (Not offered in 2010–11.)

115. Neurological Development and Cognitive Change (4)

This course provides an overview of neurological development and explores the relations between physiological change and the experience for the child from the prenatal period through adolescence. **Prerequisite:** BILD 10, or Cognitive Science 17, or HDP 110.

118A. Natural Computation I (4)

This course is an introduction to computational modeling of biological intelligence, focusing on neural networks and related approaches to supervised learning. Topics include estimation, filtering, optimization, multilayer perceptrons, support vector machines, boosting, Bayes nets. **Prerequisites:** Cognitive Science 109, Mathematics 20E, Mathematics 20F, and Mathematics 180A or consent of instructor.

118B. Natural Computation II (4)

This course is an introduction to computational modeling of biological intelligence, focusing on neural networks and related approaches to unsupervised learning. Topics include density estimation, clustering, self-organizing maps, principal component analysis, information theoretic models, and evolutionary approaches. **Prerequisites:** Cognitive Science 109, Mathematics 20E, Mathematics 20F, and Mathematics 180A or consent of instructor.

120. Human Computer Interaction (4)

This course is an introduction to the field of human computer interaction (HCI). It provides an overview of HCI from the perspective of cognitive science. Recommended: Cognitive Science 10 and an introductory programming course.

121. Human Computer Interaction Programming Studio (4)

This course covers fundamentals of user interface design and implementation of Web-based systems. A major component is completion of a substantial programming project in which students work together in small teams. Three hours of lecture and one hour of laboratory. **Prerequisites:** Cognitive Science 120, Cognitive Science 18 or Cognitive Science 3 or Computer Science and Engineering 5A or Computer Science and Engineering 8A or Computer Science and Engineering 8B or Computer Science and Engineering 11 or Computer Science and Engineering 12 or Mechanical and Aerospace Engineering 9, or consent of instructor.

143. Animal Cognition (4)

Review of historical perspectives: introspectionist, behaviorist, and cognitivist models. Examination of how perceptual and motor constraints and ecological demands yield species-specific differences in cognitive repertoire. Contemporary issues in the comparative study of the evolution of human cognition. **Prerequisite:** upper-division standing.

151. Analogy and Conceptual Systems (4)

Human thought and meaning are deeply tied to the capacity for mapping conceptual domains onto each other, inducing common schemas and performing mental simulation. This course examines major aspects of this cognitive activity including metaphor, conceptual blending and embodied cognition. **Prerequisite:** upper-division standing.

152. Cognitive Foundations of Mathematics (4)

How the human mind/brain creates mathematics: embodiment, innovation, and creativity. The emergence and power of abstract concepts, such as infinity, infinitesimals, imaginary numbers, or zero. Cognitive approaches that connect mathematics to human thought in general. **Prerequisite:** upper-division standing.

154. Communication Disorders in Children and Adults (4)

Neural bases of language use in normal adults, and neural bases of language and communication development in normal children. Evidence on the language and communication deficits in adults (especially aphasia and dementia) and children (specific language impairment, focal brain injury, retardation, and autism). **Prerequisites:** upper-division standing.

155. Gesture and Cognition (4)

Spontaneous gestures and their relationship to speech, cognition, brain, and culture. The course covers, among others, gesture and language development, gesture and conceptual systems, speech-gesture co-production and its brain bases, evolution of language, and gestural behavior in special populations. **Prerequisite:** upper-division standing.

156. Language Development (4)

A comprehensive survey of theory, method and research findings on language development in children ranging from the earliest stages of speech perception and communication at birth to refinements in narrative discourse and conventional fluency through middle childhood and adolescence. **Prerequisite:** upper-division standing and background in development psychology and/or linguistics is recommended.

160. Upper-Division Seminar on Special Topics (4)

Special topics in cognitive science are discussed. (May be repeated when topics vary.) **Prerequisite:** department approval.

170. Natural and Artificial Symbolic Representational Systems (4)

This course develops a detailed analogy between the evolution and architecture of language comprehension in human primates and symbol processing at the level of individual cells, contrasting this with the analogy between cognition and computation. **Prerequisite:** Cognitive Science 17 or Biology 12; Recommended: Cognitive Science 18 or Computer Science and Engineering 62AB.

172. Brain Disorders and Cognition (4)

A review of the patterns of impaired and intact cognitive abilities present in brain-damaged patients in terms of damage to one or more components of a model of normal cognitive functioning. (Cognitive science majors may not receive elective credit for both Psychology 139 and Cognitive Science 172.) **Prerequisite:** Cognitive Science 107A.

174. Drugs: Brain, Mind and Culture (4)

This course explores how drugs interact with the brain/mind and culture. It covers evolutionary and historical perspectives, brain chemistry, pharmacology, expectancies and placebo effects, and models of addiction. It also provides a biopsychosocial survey of commonly used and abused substances. **Prerequisite:** upper-division standing.

175. The Neuropsychological Basis of Alternate States of Consciousness (4)

This course will review the literature that correlates brain rhythms in the human EEG with aspects of cognition, behavioral states, neuropsychopharmacology, and psychopathology in order to understand the psychological and neurophysiological underpinnings of these experiences. **Prerequisite:** Cognitive Science 101A or Cognitive Science 107A.

179. Electrophysiology of Cognition (4)

Survey the theory and practice of using electrical recordings (event-related brain potentials) to study cognition and behavior including attention, language, mental chronometry, memory, and plasticity. **Prerequisites:** Cognitive Science 107A or Psychology 106; Cognitive Science 101A or Psychology 105.

184. Modeling the Evolution of Cognition (4)

Mathematical and computational modeling of the evolution and mechanisms of simple cognitive functions. Theoretical background, including topics in population genetics, behavioral ecology, evolutionary game theory, dynamical systems theory, genetic algorithms, and neural networks are applied to questions concerning the evolution of behavioral strategies, the relation between evolution and learning, and the evolution of cooperation, communication and other aspects of social behavior. **Prerequisites:** programming ability, calculus, and consent of instructor.

187A. Cognitive Aspects of Multimedia Design (4)

Examines the cognitive basis of successful Web and multimedia design. Topics: information architecture, navigation, usability, graphic layout, transaction design, and how to understand user interaction. **Prerequisites:** Cognitive Science 3 or Cognitive Science 25; open to cognitive science majors with upper-division standing only.

187B. Cognitive Aspects of Multimedia Design II (4)

This course follows up on the basics of multimedia design taught in Cognitive Science 187A. Students will probe more deeply into selective topics, such as animation, navigation, graphical display of information, and narrative coherence. A large fraction of time will be spent on group projects. **Prerequisites:** COGS 187A; open to cognitive science majors with upper-division standing only.

188. Representation, Search, and the Web (4)

Computational methods for finding and exploiting structure across vast data corpora, from personal e-mail collections to the entire WWW. Students will implement and evaluate algorithms used as part of modern search engines, and connect these to models of shared cognition. **Prerequisites:** Cognitive Science 109 or Computer Science and Engineering 12. Recommended: Cognitive Science 102A or Cognitive Science 118B.

190A. Pre-Honors Project in Cognitive Science (4)

This course prepares students for the Cognitive Science Honors Program. The aim is to refine the research project and to teach students what a successfully written proposal entails. Students may be admitted to the Honors Program contingent upon completion and progress in the course. (See "[Cognitive Science Honors Program](#)" section for more information). Course should be taken for a letter grade. **Prerequisites:** upper-division standing; instructor and department approval.

190B. Honors Studies in Cognitive Science (4)

This course will allow cognitive science honors students to explore advanced issues in the field of cognitive science research. It will also provide the opportunity to develop a thesis on the topic of their choice and begin work under faculty supervision. **Prerequisites:** Cognitive Science 190A and formal admittance to the Cognitive Science Honors Program; department stamp. (See "[Cognitive Science Honors Program](#)" section for more information.)

190C. Honors Thesis in Cognitive Science (4)

This course will provide honors candidates an opportunity to complete the research on and preparation of an honors thesis under close faculty supervision. Oral presentation of student's thesis is required to receive honors; additionally, student must receive grade of A- or better in 190B and 190C to receive honors. **Prerequisites:** Cognitive Science 190B with grade of A- or better and formal admittance to the Cognitive Science Honors Program. (See "[Cognitive Science Honors Program](#)" section for more information.)

190D. Preparation for Thesis Presentation (1)

This course is affiliated with the honors program (190A-B-C) and is required of honors students during spring quarter. Its aim is to prepare students to present research results to an audience. Emphasis will be on the oral presentation (organization, wording, graphics), but there will also be some discussion about written research reports. Seminar style format with occasional short lectures wherein students will practice oral presentations and provide constructive criticism to each other. **Prerequisite:** must be concurrently enrolled in 190B or 190C.

191. Laboratory Research (1-4)

Students engage in discussions of reading of recent research in an area designated and directed by the instructor and also participate in design and execution of original research. Assignments include both oral and written presentations and demonstrating the ability to pursue research objectives. **Prerequisites:** consent of the instructor and department approval. (May be repeated for credit, but not to exceed eight units).

195. Instructional Apprenticeship in Cognitive Science (4)

Students, under the direction of the instructor, lead laboratory or discussion sections, attend lectures, and meet regularly with the instructor to help prepare course materials. Applications must be submitted to and approved by the department. **Prerequisites:** upper-division standing; 3.0 GPA; instructor and department approval. P/NP only.

197. Cognitive Science Internship (2 or 4)

The student will undertake a program of practical research in a supervised work environment. Topics to be researched may vary, but in each case the course will provide skills

for carrying out these studies. **Prerequisite:** consent of instructor.

198. Directed Group Study (4)

This independent study course is for small groups of advanced students who wish to complete a one-quarter reading or research project under the mentorship of a faculty member. Students should contact faculty whose research interests them to discuss possible projects. **Prerequisites:** upper-division standing; 2.5 GPA; consent of instructor and department approval.

199. Special Project (2 or 4)

This independent study course is for individual, advanced students who wish to complete a one-quarter reading or research project under the mentorship of a faculty member. Students should contact faculty whose research interests them to discuss possible projects. **Prerequisites:** upper-division standing; 2.5 GPA; consent of instructor and department approval.

GRADUATE**200. Cognitive Science Seminar (4)**

This seminar emphasizes the conceptual basis of cognitive science, including representation, processing mechanisms, language, and the role of interaction among individuals, culture, and the environment. Current developments in each field are considered as they relate to issues in cognitive science. (May be repeated for credit.)

201. Systems Neuroscience (4)

Examination of the neurophysiological and neuroanatomical basis of human and animal cognition, covering cellular neurophysiology and circuit modeling; development; visual, somatosensory, auditory, motor, and limbic systems; neuroimaging and language. Students in Cognitive Science 107B will have a textbook and will be given short-answer tests; students in Cognitive Science 201 will have a reader and written take-home assignments, in addition to a short final paper.

202. Cognitive Science Foundations: Computational Modeling of Cognition (4)

This course surveys the development of symbolic and connectionist models of cognition. Selected readings from the late 1940s to the present are covered. Topics include: Turing machines, information theory, computational complexity, search, learning, symbolic artificial intelligence, and neural networks.

203. Cognitive Science Foundations: Theories and Methods in the Study of Cognitive Phenomena (4)

Surveys a variety of theoretical and methodological approaches to the study of human cognition. Topics include language structure, language processing, concepts and categories, knowledge representation, analogy and metaphor, reasoning, planning and action, problem solving, learning and expertise, and emotion.

205. Introduction to Thesis Research (4)

This course is taken to focus the students' development of a thesis topic and research proposal. Students prepare an outline of thesis proposal and make an oral public presentation of the proposed topic prior to the end of the third year. S/U only.

210A-B-C. Introduction to Research (4-4-4)

This sequence is an intensive research project. Students under faculty mentorship perform a thorough analysis of the problem and the literature, carry out original studies, and prepare oral and written presentations. Students should aim for a report of publishable quality. Letter grade required.

211A-B-C. Research Methods in Cognitive Science (2-2-2)

Issues in design, implementation, and evaluation of research in cognitive science are discussed. Students will present and comment on their own research projects in progress. Discussions also include presentations of research to various audiences, abstracts, reviews, grant process, and scientific ethics. Letter grade required.

213. Issues in Cognitive Development (4)

This course examines current issues in human development of interest to cognitive scientists. An emphasis is placed on the foundations of mind and how information is represented at various stages of learning and development. (May be repeated once, when topics vary.)

215. Neurological and Cognitive Development (4)

This course is presented in two sections. The first part of the course focuses on early neurological development. The second part addresses questions concerned with the relations between cognitive brain development, and linguistic and affective development.

220. Information Visualization (4)

This seminar surveys current research in information visualization with the goal of preparing students to do original research. The focus is on the cognitive aspects of information design, dynamic representations, and computational techniques. Topics vary each time course is offered.

234. Distributed Cognition (4)

This course focuses on aspects of individual and socially distributed cognition. Empirical examples are drawn from natural and experimental settings which presuppose, tacitly or explicitly, socially distributed knowledge among participants. The class examines the way locally managed, pragmatic conditions influence how decisions are framed.

238. Topics in Cognitive Linguistics (1-4)

(Same as Linguistics 238) Basic concepts, empirical findings, and recent developments in cognitive and functional linguistics. Language viewed dynamically in relation to conceptualization, discourse, meaning construction, and cognitive processing. (As topics vary, may be repeated for credit.)

241. Ethics and Survival Skills in Academia (3)

(Same as Neurosciences 241) This course will cover ethical issues which arise in academia, including: dishonesty, plagiarism, attribution, sexual misconduct, etc. We will also discuss 'survival' issues, including job hunting, grant preparation, journal reviews, writing letters of recommendation, mentoring, etc. S/U only.

243. Statistical Inference and Data Analysis (2 or 4)

This course provides a rigorous treatment of hypothesis testing, statistical inference, model fitting, and exploratory data analysis techniques used in the cognitive and neural sciences. Students will acquire an understanding of mathematical foundations and hands-on experience in applying these methods using Matlab.

253. Semantics and Cognition (4)

This course explores current issues in the study of meaning and its interaction with other areas of cognitive science. The focus is on cognitive semantics, pragmatics, and meaning construction in general.

254. Pragmatics and Common Sense Reasoning (4)

A study of the pragmatic principles involved in language comprehension and the logic of everyday life. Cognitive, linguistic, cultural, and sociological aspects will be covered.

260. Seminar on Special Topics (1-4)

Specific topics in cognitive science are discussed. (May be repeated when topics vary.)

272. Topics in Theoretical Neurobiology (4)

The main focus of this course is the relationship between nervous system function and cognition. It covers broad theoretical issues and specific topics. Material comes from lectures, papers, and the text. Topic varies each time the course is offered. (May be repeated for credit.)

273. Biological Basis of Attention (4)

A survey of the research and theories of attention with special emphasis on the current anatomical, physiological, and biochemical basis of attention.

275. Visual Modeling (4)

Visual system neurophysiology and neuroanatomy, and neurally realistic and artificial intelligence modeling approaches are covered. Topics are: dendrites, orientation and edges, motion, stereo, shading and color, eye movements, and pattern recognition. Students prepare computer modeling projects or research papers.

276. Foundations of Neuroimaging (4)

Foundations of neuroimaging: (1) MRI/fMRI: RF excitation, relaxation, echos, image formation, BOLD and flow, DTi, EPI, time and series analysis, (2) cortical surface reconstruction, morphing, mapping, and data display, (3) physiological basis of MEG and EEG, forward and inverse solutions.

279. Electrophysiology of Cognition (4)

(Conjoined with Cognitive Science 179; cross-listed with NEU 279) This course surveys the theory and practice of using recordings of electrical and magnetic activity of the brain to study cognition and behavior. It explores what brain waves reveal about normal and abnormal perception, processing, decision making, memory, preparation, and comprehension. Graduate students will be required to do additional readings for the material each week (different for each grad) and to present orally (as well as in a written page) a critical analysis of the readings. **Prerequisites:** Cognitive Science 107A or Psychology 106; Cognitive Science 101A or Psychology 105.

290. Cognitive Science Laboratory Rotation (2)

Laboratory rotations provide students with experience in the various experimental methods used in cognitive science. **Prerequisite:** consent of instructor. S/U only.

291. Laboratory Research (1–4)

Students engage in discussions of reading of recent research in an area designated and directed by the instructor and also participate in the design and execution of original research. Students are expected to demonstrate oral and written competence in presenting original research. **Prerequisites:** consent of the instructor and departmental approval. (May be repeated for credit.)

298. Directed Independent Study (1–12)

Students study and research selected topics under the direction of a member of the faculty.

299. Thesis Research (1–12)

Students are provided directed research on their dissertation topic by faculty advisors.

500. Teaching Apprenticeship (1–4)

This practicum for graduate students provides experience in teaching undergraduate cognitive science courses. S/U only.

Communication

PROFESSORS

Lisa Cartwright, Ph.D.
Michael Cole, Ph.D., *University Professor and Sanford I. Berman Professor of Language and Human Communication*
Zeinabu Davis, M.F.A.
Yrjo Engestrom, *Emeritus*
Dee Dee Halleck, *Emerita*
Daniel C. Hallin, Ph.D., *Chair*
Robert B. Horwitz, Ph.D.
Chandra Mukerji, Ph.D.
Carol A. Padden, Ph.D.
Michael S. Schudson, Ph.D.

ASSOCIATE PROFESSORS

Barry Brown, Ph.D.
Gary Fields, Ph.D.
Brian Goldfarb, Ph.D.
Valerie A. Hartouni, Ph.D., *Academic Senate Distinguished Teaching Award*
Tom Humphries, Ph.D.
David Serlin, Ph.D.
Olga A. Vasquez, Ph.D.

ASSISTANT PROFESSORS

Morana Alac, Ph.D.
Patrick Anderson, Ph.D.
Akosua Boatema Boateng, Ph.D.
Kelly Gates, Ph.D.
Nitin Govil, Ph.D.
Michael Hanson, Ph.D.
Ariana Hernandez-Reguant, Ph.D.
John McMurria, Ph.D.
Natalia Roudakova, Ph.D.
Elana Zilberg, Ph.D.

LECTURER WITH SECURITY OF EMPLOYMENT

Claudio Fenner-Lopez, M.A., *Emeritus*

OFFICE: 127 Media Center Communication Building, Marshall College
(858) 534-4410
<http://communication.ucsd.edu>

Communication at UC San Diego is a field of study which emphasizes the role of technologies and institutions of communication, from language, to television, to the Internet and beyond, in mediating human experience. It draws from such social science disciplines as anthropology, psychology, sociology, and political science, and from the humanities and fine arts, including theatre, literature, and visual arts. Communication students will develop a critical awareness of the communicative forces that affect their everyday lives.

The communication major is not designed as a training program in advertising, journalism, production, or public relations. It provides students with a solid liberal arts background necessary for graduate studies in communication and other disciplines, and for professional work in a number of

communication-related fields, including primary and secondary education.

Though the emphasis of the major is not a technical one, the faculty in the Department of Communication believe that students will develop a deeper understanding of how communication works by exploring firsthand the capabilities and limitations of a variety of media; students, therefore, will have the opportunity to conduct part of their studies in video, computer communication or other forms of media practice.

Within the Department of Communication curriculum are three broadly defined areas of study: Communication as a Social Force, Communication and Culture, and Communication and Human Information processing. Students take courses in each of these areas.

COMMUNICATION AS A SOCIAL FORCE

How are social systems affected by communication technology? What is the social organization of the communication industries? How is the information presented by the media related to the characteristics of the intended audiences? How do media fit into the power structure of societies? Courses in this area address such questions. Students analyze mass communications, the development of telecommunication and information technologies, and the political economy of communication institutions both at home and abroad.

COMMUNICATION AND CULTURE

Film, music, advertising, art, theater, ritual, literature, and language are forms of communication which embody cultural beliefs of the societies from which they come. These media can influence and bring about changes in social behavior, styles, and traditions. At the same time, individuals and groups can reshape the media. Students will study the social production of cultural objects, the cultural traditions that shape their form and content, and various approaches to interpreting or "reading" television, film, newspapers, language, rituals, and other forms.

COMMUNICATION AND HUMAN INFORMATION PROCESSING

How do people turn concepts and ideas into messages? What is the process by which people receive and respond to those messages? Each medium—whether it is language, writing, or electronic media—has different properties that change the way people create and comprehend messages. The impact of television on the individual, the effect of literacy on individuals and on cultures, the ways that concepts are transmitted in film, and the means by which computers expand communication potentials are examples of topics investigated in this area.

THE COMMUNICATION MAJOR

Degree offered: Bachelor of Arts

The major consists of two lower-division courses and fourteen upper-division courses. None of the major courses may be taken on a Pass/Not Pass basis.

LOWER-DIVISION

*COGN 20: Introduction to Communication
COGN 21: Methods of Media Production

UPPER-DIVISION

*COSF 100: Introduction to Communication as a Social Force
*COCU 100: Introduction to Communication and Culture
*COHI 100: Introduction to Communication and Human Information Processing
*COGN 150: Senior Seminar in Communication One media methods course

Three courses beyond the introductory courses: (one must be chosen from each of the categories: COSF, COCU, and COHI)

Six upper-division communication electives

* These courses must be taken at UCSD.

Note: If students choose to do a 198, 199, or 197 note the following. COGN 198, 199, 197 grading option is Pass/Not Pass and only ONE may be applied to the major to satisfy an upper-division elective. AIP 197 must be petitioned for approval for the major.

RESIDENCY REQUIREMENT

Students are required to complete at least ten classes of their overall work in the major at UCSD. Following are the communication classes required to be taken at UCSD. See your college advisor for further residency requirements.

COGN 20: Introduction to Communication
COSF 100: Introduction to Communication as a Social Force

COCU 100: Introduction to Communication and Culture

COHI 100: Introduction to Communication and Human Information Processing

COGN 150: Senior Seminar

One COCU elective

One COHI elective

One COSF elective

One COMT elective

REQUIREMENTS FOR THE COMMUNICATION MINOR

(Effective fall 1998)

The communication minor at UCSD is a social science minor. None of the courses may be taken on a Pass/Not Pass basis. Students are required to take seven courses in communication as follows:

*COGN 20 (Introduction to Communication)

Two courses of your choice from the following 100's:

*COSF 100 (Introduction to Communication as a Social Force)

*COCU 100 (Introduction to Communication and Culture)

*COHI 100 (Introduction to Communication and Human Information Processing)

*Four upper-division communication electives within the areas of the chosen 100 classes.

*These courses must be taken at UCSD within the communication department.

Note: COGN 150, 197, 198, and 199 Media Methods, and courses outside of the department may not be used as electives within the minor.

THE HONORS PROGRAM

The Department of Communication offers an honors program to those students who have

demonstrated excellence in the communication major. Successful completion of the honors program enables the student to graduate "With Highest Distinction," "With High Distinction," or "With Distinction," depending on performance in the program. The honors program requires an application. Students wishing to be considered need to include the following in their application: one faculty advisor who supports their admission to the program, a verified overall GPA of 3.0 and a major GPA of 3.5, and a brief but detailed description of the proposed research or creative project.

Applications will be reviewed by a faculty committee, accepting students who meet these criteria. Once accepted into the Honors Program, students are required to complete a two-quarter course sequence, COGN 191A/191B in the fall and winter quarters of their senior year. At the end of the fall quarter, students will receive an IP grade report. This grade will change to the final letter grade at the completion of the course sequence in the winter quarter. This grade is based on attendance in the seminars and successful completion of the research paper or creative production.

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THE GRADUATE PROGRAM

The Department of Communication offers a program of study leading to the Doctor of Philosophy degree. Communication at UC San Diego seeks to combine modes of analysis from the humanities and social sciences to explore the history, structure, and process of communication. The graduate program is conceived as a blending of the tradition of critical communication research with the empirical tradition of American scholarship. The program does not closely resemble any other communication department in this country. It is related by sympathy and interest to mass communication programs, but not by kinship. Historically, this department grew out of an interdisciplinary program jointly sponsored by the Departments of Drama (currently, Theatre and Dance), Political Science, Psychology, and Sociology. The department retains strong ties to the departments and disciplines from which it developed.

The study of communication at UCSD places major emphasis on historical, comparative, and ethnographic approaches to symbolically mediated human communication. Study is organized around the following three analytic perspectives: communication as a social force, communication and culture, and communication and human information processing. In addition, the department believes that investigation into communication requires a blending of theory and practice, hence, our attention to the media practices.

Communication as a Social Force examines the relation of communication institutions to structures of power in society. In this part of the curriculum, we examine institutional arrangements and structural characteristics regarding

- Communication and political systems: state, law, regulation, social movements and political parties, democracy

- Communication and economic systems: markets, ownership, access; "demographics" and class/gender/racial and national stratification
- The production of content within media industries

Faculty research includes the following topics:

- The study of news as public information and political ideology
- Telecommunications and the information economy
- Intellectual property and the flow of culture between global North and South
- The relationships among law, communication technologies, ownership, democracy, and the public sphere.
- Comparative analysis of media systems
- Communication, globalization, and economic development

Communication and Culture examines the cultural artifacts and discourses through which we experience our everyday lives, including popular music, films and television shows, advertisements, museum displays, landscape and urban design, and health and identity documentation systems. How can we understand the histories and changing practices associated with these forms of representation? What is the role of media (print, visual, electronic, material) in forming ideas about social identity and in shaping subjectivity? This part of the curriculum draws on the humanities, anthropology, history, political theory, cultural studies, and the sociology of culture to offer students a range of methods and theoretical frameworks for interpreting the production and circulation of artifacts, discourses, and meanings in a range of local, national, transnational, and diasporic cultural contexts.

Faculty research includes the following topics:

- Collective memory and the struggles over the meaning of the past
- The politics of representation of women, children, abortion, and childbearing
- Political violence as performance
- Popular music and African-American political movements

Communication and Human Information

Processing examines the ways in which our experience as human beings is created by the communicative practices of the societies in which we live and the cultural practices of our families and communities with which we interact from the earliest days of life. With a sociocultural lens, we study the role of communication through language and other organized symbolic media. Because both individuals and their environments are constantly changing, the study of culture and the person pays special attention to the cultural and historical contexts of personal experience and the practices that constitute the proximal environments of individual development. This part of the curriculum draws particularly on the fields of anthropology, sociology, psychology, linguistics, cognitive science, and education to examine such processes as learning

and cognition, language structure and language use, the construction and negotiation of meaning, and the organization of mental worlds.

Faculty research includes the following topics:

- The evolution of language and communication in human beings
- The role of new communicative practices in human development
- The study of human cognition as distributed among people and coordinated in communicative practices
- The development of reading and writing in young children
- The use of technology to study human thought
- Bilingual and bicultural development in a globalized world
- The use of information technology in work and leisure

Communication and Media Practices faculty work in video, film, and interactive media production as well as in research scholarship. Graduate students as well as undergraduates are offered the opportunity to integrate creative practice in media production into their program of study.

Some communication faculty production interests include

- Hybrid documentary and narrative forms
- Alternative representation of gender, race, and ethnicity in film and electronic media
- Distributed and networked media production
- Digital media based on game-like forms
- Development and use of media technology in and for educational contexts
- Global media networks
- Experimental approaches to cinematography and sound design
- Media as a tool for social and political activism

PH.D. REQUIREMENTS

1. 200A-B-C (Introduction to the Theory of Communication as a Social Force, Communication and Culture, and Communication and the Individual).
2. 294, The History of Communication Research.
3. At least three methods courses from the 201 methodology sequence (see course listings).
4. Four courses in communication history and theory (see course listings).
5. 280, Advanced Workshop in Communication Media.
6. 296, Communication Research as an Interdisciplinary Activity.
7. First-Year Exam and Evaluation: At the end of the spring quarter of the student's first year, the student must pass a comprehensive written examination based on course work completed during the first year.

8. Language Requirement: All students are required to demonstrate proficiency in one language other than their native language.
9. Qualifying Examinations: Before the end of the fourth year the student must take and pass an oral qualifying examination. The exam will be based on two papers concerning two of the subfields covered in the program. The student will also present a separate dissertation proposal at the examination. At this time, the faculty will examine the proposal for appropriateness and feasibility.
10. Teaching Requirement: In order to acquire teaching experience, all students are required to participate in the teaching activities of the department in two courses from the Department of Communication curriculum prior to completion of their Ph.D. as follows:
- One quarter of COGN 20—Introduction to Communication
 - One quarter of any one of the following three courses:
 - COCU 100—Introduction to Communication and Culture
 - COHI 100—Introduction to Communication and Human Information Processing
 - OSF 100—Introduction to Communication as a Social Force
11. Dissertation: Acceptance of the dissertation by the university librarian represents the final step in completing all requirements for a Ph.D. The dissertation committee must be approved by the department chair and the dean of Graduate Studies.

DEPARTMENTAL PH.D. TIME LIMIT POLICIES

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

STUDENT ADVISING

Faculty Graduate Advisor
David Serlin, Ph.D.

Faculty Undergraduate Advisor
Valerie Hartouni, Ph.D.

Undergraduate Student Affairs Advisor
Jamie Lloyd

Graduate Program Coordinator
Gayle Aruta

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

GENERAL COMMUNICATION

COGN 20. Introduction to Communication (4)

An historical introduction to the development of the means of human communication, from language and early symbols through the introduction of writing, printing, and electronic media, to today's digital and multimedia revolution. Examines the effect of communications media on human activity, and the historical forces that shape their development and use. Offered fall and spring quarters.

COGN 21. Methods of Media Production (4)

This course explores fundamental technical and social constraints shaping media production. We read film and television as texts by considering history, theory, genre and practical technique. COGN 22 and COGN 21 taken concurrently strongly recommended. COGN 22 is required for students interested in advanced communication production in media courses. Majors must enroll for a letter grade.

COGN 22. Methods of Media Production Lab (2)

In groups in lab students work hands-on with video and new media equipment, exploring fundamental technical constraints shaping media production. COGN 21 and COGN 22 strongly recommended concurrently. COGN 22 is required for students interested in advanced communication production courses. Majors must enroll for a letter grade. **Prerequisite:** COGN 21 (may be taken concurrently).

COGN 87: Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen. **Prerequisites:** none.

UPPER-DIVISION

COMMUNICATION AS A SOCIAL FORCE

COSF 100. Introduction to Communication as a Social Force (4)

A critical overview of areas of macro communication and analysis, with special emphasis on the development of communication institutions, including broadcasting, common carriers, and information industries. Questions regarding power, ideology, and the public interest are addressed. **Prerequisite:** COGN 20. Offered fall quarter.

COSF 123. Communication, Dissent, and Social Movements (4)

Emergence of dissent in different societies, and the relationship of dissent to movements of protest and social change. Movements studied include media concentration, antiwar, antiglobalization, death penalty, national liberation, and labor. Survey of dissenting voices from Tolstoy and Naomi Klein seeking to explain the relationship of ideas to collective action and its outcomes. **Prerequisite:** COSF 100 or consent of instructor.

COSF 124. Black Women, Feminism, and the Media (4)

This course examines the challenges that arise in using feminist theory to understand black women's experience in Africa and the United States. It also looks at the mass media and popular culture as arenas of black feminist struggle. **Prerequisite:** COSF 100 or consent of instructor.

COSF 126. The Information Age: In Fact and Fiction (4)

Analysis of the forces propelling the "Information Age." An examination of the differential benefits and costs, and a discussion of the presentation in the general media of the "Information Age." **Prerequisite:** COSF 100 or consent of instructor.

COSF 127. The Internet Industry (4)

The political economy of the emergent Internet industry, charted through analysis of its hardware, software, and services components. The course specifies leading trends and changing institutional outcomes by relating the Internet

industry to the adjoining media, telecommunications, and computer industries. **Prerequisite:** COSF 100 or consent of instructor.

COSF 128. Cultural Industries (4)

We examine how people interact with products of popular culture, production of cultural goods by looking at conditions in cultural industries. We examine film, music, publishing, focusing on how production is organized, what kind of working conditions arise, how products are distributed. **Prerequisites:** COSF 100 or consent of instructor.

COSF 129. Television and Citizenship (4)

Television is a contested site for negotiating the rationales of inclusion and exclusion associated with citizenship and national belonging. Historical and contemporary case studies within international comparative contexts consider regulation, civil rights, cultural difference, social movements, new technologies, and globalization. **Prerequisite:** COSF 100 or consent of instructor.

COSF 130. History of Electronic Media (4)

This course considers the social, cultural, economic, and technological contexts that have shaped electronic media, from the emergence of radio and television to their convergence through the internet, and how these pervasive forms of audiovisual culture have impacted American society. **Prerequisite:** COSF 100 or consent of instructor.

COSF 132. History of U.S. Political Communication (4)

Survey of the history of political communication in the United States from the colonial period to the present. Students will work on term papers in which they will undertake original historical research. **Prerequisites:** COSF 100, communication major.

COSF 133. Science Fiction (4)

Focuses on science fiction's critical investigation of history, identity, and society across a range of media forms, including film, television, and literature. **Prerequisite:** COSF 100 or consent of instructor.

COSF 134. Communication, Politics, and Citizenship in America (4)

(Formerly COCU 134.) Selected topics, both historical and contemporary, on the public sphere, political participation, and the meaning of citizenship. Topics may include: voting practices, the role of political parties, social and cultural dimensions of citizenship, and shifts in public understanding of what counts as "political." The course may require five to ten hours of internship work, arranged through the AIP office. See instructor for further information. **Prerequisite:** COSF 100 or consent of instructor.

COSF 135. Communication and Religion (4)

The secularization thesis—that as society becomes more modern and standards of living rise, the importance of religion will diminish and be confined to the private sphere—may be wrong. We address religion, communication, culture, and politics in the United States. **Prerequisite:** COSF 100 or consent of instructor.

COSF 139A-B. Law, Communication, and Freedom of Expression (4-4)

An examination of the legal framework of the freedom of expression in the United States. 139A covers the fundamentals of First Amendment law through the consideration of key cases in historical context. Prior restraint, incitement, obscenity, libel, fighting words, public forum, commercial speech, and hate speech are some of the topics covered. 139B focuses on the law of mass communication, examining the different legal treatments accorded print, broadcasting, cable, and common carriers. The decline of broadcast regulation, the breakup of AT&T, the rise of new forms of mass communication, and the question of the public interest are of central concern. **Prerequisites:** 139A-COSF 100 or PS 40 or consent of instructor. 139B-COSF 100 or PS 40, COSF 139A preferred.

COSF 140A. Comparative Media Systems: Asia (4)

The development of media systems in Asia: focusing on India and China. Debates over nationalism, regionalism, globalization, new technologies, identity politics, censorship, privatization and media piracy. Alignments and differences with North American and European media systems will also be considered. **Prerequisite:** COSF 100 or consent of instructor.

COSF 140B. Comparative Media Systems: Europe (4)
The development of media systems and policies in Europe. Differences between European and American journalism. Debates over the commercialization of television. The role of media in post-communist societies in Eastern Europe. **Prerequisite:** COSF 100 or consent of instructor.

COSF 140C. Comparative Media Systems: Latin America and the Caribbean (4)
The development of media systems and policies in Latin America and the Caribbean. Debates over dependency and cultural imperialism. The news media and the process of democratization. Development of the regional television industry. **Prerequisite:** COSF 100 or consent of instructor.

COSF 140XL. Foreign Language Discussion (1)
Students will exercise advanced foreign language skills to discuss materials and the correspondingly numbered communication language foreign area course. This section is taught by the course instructor, has no final exam, and does not affect the grade in the core course, COSF 140C. **Prerequisite:** concurrent enrollment in COSF 140C.

COSF 141. History of U.S. Telecommunications (4)
This course provides a sustained historical focus on the developing social form and industry structure of U.S. telecommunications, beginning with the Post Office. Policy issues are regularly incorporated into readings and discussions. Emphasis is placed on the emergence, around the turn of the century, of the regulated, national telephone network system dominated by AT&T and its extension. **Prerequisite:** COSF 100 or consent of instructor.

COSF 142. The Internet in Social and Historical Perspective (4)
This course explores the social, cultural, legal, and political-economic dimensions of the Internet from the 1960s to the present. Students also are introduced to theories and methods developed in communications and related fields for studying online media and their uses. **Prerequisite:** COSF 100 or consent of instructor.

COSF 159. Work and Industry in the New Information Economy (4)
This course, a research seminar, examines the evolution of the so-called new information economy and analyzes the transformation of patterns of work and industrial organization. Students will be expected to write a research paper, typically on some aspect of the new economy in the San Diego-Tijuana region. **Prerequisite:** upper-division standing or consent of instructor.

COSF 160. Political Economy/Global Consumer Culture (4)
This course critically examines social and economic forces that shape the making of this new global consumer culture by following the flows of consumption and production between the 'developed' and 'developing' worlds in the 1990s. We will consider how consumers, workers, and citizens participate in a new globalized consumer culture that challenges older distinctions between the 'First' and the 'Third World.' In this course, we will focus on the flows between the U.S., Asia, Latin America. **Prerequisite:** COSF 100 or consent of instructor.

COSF 161. Global Economy and National Identity (4)
Examine the interplay of globalization as a discourse and set of practices focusing on free movement of commodities and ideas, nationalist fragmentation marked by ethnic rivalry and identity conflict, seeks to examine those places where dualism is most pronounced. **Prerequisite:** COSF 100 or consent of instructor.

COSF 171A. American News Media (4)
(Same as Soc. 165A.) History, politics, social organization, and ideology of the American news media. SF 171A surveys the development of the news media as an institution, from earliest news newspapers to modern mass news media. SF 171B deals with special topics, including the nature of television news, and with methods of news media research, and requires a research paper. **Prerequisite:** COSF 100 or COSF 171A.

COSF 172. The Cultural Politics of Sport (4)
Examine sport as play, performance, competition, an arena where there are politics, culture, power, identity struggles. Establishing the social meanings of sport, we address:

ethics, race, class, nation, gender, body, science, technology, entertainment industries, commerce, spectatorship, consumption, amateurism, professionalism. **Prerequisite:** COSF 100 or consent of instructor.

COSF 173. Transparent Society (4)
How have politics, media, and society made visible features of life that were once hidden? From the women's health movement to gay liberation to laws requiring public disclosure, frankness challenges civility, privacy, and taste. How can this be understood? **Prerequisite:** COSF 100 or consent of instructor.

COSF 175. Advanced Topics in Communication: Social Force (4)
Specialized study in communication as a social force with topics to be determined by the instructor for any given quarter. Past topics include information as a commodity and book publishing. May be repeated for credit three times. **Prerequisite:** COSF 100 or consent of instructor.

COSF 180. Political Economy of Mass Communications (4)
The social, legal, and economic forces affecting the evolution of mass communications institutions and structure in the industrialized world. The character and the dynamics of mass communications in the United States today. **Prerequisite:** COSF 100 or consent of instructor.

COSF 181. Political Economy of International Communications (4)
The character and forms of international communications. Emerging structures of international communications. The United States as the foremost international communicator. Differential impacts of the free flow of information and the unequal roles and needs of developed and developing economies in international communications. **Prerequisite:** COSF 100 or consent of instructor.

COSF 182. Surveillance, the Media, and the Risk Society (4)
Contributions of the field of communication to the study of surveillance and risk. Critical and legal perspectives on consumer research, copyright enforcement, the surveillance capacity of ICTs, closed-circuit television, interactive media, and the "rhetorics of surveillance" in television and film. **Prerequisite:** COSF 100 or consent of instructor.

COSF 183. The Politics of World Music (4)
What is "world music?" How, where, and why did it come into being? Is it a naturally occurring category of music? What makes it distinct from other music? We critically examine history of world music, analyzing how it is produced, circulated, and consumed. **Prerequisite:** COSF 100 or consent of instructor.

COSF 184. The Mass Media and Politics in Africa (4)
This course will critically examine the role of the mass media in Sub-Saharan Africa in the areas of colonial rule, nationalist struggles, authoritarianism, and popular movements. It will examine general trends regionally and internationally, as well as individual national cases, from the early twentieth century to the Internet news services of the information age.

COSF 185. Gender, Labor, and Culture in the Global Economy (4)
Course examines the ways in which women participate in the global economy as the producers of consumer products and of cultural goods like entertainment and information. It also examines power as it relates to women's labor in producing such material and cultural goods. **Prerequisite:** COSF 100 or consent of instructor.

COSF 186. Film Industry (4)
A study of the social organization of the film industry throughout its history, addressing such questions as who makes films, by what criteria, and for what audience. The changing relationships between studios, producers, directors, writers, actors, editors, censors, distributors, audience, and subject matter of the films will be explored. **Prerequisite:** COSF 100 or consent of instructor.

COSF 187. Culture Wars: Creationism vs. Evolutionism (4)
Explore current debate from a variety of perspectives, rhetorical styles, political views, academic disciplines,

media, popular culture, different interest, political, religious, cultural groups, and constituencies. **Prerequisite:** COSF 100 or consent of instructor.

COMMUNICATION AND CULTURE

COCU 100. Introduction to Communication and Culture (4)
Processes of communication shape and are shaped by the cultures within which they occur. This course emphasizes the ways in which cultural understandings are constructed and transmitted via the variety of communication media available to members. A wide range of cultural contexts are sampled, and the different ways that available communication technologies (language, writing, electronic media) influence the cultural organization of people's lives are analyzed. **Prerequisite:** COGN 20, or HDP 1, or consent of instructor. Offered winter quarter.

COCU 108. Visual Culture (4)
How visual images contribute to our understanding of the world and ourselves. Theoretical approaches from media studies, art history, gender studies, and social theory will be used to analyze cultures of science, art, mass media, and everyday life. **Prerequisite:** COCU 100 or consent of instructor.

COCU 110. Cinema in Latin America (4)
Analysis of the changing content and sociopolitical role in Latin America of contemporary media, including the "new cinema" movement, recent developments in film, and popular television programming, including the telenovela. Examples drawn from Mexico, Brazil, Cuba, and other countries. **Prerequisite:** COCU 100 or consent of instructor.

COCU 120. The Problem of Voice (4)
This course will explore the problem of self-expression for members of various ethnic and cultural groups. Of special interest is how writers find ways of describing themselves in the face of others' sometimes overwhelming predilection to describe them. **Prerequisite:** COCU 100 or consent of the instructor.

COCU 123. Black Women Filmmakers (4)
Students examine film and video media produced by black women filmmakers worldwide. This course will use readings from the writings of the filmmakers themselves as well as from film studies, women's studies, literature, sociology, and history. **Prerequisite:** COCU 100 or consent of the instructor.

COCU 124. Documentary History and Theory (4)
Lecture and discussion course in the history of nonfiction film and video. Through film and written texts we survey the nonfiction film genre, considering technological innovations, ethical issues, and formal movements related to these representations of the "real." Students write a research paper in lieu of a final. **Prerequisite:** COCU 100 or consent of instructor.

COCU 125. How to Read a Film (4)
The purpose of this course is to increase our awareness of the ways we commonly interpret or make understandings from movies and to enrich and increase the means by which one can enjoy and comprehend movies. We will talk about movies and we will explore a range of methods and approaches to film interpretation. Readings will emphasize major and diverse theorists, including: Bazin, Eisenstein, Cavell, and Mulvey. **Prerequisite:** COCU 100 or consent of instructor.

COCU 126. African Cinema (4)
History, theory, and aesthetics of African cinema developed by selected filmmakers from the continent. Through film screenings and a wide range of readings, students will discuss such topics as cinema and national identity, cinema and social change, and Hollywood dominance. **Prerequisite:** COCU 100 or consent of instructor.

COCU 127. Folklore and Communication (4)
Folklore is characterized by particular styles, forms, and settings. Course introduces a range of folklore genres from different cultures, historical periods, oral narrative, material folk arts, dramas, rituals. Study of the relationship between expressive form and social context. **Prerequisite:** COCU 100 or consent of the instructor.

COCU 129. Public History and Museum Studies (4)

This course will explore the role that “public history”—history as created for general audiences—plays in communicating cultural and national identities by examining museum exhibitions, their controversies, and how material objects mediate interpretations of the past. **Prerequisite:** COCU 100 or consent of instructor.

COCU 130. Tourism: Global Industry and Cultural Form (4)

The largest industry in the world has far-reaching cultural ramifications. We will explore tourism’s history and its contemporary cultural effects, taking the perspective of the “toured” as well as that of the tourist. **Prerequisite:** COCU 100 or consent of the instructor.

COCU 131. Cinema of the Cuban Revolution (4)

Overview of the Cuban Revolution (1959–2000) and cultural policies through the study of its film production, as a cultural industry and representational style. Cuban film in context of domestic and international events, particularly treatment of race and gender dynamics. **Prerequisite:** COCU 100 or consent of instructor.

COCU 132. Gender and Media (4)

This course examines the work of women artists and the history of the representation of women in the media, from the beginnings of cinema to the present, and offers a basic introduction to feminist media theory. It focuses on the representation of gender, and narrative and experimental strategies used by women media makers, and the role of the female spectator. **Prerequisite:** COCU 100 or consent of the instructor.

COCU 136. Concepts of Freedom (4)

This course examines some of the changing cultural, social, technological, and political meanings, practices, and aspirations that together constitute what is, and has been, called Freedom. **Prerequisite:** COCU 100 or consent of the instructor.

COCU 137. The Politics of Bodies (4)

This course will explore the construction of gendered bodies and gendered sexuality in postindustrial culture(s) through political, historical, and media analysis. Topics may include abortion, eating disorders, body modification, work and consumption, AIDS, and genetic engineering. **Prerequisite:** COCU 100 or consent of instructor.

COCU 139. Reproductive Discourse and Gender (4)

In this course we will examine as a problem of discourse and culture the controversies surrounding the development and use of the new technologies of human genetics and reproduction. Of particular interest will be the way in which these new technological practices and processes test, erode, or undermine traditional understanding of “human nature” and relationship while enforcing traditional understanding of gender. **Prerequisite:** COCU 100 or CGS 2A or 2B or consent of instructor.

COCU 140. Television, Culture, and the Public (4)

How and what does television communicate? Emphasis will be on contemporary U.S. television programming, placed in comparative and historical context. Special topics may include: TV genres; TV and politics; TV and other media. Frequent in-class screenings. **Prerequisite:** COGN 20 or consent of the instructor.

COCU 141A. Media and Technology: Global Nature, Global Culture (4)

Considers globalization’s impact on concepts of nature in and through media texts, information systems, circulation of consumer goods and services, the emergence of global brands, science, health initiatives, environmental media activism, technology transfer in the twentieth and early twenty-first centuries. **Prerequisite:** COSF 100 or COCU 100 or COHI 100 or consent of instructor.

COCU 141B. Media and Technology: Gender and Biomedicine (4)

From historical and cultural aspects of media, information, imaging technology use in biomedical research, clinical care, health communication to constructions of gender, and identity. We approach the subject through audiovisual texts and writings from fields including science and technology studies and cultural studies. **Prerequisite:** COSF 100 or COCU 100 or COHI 100 or consent of instructor.

COCU 141C. Media and Technology: Disability (4)

Cultural and historical ways of defining and understanding disability relative to communication and assistive technologies, including the impact of digital technologies and the Americans with Disabilities Act. Use of audiovisual texts and writings from fields including science and technology studies, and cultural studies. **Prerequisite:** COSF 100 or COCU 100 or COHI 100 or consent of instructor.

COCU 142. Holocaust Discourse (4)

Legal, visual, historical, cultural discourses and debates that contribute to represent the Holocaust as a coherent and cohesive event, and as a touchstone of moral and political discourse in the U.S., entailing powerful stories about pluralism, tolerance, democracy, human rights, and justice. **Prerequisite:** COCU 100 or consent of instructor.

COCU 143. Culture and Media: Theories and Methods (4)

Considers in greater depth the theories and methods introduced in COCU 100. Advanced approaches to the analysis of media texts in everyday life and the study of concepts such as representation, culture, reality, and the virtual. **Prerequisite:** COCU 100.

COCU 144. The Globalization of Culture and Communication (4)

We live in a world of transnational flows of media, money, goods, and people. What representational and methodological challenges does globalization pose for the study of culture and communication? We will explore such questions from a cross-cultural and global perspective. **Prerequisite:** COCU 100 or consent of instructor.

COCU 145. Cultures of Consumption (4)

This course examines the cultural politics of consumption across time and cultures through several concepts: commodity fetishism; conspicuous consumption; taste, class, and identity formation; consumption’s psychological, phenomenological, and poetic dimensions; and contemporary manifestations of globalization and consumer activism. **Prerequisite:** COCU 100 or consent of instructor.

COCU 148. Communication and the Environment (4)

Survey of the communication practices found in environment controversies. The sociological aspects of environmental issues will provide background for the investigation of environmental disputes in particular contested areas, such as scientific institutions, communities, work-places, governments, popular culture, and the media. **Prerequisite:** COCU 100 or consent of instructor.

COCU 160. Performance and Cultural Studies (4)

Explores performance as a range of aesthetic conventions (theater, film, performance art) and as a mode of experiencing and conveying cultural identity. Texts include critical writing from anthropology, psychology, linguistics, media studies as well as film/video, play scripts, live performance. **Prerequisite:** COCU 100 or consent of instructor.

COCU 162. Popular Culture (4)

An overview of the historical development of popular culture from the early modern period to the present. Also a review of major theories explaining how popular culture reflects and/or affects patterns of social behavior. **Prerequisites:** COGN 20 and COCU 100 or consent of instructor.

COCU 163. Popular Culture in Contemporary Life (4)

Treats products of modern culture industries, and theories of social political importance. Study cultural forms: including music, television, fashion, food, landscapes. How popular culture is consumed, what it means to audiences, gender and racial/ethnic differences among producers and consumers. **Prerequisite:** upper-division standing or consent of instructor.

COCU 164. Representing Race, Nation, and Violence in Multicultural California (4)

How does media representation of race, nation, and violence work? Taking multicultural California as our site, we will explore how social power is embedded in a variety of visual texts, and how media not only represents but also reproduces conflict. **Prerequisite:** COCU 100 or consent of instructor.

COCU 165. History, Memory and Popular Culture (4)

What role does popular culture play in shaping and creating our shared memory of the past? The course examines diverse sources such as school text books, monuments, holidays and commemorations, museums, films, music, and tourist attractions. **Prerequisite:** COCU 100 or consent of the instructor.

COCU 166. Cartoons (4)

This class relates cartoon programming for children to the history of western childhood and the contemporary American culture of the child. While other classes may deal with the effects of television on children, this one is designed to encourage students to review the long-standing western traditions of hope and fear associated with children that shape these concerns. **Prerequisites:** COGN 20 and COCU 100 or consent of the instructor.

COCU 168. Latino Space, Place, and Culture (4)

Develop a critical understanding of the history, politics, and poetics of the Latino barrio as a distinct urban form. Course covers key concepts such as the production of space, landscapes of power, spatial apartheid, everyday urbanism, urban renewal and gentrification. **Prerequisite:** COCU 100 or consent of instructor.

COCU 169. Cultural Domination and Resistance (4)

Explores theories and narratives of cultural power, contemporary practices of resistance. Texts from a wide range of disciplines consider how domination is enacted, enforced, and what modes of resistance are employed to contend with uses and abuses of political power. **Prerequisite:** COCU 100 or consent of instructor.

COCU 170. Advertising and Society (4)

Advertising in historical and cross-cultural perspectives. Topics will include the ideology and organization of the advertising industry; the meaning of material goods and gifts in capitalist, socialist, and nonindustrial societies; the natures of needs and desires and whether advertising creates needs and desires; and approaches to decoding the messages of advertising. **Prerequisite:** COCU 100 or consent of instructor.

COCU 172. The Cultural Politics of Sport (4)

(Previously COSF 172.) Examine sports as play, performance, competition, an arena where there are politics, culture, poser, identity struggles. Establishing the social meanings of sport, we address: ethics, race, class, nation, gender, body, science, technology, entertainment industries, commerce, spectatorship, consumption, amateurism, professionalism. Students may not receive credit for both COCU 172 and COSF 172. **Prerequisite:** COCU 100 or consent of instructor.

COCU 175. Advanced Topics in Communication: Culture (4)

Specialized study in communication and culture with topics to be determined by the instructor for any given quarter. Past topics include critical theory, rituals and spectacles. May be repeated for credit three times. **Prerequisite:** COCU 100 or consent of instructor.

COCU 177. Computer Game Studies (4)

Course considers computer games both as media and as sites of communication. Games are studied through hands-on play and texts from a variety of disciplinary perspectives. Course encompasses commercial, academic, and independent games. Writing papers, analyzing games required. **Prerequisite:** COCU 100 or consent of instructor.

COCU 178. American Television in the 1970s (4)

Course will explore the politics and culture of the 1970s through the lens of network television programming and the decade’s most provocative sitcoms, dramas, variety shows, and news features. Students will analyze television episodes and read relevant media studies scholarship. **Prerequisite:** COCU 100 or consent of instructor.

COCU 179. Colonialism and Culture (4)

This course examines colonial narratives, slave accounts, essays, and stories by both colonizers and colonized. It also explores the issue of nationalism in determining the limits of colonialism among minority groups in the United States and in the Third World. **Prerequisite:** upper-division standing.

COCU 181. Architecture as Communication (4)

This course examines how buildings, cities, towns, gardens, neighborhoods, roads, bridges, and other bits of infrastructure communicate. We consider both the materiality and language-like properties of physical things in order to understand how built environments are represented, experienced, and remembered. **Prerequisite:** COCU 100 or consent of instructor.

COCU 182. Black Popular Music (4)

Examine black popular music as social practice, cultural product, historically. African American musical expressions, discussions of race and intercultural exchange, power, social change, sound and identity, music industry, black performance. Music making, hearing, performance are examined. **Prerequisite:** COCU 100 or consent of instructor.

COCU 183. Popular Music, Social Practices, and Cultural Politics (4)

Focuses on popular music as a social, aesthetic, historical, political formation. Relationship between musical and extramusical forces (institutions, communities, industries, identities) will be examined. Music making, hearing, performance will be engaged as sites of expressive practice, cultural politics, social identity. **Prerequisite:** COCU 100 or consent of instructor.

COMMUNICATION AND HUMAN INFORMATION PROCESSING**COHI 100. Introduction to Communication and the Individual (4)**

An introduction to theories of human mental processes which emphasizes the central role of mediation. The course covers methods of research that permit the study of mind in relation to different media and contexts of use. The traditional notion of media effects is critically examined in a number of important domains, including television, film, writing, and oral language. **Prerequisite:** COGN 20 or HDP 1, or consent of instructor. Offered spring quarter.

COHI 112. Interaction with Technology (4)

In this class we will look closely at the everyday ways in which we interact with technology to discuss: sociocultural character of objects and built environments; situated, distributed, and embodied character of knowledges; the use of multimodal semiotic resources (i.e., talk, gesture, body orientation, gaze, etc.) in interaction with technology. **Prerequisite:** COHI 100 or consent of instructor.

COHI 113. Communication and Social Machines (4)

An examination of the questions that developments in robotics pose to the scholars of communication: How do we communicate when our interlocutors are nonhumans? How do we study objects that are claimed to be endowed with social and affective character? **Prerequisite:** COHI 100 or consent of instructor.

COHI 114. Bilingual Communication (4)

This course is designed to introduce students to the multiple settings in which bilingualism is the mode of communication. Students will examine how such settings are socially constructed and culturally-based. Readings on language policy, bilingual education, and linguistic minorities, as well as field activities will constitute the bulk of the course. **Prerequisite:** COHI 100 or consent of instructor.

COHI 115. Education and Global Citizenship (4)

The course introduces students to concepts, possibilities, and dilemmas inherent in the notion of global citizenship. Students will formulate goals and instructional strategies for global education and the expected competence of an individual within a global society—able to focus simultaneously upon many diverse elements, issues, and contexts. It will examine the role that communication and curriculum can play in the formation of identity, language use, and civic responsibility of a global citizen. **Prerequisite:** COHI 100 or consent of instructor.

COHI 117. Language, Thought, and the Media (4)

This course examines the ways in which various communicative channels mediate human action and thought. A basic premise of the course is that human thought is shaped in important ways by the communicative devices used to communicate. There is a particular emphasis

on how thought develops, both historically and in the individual. **Prerequisite:** COHI 100 or consent of instructor.

COHI 119. Learning to Read (4)

This course explores learning to read as a process involving individual, cultural, and social resources. Reading difficulty is understood as induced by lack of resources, such as access to books or access to strategies for decoding, comprehension, and analysis of written text. Activities of reading are taken as a basic context for understanding patterns of chronic and pervasive reading difficulty in their populations. **Prerequisite:** COHI 100 or consent of instructor.

COHI 120. Reading the Web (4)

This course explores how networked computing has helped change many aspects of modern life, from how we manage illness to how we see ourselves culturally. The focus of the class is the online venue—how has the Web become part of daily life? What is different about goods, services, and events that transpire online? What theories of communication and social interaction are useful in understanding online behavior? **Prerequisite:** COHI 100 or consent of instructor.

COHI 121. Literacy, Social Organization, and the Individual (4)

This course will examine the historical growth of literacy from its earliest precursors in the Near East. The interrelation between literate technology and social organization and the impact of literacy on the individual will be twin foci of the course. Arriving at the modern era, the course will examine such questions as the impediments to teaching reading and writing skills to all normal children in technological societies and the relation between literacy and national development in the Third World. **Prerequisite:** COHI 100 or COCU 100 or HDP 1 or consent of instructor.

COHI 122. Communication and the Community (4)

This course examines forms of communication that affect people's everyday lives. Focusing on ways that ethnic communities transmit and acquire information and interact with mainstream institutions, we examine a variety of alternative local media, including murals, graffiti, newsletters, and community radio. **Prerequisite:** COHI 100 or consent of instructor.

COHI 123. Children and Media (4)

A course which analyzes the influence of media on children's lives. The course adopts an historical as well as social perspective on childhood within which media plays a role. Among media studied are books, films for children, video games, computer games, and television. **Prerequisite:** COGN 20 or HDP 1 or consent of instructor.

COHI 124. Voice: Deaf People in America (4)

The relationship between small groups and dominant culture is studied by exploring the world of deaf people who have for the past twenty years begun to speak as a cultural group. Issues of language, communication, self-representation, and social structure are examined. **Prerequisite:** COHI 100 or consent of instructor.

COHI 125. Communication in Organizations (4)

Organizations are analyzed as historically-evolving discursive systems of activity mediated by talk, text, and artifacts. The class covers sense making, coordinating, symbolizing, talking, negotiating, reading and writing, story-telling, joking, and visualizing in organizations. Exemplary case studies, employing several complementary theoretical frameworks, are used to analyze these communicative processes. **Prerequisite:** COHI 100 or consent of instructor.

COHI 127. Biography and Life Stories (4)

Course examines several different ways of telling stories as a form of communication: our own life and about the lives of others. There are also the occasions that the life stories of ordinary people are told and celebrated: for example, funerals, festschrifts, retirement dinners, fiftieth-anniversary parties, and retrospective art shows. **Prerequisite:** COHI 100 or consent of instructor.

COHI 128. Mobile Communications (4)

Movement is central to our lives. This course draws on the latest research into how we travel, trade, and move. Diverse topics will be covered including kids in cars, the New York

subway, and theories of mobility. **Prerequisites:** COHI 100 or consent of instructor.

COHI 129. Borderlands (4)

Communicative and identity aspects of "marginality"—belonging to more than one race, community, or nationality, and on the literature about insiders and outsiders. Considers contemporary race-critical and feminist theory, including cyborg anthropology, the historical concept of race in America, and the problematics of multiple memberships of various sorts. **Prerequisite:** COHI 100 or consent of instructor.

COHI 130. Cross-Cultural Communication (4)

Explores psychological and communicative processes that create and sustain culture and shape intercultural interaction. Students engage in creating simulated cultural groups. Course readings focus on microgenesis of culture, idiocultures, culture as an evolutionary strategy, relationships between cultural groups. **Prerequisite:** COHI 100 or consent of instructor.

COHI 134. Language and Human Communication (4)

This course examines the interaction of language and culture in human communication. Beginning with language evolution, the course then discusses a broad range of human languages including indigenous languages, sign languages, and hybrid languages spoken in urban centers. **Prerequisite:** COHI 100 or consent of instructor.

COHI 135. Language and Globalization (4)

The interaction of language and culture in human communication. New and old languages, standard and dialect, dominant and endangered, are the special focus. Selected languages as examples of how languages exist in contemporary contexts. **Prerequisite:** COHI 100 or consent of instructor.

COHI 136. Gender and Science (4)

This course will focus on arguments about cognitive differences between men and women in science. We will review current arguments about essential differences, historical beliefs about gender attributes and cognitive ability, and gender socialization into patterns of learning in school. **Prerequisite:** COHI 100 or consent of instructor.

COHI 175. Advanced Topics in Communication: Human Information Processing (4)

Specialized study in communication: human information processing with topics to be determined by the instructor for any given quarter. May be repeated for credit three times. **Prerequisite:** COHI 100 or consent of the instructor.

COMMUNICATION MEDIA METHODS**COMT 100. Nonlinear/Digital Editing (4)**

Prepare students to edit on nonlinear editing facilities and introduce aesthetic theories of editing: time code editing, time line editing on the Media 100, digital storage and digitization of audio and video, compression, resolution, and draft mode editing. **Prerequisites:** communication majors, COGN 21 and COGN 22, or consent of instructor.

COMT 101. Television Analysis and Production (6)

An introduction to the techniques and conventions common to the production of news, discussion, and variety-format television programs. Particular emphasis will be placed on the choice of camera "point of view" and its influence on program content. Laboratory sessions provide students the opportunity to experiment with production elements influencing the interpretation of program content. Concentration on lighting, camera movement, composition, and audio support. **Prerequisites:** COGN 21 and COGN 22, or consent of instructor.

COMT 102. Introduction to Media Use in Communication (4)

Students will engage in projects, using media, to address theories of communication. Students can use film, video, computers, pen and paper, photography, posters, or performances for their projects. **Prerequisite:** COGN 20 and COGN 21 and COGN 22.

COMT 103. Television Documentary (6)

An advanced television course which examines the history, form, and function of the television documentary in American society. Experimentation with documentary

techniques and styles requires prior knowledge of television or film production. Laboratory sessions apply theory and methods in the documentary genre via technological process. Integrates research, studio and field experience of various media components. **Prerequisite:** COMT 101 or consent of instructor.

COMT 104. Studio/TV (4)

This course offers students the opportunity to produce and engage in critical discussions around various television production formats. We will study and produce a variety of projects including public service announcements, panel programs, scripted drama, and performance productions. **Prerequisites:** COGN 21 and COGN 22, or consent of instructor.

COMT 105. Media Stereotypes (4)

An examination of how the media present society's members and activities in stereotypical formats. Reasons for and consequences of this presentation are examined. Student responsibilities will be: (a) participation in measurement and analysis of stereotype presentations; (b) investigating techniques for assessing both cognitive and behavioral effects of such scripted presentations on the users of media. Course can be taken to meet COCU major requirement. **Prerequisite:** COCU 100 or consent of instructor.

COMT 108. Writing for Digital Media (4)

Practice, history, and theory of writing for digital media. Text combines with images, sounds, movement, and interaction. New network technologies (email, blogs, wikis, and virtual worlds) create new audience relationships. Computational processes enable texts that are dynamically configured and more. **Prerequisites:** COGN 21 and COGN 22.

COMT 109. Digital Media Pedagogy (4)

This course teaches techniques for teaching digital media: such as Word, Photoshop, PageMaker, digital cameras, digital video, non-linear editing. What are the special challenges digital media present to teachers and students? How do digital media compare to older technologies such as typewriters, film cameras, and analog video? How do gender, class, and age affect the way students and teachers respond to digital media? At least six hours of fieldwork at a computer lab of their choice or at Seiter's project at Adams Elementary will be required. Experience with computers and/or digital imaging recommended. **Prerequisite:** communication majors only.

COMT 110. News Media Workshop (4)

Designed for students working in student news organizations or off-campus internships or jobs in news, public relations, or public information. A workshop in news writing and news analysis. **Prerequisite:** COCU 100 and COSF 171 (may be taken concurrently) or consent of instructor.

COMT 111A. Communicating and Computers (4)

This course introduces students to computers as media of communication. Each quarter students participate in a variety of networking activities designed to show the interactive potential of the medium. Field work designed to teach basic methods is combined with readings designed to build a deeper theoretical understanding of computer-based communication. Courses can be taken to meet COHI major requirement. **Prerequisite:** COHI 100 and communication major or consent of instructor.

COMT 112. Ethnographic Methods for Media Research (4)

This is a practical course on ethnographic fieldwork—obtaining informed consent interviewing, negotiating, formulating a research topic, finding relevant literature, writing a research paper, and assisting others with their research. Course can be taken to meet COHI major requirement. **Prerequisite:** COHI 100 or consent of instructor.

COMT 115. Media and Design of Social Learning Contexts (6)

(Same as HDP 115). A combined lecture/lab course cross listed in Communication and Human Development. Students attend lecture, write fieldnotes, and spend 3 hours per week in specially designed afterschool settings working with children and designing new educational media and producing special projects. **Prerequisite:** COHI 100 or HDP 1.

COMT 116. Practicum in Child Development (6)

(Same as HDP 135.) A combined lecture and laboratory course for juniors and seniors in psychology and communication. Students should have a solid foundation in general psychology and communication as human information processing. Students will be expected to spend four hours a week in a supervised practical after-school setting at one of the community field sites involving children. Additional time will be devoted to readings and class prep, as well as, six hours a week transcribing field notes and writing a paper on some aspect of the field work experience as it relates to class lectures and readings. Please note that the enrollment size for each site/section is limited. See department course listing for site/section descriptions. **Prerequisite:** COHI 100 or HDP 1 or Psych 101.

COMT 120. Documentary Sketchbook (4)

Digital video is the medium used in this class both as a production technology and as a device to explore the theory and practice of documentary production. Technical demonstrations, lectures, production exercises, and readings will emphasize the interrelation between production values and ethics, problems of representation, and documentary history. **Prerequisites:** COGN 21 and COGN 22, or consent of instructor.

COMT 121. Sound Production and Manipulation (4)

Advanced seminar in sound production, design, editing. Students create projects by recording original sounds, editing on a Pro-Tools system. We consider the potential of sound in film, radio, TV, and the Web by reviewing work and reading sound theory. **Prerequisites:** communication majors only and COGN 21 and COGN 22.

COMT 122. Social Issues of Media Production (4)

Analyze forms of social issue media production, photography, audio/radio, arts, crafts, Web, print zines, political documentary. Students work with several forms of media making: video, audio, Web design, and a project in their chosen format. **Prerequisites:** COGN 21 and COGN 22, or consent of instructor.

COMT 175. Advanced Topics in Communication, Media Methods (4)

Specialized "practice" in communication: media methods with topics to be determined by the instructor in any given quarter. May be repeated for credit three times. **Prerequisite:** communication majors only.

COMT 175A. Advanced Topics in Communication, Media Methods Production (4)

Specialized practice in communication: relating to media methods production with topics to be determined by the instructor in any given quarter. **Prerequisites:** COGN 21 and COGN 22.

GENERAL COMMUNICATION

COGN 150. Senior Seminar in Communication (4)

This course examines in detail some topic in the field of communication, bringing to bear several of the approaches and perspectives introduced in the basic communication curriculum. Seminars will be limited to 25 students and class participation is stressed. A research paper is required. **Prerequisite:** senior standing or consent of instructor.

COGN 175. Advanced Topics in Communication: General (2)

Specialized study in general communication with topics to be determined by the instructor, for any given quarter. May be repeated for credit. **Prerequisite:** must be taken with AIP 197.

COGN 191A-B. Honors Seminar in Communication (4)

Preparation of an honors thesis, which can be either a research paper or a media production project. Open to students who have been admitted to the honors program. Grades will be awarded upon completion of the two-quarter sequence. **Prerequisite:** admission to the honors program.

COGN 192. Senior Seminar (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in Communication (at the upper-division level). Topics will

vary from quarter to quarter. Senior Seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp, consent of instructor, and upper-division standing.

COGN 194. Research Seminar in Washington, D.C. (4)

(Same as PS 194, USP 194, Hist 193, SocE 194, Erth 194.) Course attached to six-unit internship taken by students participating in the UCDC program. Involves weekly seminar meetings with faculty and teaching assistants and a substantial research paper. **Prerequisite:** participation in UCDC program.

COGN 198. Directed Group Study in Communication (4)

Directed group study on a topic or in a field not included in the regular curriculum by special arrangement with a faculty member. (P/NP grades only.) May be taken three times for credit. **Prerequisite:** consent of instructor.

COGN 199. Independent Study (4)

Independent study and research under the direction of a member of the staff. (P/NP grades only.) **Prerequisite:** consent of instructor.

GRADUATE

COGR 200A. Introduction to the Study of Communication as Social Force (4)

This course focuses on the political economy of communication and the social organization of key media institutions. There will be both descriptive and analytical concerns. The descriptive concern will emphasize the complex structure of communication industries and organizations, both historically and cross-nationally. The analytic focus will examine causal relationships between the economic and political structure of societies, the character of their media institutions, public opinion, and public attitudes and behaviors expressed in patterns of voting, consuming, and public participation. The nature of evidence and theoretical basis for such relationships will be critically explored.

COGR 200B. Introduction to Study of Communication: Communication and Culture (4)

This course focuses on questions of interpretation and meaning. This course will examine how people use texts to interpret the world and coordinate their activities in social groups. Students will study both theories of interpretation in the conventional sense and theories about the act of interpreting.

COGR 200C. Introduction to the Study of Communication: Communication and the Individual (4)

This course will draw on theorists who examine human nature as constituted by social, material, and historical circumstances. This course considers the media in relation to the ontogenetic and historical development of the human being and an examination of the individual as socially constituted in a language-using medium. The role of new communication technologies as part of research methodologies is explored in lecture-seminar.

COGR 201B. Ethnographic Methods for Communication Research (4)

A supervised and coordinated group project will allow students to develop competence in a variety of ethnographic approaches to communication. Subjects covered include choosing a field-work site, setting or process for participation; entry and development of relationships; techniques of observation, interviewing, notetaking, and transcription. Course may also include photography and video as research tools. All participant observation and interviewing strategies fall under the review of the Committee on Human Subjects.

COGR 201C. Discourse Analysis (4)

Review and critique of studies employing discourse analysis, focusing on the ways that "discourse" is identified, recorded, and reported. A working notion of "discourse" will develop from works representing diverse disciplinary approaches. Students will record, transcribe, and report on segments of talk in an everyday setting. All participant

observation and interviewing strategies fall under the review of the Committee on Human Subjects.

COGR 201D. Historical Methods for Communication Research (4)

Different approaches to conducting historical research in communication. Such approaches may include the social history of communication technology; structuralist and poststructuralist accounts of language, media, and collective memory; and new historicist treatments of cultural history. Sources, documentation, and the nature of argument from historical evidence are emphasized.

COGR 201J. Comparative Analysis (4)

The logic of comparative analysis and its role in communication research. Scientific inference in qualitative research. Selection of cases. Problems of translation across cultures.

COGR 201L. Qualitative Analysis of Information Systems (4)

Historical and ethnographic studies of information systems—the design and use of information and communication technologies in their social, ethical, political, and organizational dimensions. Objects of study range from the invention of file folders to e-mail use and distributed databases as communication systems. **Prerequisite:** graduate standing or consent of instructor.

COGR 201M. Content Analysis (4)

History uses methodology of quantitative analysis of media content. Includes conceptual issues concerning the quantification of meaning and practical procedures for coding and data analysis. Students read examples of studies using content analysis and carry out their own pilot analyses. **Prerequisite:** graduate standing or consent of instructor.

COGR 210. Information and Society (4)

The social, legal, and economic forces affecting the evolution of mass communication institutions and structure in the industrialized world. Differential impacts of the free flow of information and unequal roles and needs of developed and developing economies.

COGR 211. Memory Practices (4)

Examines theories of social and distributed memory—Maurice Halwachs to Ed Hutchins, John Sutton, and nature of the Archive (Foucault and Derrida), reading databases (as memory prostheses), beginning with Manovich's work. Enquiry into mediated nature of memory practices. **Prerequisite:** graduate standing.

COGR 215. Regulation of Telecommunications (4)

The course will look at the history of, and rationales for, the regulation of mass communications in the United States. The course will cover both broadcasting and common carrier regulation. We will analyze telecommunications regulatory structures as they were constituted historically with the 1934 Communications Act and examine their breakdown in the late 1970s. In a larger vein, the course will examine the rise and functions of regulatory agencies in modern American history.

COGR 220. The News Media (4)

History, politics, social organization, and ideology of the American news media. Special attention will be paid to: historical origins of journalism as a profession and "objective reporting" as ideology; empirical studies of print and TV journalism as social institutions; and news coverage of Vietnam and its implications for theories of the news media.

COGR 221. The State (4)

What is that "thing" we call the State? What is its relationship to government, citizenship, and power? Will consider different approaches to the study and theorization of the State, from European Enlightenment to post-9/11 reflections on sovereignty, rights, future. **Prerequisite:** graduate standing or consent of instructor.

COGR 223. Communication Law and Policy (4)

This course examines the legal and policy framework for free speech in the United States. We cover First Amendment case law, free speech theory, copyright, and the different legal and regulatory treatment historically accorded print, broadcasting, cable television, telephone, and Internet. **Prerequisite:** graduate standing or consent of instructor.

COGR 224. Geographies of Difference, Exclusion, and Conflict (4)

This course is a critical geography of how territorial environments shape entanglements of power and conflict between dominant and subordinate groups, and how, in turn, such conflict between these actors reshapes spatial landscapes. **Prerequisite:** graduate standing or consent of instructor.

COGR 225A. Introduction to Science Studies: Part 1 (4)

Study and discussion of classic themes and texts in history of science, sociology of science, and philosophy of science, and of work that attempts to develop an interdisciplinary science studies approach. **Prerequisite:** enrollment in the Science Studies Program or consent of instructor.

COGR 225B. Seminar in Science Studies (4)

Study and discussion of a selected topic in the science studies field with an emphasis on the development of research and writing skills. The topic varies from year to year. **Prerequisite:** enrollment in the Science Studies Program or consent of instructor.

COGR 225C. Colloquium in Science Studies (4)

A forum for the presentation and discussion of research in progress in science studies by graduate students, faculty, and visitors. Students must attend the colloquium series for their entire first and second years. They receive course credit in one quarter each year. **Prerequisite:** enrollment in the Science Studies Program.

COGR 225D. Introduction to Science Studies Part II (4)

Continuing the introduction developed in Part 1, this course examines recent key topics and problem situations in science studies. Emphasis is on recent theoretical perspectives and empirical studies in communication, history, philosophy, and sociology of science and technology, and the interplay between them. **Prerequisite:** Completion of COGR 225A, HIGR 238, PHIL 209A, or SOCG 255A or consent of instructor.

COGR 238. The Frankfurt School on Mass Culture Social Theory (4)

This reading seminar will consider works by Frankfurt School theorists (Horkheimer, Adorno, Pollock, Lowenthal, Marcuse, Benjamin, Habermas) on mass media, mass culture, ideology, art, authority and the individual, and their relevance in the analysis of contemporary capitalism. **Prerequisite:** graduate standing or consent of instructor.

COGR 240. The Culture of Consumption (4)

(Cross-listed with HIGR 273.) This course will explore the development and cultural manifestations of consumerism in the nineteenth and twentieth centuries. Topics will include the rise of museums, the development of mass market journalism and literature, advertising, and the growth of commercial amusements. Readings will focus primarily, but not exclusively, on the United States. Students will be encouraged to think comparatively.

COGR 250. Third World Cinema Screening (4)

Course examines the historical impetus, development, and construction of "Third Cinema"—a particular style of media making in Africa, Latin America, and Asia. An interdisciplinary approach interrogates how Third Cinema influences world cinema of today. Additional screening session required. **Prerequisite:** graduate standing.

COGR 261. Mediation Approaches to Culture/Mind (4)

This course will examine theories of mind in which cultural mediation is given a leading role. The work of anthropologists, psychologists, and communication scholars will be studied in depth. Emphasis will be placed on the methodological implication of cultural theories of mind for empirical research.

COGR 275. Topics in Communication (4)

Specialized study in communication, with topics to be determined by the instructor for any given quarter.

COGR 278. Talking Culture, Culture Talking: Voices of Diversity (4)

(Cross listed with EDS 278). This course explores the discourse of culture in American society and the problem of

"silenced" or unheard voices. The interaction of individual and collective voice, language, and identity are discussed as they bear on the ways that culture moves through important social institutions such as schools. Of particular interest are issues of teaching, learning, displacement, inclusion, marginality, and the "speaking center." **Prerequisite:** Graduate standing or consent of instructor.

COGR 280. Advanced Workshop in Communication Media (4)

This course is a project course in which students prepare a production or experiment using one of the forms of media. The course is designed to allow students to experiment in a communication form other than the usual oral presentation in class or a term paper. Students can do a video production, a coordinated photographic essay or exhibit, a computer instructional game, a published newspaper or magazine article directed at a special audience, a theatrical presentation, or some form other than those listed. **Prerequisite:** graduate standing or consent of instructor.

COGR 294. The History of Communication Research (4)

Intellectual history of the field of communication studies from Robert Park to the present. Explication and assessment of major research approaches and classic studies representing both empirical and critical traditions.

COGR 296. Communication Research as an Interdisciplinary Activity (4)

A course that introduces students to the interdisciplinary nature of the field of communication research as represented by the work of faculty in the Department of Communication. Through faculty research, students are presented with concrete examples of communication research theory and practice that can provide them with insights for conducting their own research projects. **Prerequisite:** graduate standing or consent of instructor.

COGR 298. Directed Group Study (1-12)

The study and analysis of specific topics to be developed by a small group of graduate students under the guidance of an interested faculty member. COGR 500. Practice Teaching in Communication (4)

COGR 299. Graduate Research (1-12)

Advanced independent study in communication under the guidance of Department of Communication faculty.

COGR 500. Practice Teaching in Communication (4)

A doctoral student in communication is required to assist in teaching undergraduate Department of Communication courses for a total of six quarters. One meeting per week with the instructor, one meeting per week with the assigned sections, and attendance at the lecture of the undergraduate course in which he or she is participating are part of this requirement.

Comparative Studies in Language, Society, and Culture

Department of Music
OFFICE: 111 Mandeville Center for the Arts
(858) 534-6722/(858) 534-3279
<http://music.ucsd.edu>

PROGRAM FACULTY

Nancy Caciola, Ph.D., *Department of History*
Jann C. Pasler, Ph.D., *Department of Music, Chair*
Don E. Wayne, Ph.D., *Department of Literature,*
Co-Chair
Kathryn A. Woolard, Ph.D., *Department of*
Anthropology

Graduate students in the humanities, social sciences, and arts in this program are provided the opportunity to design curricula, conduct research, and write dissertations under the guidance of interdepartmental and/or intercampus Ph.D. committees. The student who participates in the program must be admitted, satisfy all requirements for advancement to candidacy, and pass the qualifying examination in one department. The student must also undertake advanced study in an integrally related area of research specialization. The student advances to candidacy in the program upon successfully defending a written dissertation proposal before the interdepartmental and/or intercampus Ph.D. committee. In the instance of some departments and programs, the defense will be identical with completion of the departmental qualifying examination.

Application to the program in Comparative Studies may be made at the earliest during the student's third quarter of residency in his or her primary department. From the point of acceptance into the program, the student's preparation for dissertation research will be under the supervision of the interdepartmental or intercampus Ph.D. committee. The degree granted may indicate in its title the precise nature of the student's studies and research when appropriate and desirable—e.g., Ph.D. in comparative literature and ethnopoetics, in linguistics and literary studies, in economics and Chinese studies, in philosophy and the history of ideas. When an additional degree title is contemplated, the student's Ph.D. committee must forward a program of study and research, as well as the dissertation proposal, to the supervising committee for initial approval and to the Graduate Council for final approval.

Students applying for admission to UCSD and interested in applying for admission to the program should direct their inquiries to a primary department. Students already admitted to a primary department should, after the required quarters

of residence and with the advice of a department advisor, direct inquiries to the chairperson of the program.

FACULTY RESEARCH GROUPS

Beginning with the academic year 1997–1998, the program sponsors a series of faculty research groups. These groups consist of faculty who have announced their intention to supervise graduate students wishing to work on topics involving the comparative study of language, society, and culture. Each faculty research group is expected to be composed of faculty in the humanities, social sciences, and arts from different departments and/or campuses. For a list of current faculty research groups and the topics which they support, contact the chairperson of the program.

THE ANTHROPOLOGY OF MODERN SOCIETY

The Anthropology of Modern Society is a project of graduate training and research dedicated to the study of modernity and its counterpoints in the late twentieth century. The group sees the social life of cities as making manifest this problem in issues of citizenship and democracy, social formations in tension with the nation-state, modern subjectivities, social and religious movements, transnational markets and migrations, and relations of local to global processes. Participants are committed to reorienting anthropological theory and ethnographic practice towards such contemporary social and political problems.

Director: James Holston, Department of Anthropology, (858) 534-0111

Co-Director: Martha Lampland, Department of Sociology, (858) 534-5640

PH.D. TIME LIMIT POLICIES

A student admitted to this interdisciplinary program is subject to the same time limit policies as those of the student's primary department.

Contemporary Issues

work by the faculty: handling of discussions, preparation and grading of examinations and other written exercises, and student relations. **Prerequisite:** graduate standing.

OFFICE: 2073 Humanities and Social Sciences
Building, Muir College
(858) 534-3589

DIRECTOR

Susan Smith, Ph.D.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

22. Human Sexuality (4)

A survey of the nature and problems of human sexuality in the development of the individual, in cultural traditions and values, and in social roles and organizations, particularly with regard to contemporary America.

40. Contemporary Issues: The AIDS Epidemic (4)

Using current information, this course will deal with the worldwide spread of AIDS, particularly into communities, colleges, and universities. Discussion topics: origin, infection, biology, clinical expression, risks, vaccines, epidemiology, and the social, ethical, economic, and legal aspects of this epidemic.

50. Information and Academic Libraries (2)

An introduction to research strategies directed at satisfying the information needs of the student using the academic library, with emphasis on the UCSD library system. Library techniques will be acquired through lectures and discussion, problem sets, and a term project. Students will learn to extend these techniques to independent research.

UPPER-DIVISION

136. The Anthropology of Medicine (4)

Theoretical approaches to and cross-cultural analyses of the role of the medical profession, the sick and the healers, and culture as communication in the medical event. The theoretical anthropological aspects of medical practice and medical research will include a consideration of the "Great Traditions" of medicine as well as primitive and peasant systems. Western medicine will be considered in the foregoing framework, with issues of contemporary concern by way of introduction. **Prerequisite:** upper-division standing.

195. Discussion Leading in Contemporary Issues (4)

Students will lead groups of ten to twenty students in discussions of contemporary concern. Students will meet with the professor to plan and prepare for their discussions to be held weekly. Students will also consult with another faculty member specializing in their topics for further check on reading materials and course of discussion. (P/NP grades only.) **Prerequisites:** Contemporary Issues 196 and consent of the director of Interdisciplinary Sequences.

196. Contemporary Issues Workshop (2)

A workshop for potential discussion leaders in the Contemporary Issues Program. Students will investigate topics for discussion and methods of presentation and inquiry. Participating in the workshop does not guarantee selection as discussion leader. (P/NP grades only.)

500. Apprentice Teaching in Contemporary Issues (4)

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their

Critical Gender Studies

DIRECTOR

Lisa Yoneyama, Ph.D., *Literature*

AFFILIATED FACULTY PROFESSORS

Lisa Cartwright, Ph.D., *Communication*
R. Michael Davidson, Ph.D., *Literature*
Zeinabu Davis, M.F.A., *Communication*
Page du Bois, Ph.D., *Literature*
Yen Espiritu, Ph.D., *Ethnic Studies*
Deborah Hertz, Ph.D., *History*
Jorge Huerta, Ph.D., *Theatre and Dance*
Judith Hughes, Ph.D., *History*
Christine F. Hunefeldt, Ph.D., *History*
Bennetta Jules-Rosette, Ph.D., *Sociology*
Rebecca Klatch, Ph.D., *Sociology*
Todd Kontje, Ph.D., *Literature*
Lisa Lowe, Ph.D., *Literature*
Babette Mangolte, Ph.D., *Visual Arts*
Louis Montrose, Ph.D., *Emeritus, Literature*
Naomi Oreskes, Ph.D., *History*
Carol Padden, Ph.D., *Communication*
Jann Pasler, Ph.D., *Music*
Carol Plantamura, M.F.A., *Emerita, Music*
Roddey Reid, Ph.D., *Literature*
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Shirley Strum, Ph.D., *Anthropology*
Ana Celia Zentella, Ph.D., *Ethnic Studies*
Omelbanine Zhiri, Ph.D., *Literature*

ASSOCIATE PROFESSORS

Mary Blair-Loy, Ph.D., *Sociology*
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Nancy Caciola, Ph.D., *History*
Ann Craig, Ph.D., *Political Science*
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Valerie Hartouni, Ph.D., *Communication*
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Curtis Marez, Ph.D., *Ethnic Studies*
Natalia M. Molina, Ph.D., *Ethnic Studies*
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Rebecca Plant, Ph.D., *History*
Pamela Radcliff, Ph.D., *History*
David Serlin, Ph.D., *Communication*
Nayan Shah, Ph.D., *History*
Kathryn Shevelow, Ph.D., *Literature*
Denise Ferreira da Silva, Ph.D., *Ethnic Studies*
Susan Smith, Ph.D., *Visual Arts*
Shelley Streeby, Ph.D., *Literature*
Nicole Tonkovich, Ph.D., *Literature*
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Cynthia Walk, Ph.D., *Emerita, Literature*

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Winifred Woodhull, Ph.D., *Literature*
Lisa Yoneyama, Ph.D., *Literature*
Elana Zilberg, Ph.D., *Communication*

ASSISTANT PROFESSORS

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Kirstie Dorr, Ph.D., *Ethnic Studies*
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Camille Forbes, Ph.D., *Literature*
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Joe Hankins, Ph.D., *Anthropology*
Todd Henry, Ph.D., *In Residence, History*
Adria Imada, Ph.D., *Ethnic Studies*
Tara Javidi, Ph.D., *Electrical and Computer Engineering*
Sara Johnson, Ph.D., *Literature*
Eun-Young Jung, Ph.D., *Music*
Sara C. Kaplan, Ph.D., *Critical Gender Studies and Ethnic Studies*
Roshanak Kheshti, Ph.D., *Ethnic Studies*
Kalindi Vora, Ph.D., *Ethnic Studies*
Megan E. Wesling, Ph.D., *Literature*

ADJUNCT PROFESSORS

Suzanne Cahill, Ph.D., *History*
Mary Walshok, Ph.D., *Sociology*

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CRITICAL GENDER STUDIES

The UC San Diego Critical Gender Studies Program (CGS) is an interdisciplinary academic program offering students the opportunity to study gender, race, class, sexuality, and nationalism as intersecting categories of analysis and experience. Some basic questions that anchor the program's core curriculum include asking how these categories become institutionalized yet change over time; how they work together to shape individual identity, contribute to the organization of social life, and become essential to the production of many different kinds of knowledge about that life.

The program's core curriculum builds upon feminist scholarship of the last decade, incorporating the new interdisciplinary agendas, intellectual debates, changing methodological practices, and major scholarly shifts that have reshaped the field of women's studies. Informed by the insights of critical race feminism, feminist critiques of conventional domains of knowledge, and gay and lesbian inquiries challenging traditional understandings and assumptions about sexuality, this core curriculum is designed to move students beyond simple binary descriptions and contemporary, popularized accounts of gender. Instead, gender is analyzed in the full complexity of its construction over time and in a variety of cultural, scholarly, and global arenas.

Students can expect to encounter a rich spectrum of approaches in studying these complex constructions—the majority of a student's advanced work in the program consists of upper-division courses from the Departments of History, Communication,

Literature, Ethnic Studies, Sociology, Anthropology, Philosophy, and Political Science. However, despite their important differences, what these approaches share is a critical stance with respect to the subject of gender. This stance, reflected in the program's name *Critical Gender Studies*, refuses easy answers when exploring the social relations of gender and reaches, instead, for detailed accounts of the intricacies and paradoxes of power through which these relations are and have been made and maintained.

Critical Gender Studies prepares undergraduates for a variety of careers through the study of social, political, economic, historical, and cultural contexts. For example, the interdisciplinary and multi-disciplinary course work that students complete as part of a major in Critical Gender Studies provides an excellent foundation for those students with career aspirations in law, medicine and health sciences, public administration, and social services. Students wishing to pursue doctoral work will also find that interdisciplinary training in Critical Gender Studies equips them with theoretical and methodological strengths in most disciplines and applied research fields. Specialists in gender studies are increasingly being used as consultants in industry, higher education, insurance companies, and personnel firms. State and federal government agencies require people who have special training in analyzing gender relations. Finally, educational institutions need specialists to develop and administer women's centers and gay and lesbian centers as well as other institutional structures and programs.

The Critical Gender Studies Program offers two options of study: an undergraduate major and an undergraduate minor (or program of concentration). Because Critical Gender Studies is an interdisciplinary major, it is important to work closely with a faculty advisor in planning your program.

PREPARATION FOR THE MAJOR AND MINOR

All Critical Gender Studies majors and minors are required to take the Introduction to Critical Gender Studies sequence: Critical Gender Studies 2A-B, 100, and 101.

MAJOR PROGRAM

To complete a major, students are required to take sixteen courses, comprising four courses in the introductory sequence (2A, 2B, 100, 101), and twelve upper-division courses. Six of the upper-division courses must be taken in the CGS program; the other half (six) will be drawn from among the advanced electives taught within departments. Three of the advanced elective courses must be in the Humanities Division, the other three in Social Sciences. (See information on quarterly course list below.) All CGS majors will be assigned a faculty mentor, who will supervise the student's progress through the program.

QUARTERLY COURSE LIST

When the UCSD Schedule of Classes for an upcoming quarter goes online, the Critical Gender Studies Program makes available a list of that quarter's proposed CGS courses in addition to any departmental electives being offered. The quarterly list may be found at the CGS Web site.

HONORS PROGRAM

The Critical Gender Studies Honors Program allows advanced Critical Gender Studies majors to pursue individual projects in the context of collective intellectual exchange with their peers and advising faculty. Students are eligible if they a) have senior standing at the time they begin the program, and b) are approved by the Critical Gender Studies faculty director and steering committee. Normally, students eligible for honors will have a 3.5 grade point average in upper-division courses taken for the major, but highly motivated students who do not meet this criterion may be admitted to the program at the discretion of the director and the Critical Gender Studies steering committee.

In the fall quarter of their senior year, students take the Honors Seminar (CGS 190), taught by a member of the Critical Gender Studies faculty. The first half of the quarter is devoted to intensive analysis and discussion of recent publications in the fields of gender and sexuality. During the second half of the quarter, each student develops a short thesis proposal and presents it for group discussion. While taking the Honors Seminar, each student also registers for CGS 196A: Honors Research, four units of independent study with a faculty member associated with Critical Gender Studies. With the guidance of this advisor, the student carries out background research for the thesis prospectus and selects a thesis director. In the winter quarter, students complete the thesis under the supervision of their thesis director in the Honors Thesis course, CGS 196B.

Students who complete the thesis with a grade of B+ or above and make an oral presentation have the words *with distinction* added to the notation of the major on their diplomas and transcripts.

DOUBLE MAJOR IN CRITICAL GENDER STUDIES AND ANOTHER DEPARTMENT OR PROGRAM

Students who wish to major both in Critical Gender Studies and in another department or program must fulfill all requirements for the Critical Gender Studies major as described above. A student must submit a double major petition for approval to the participating departments and the student's college advising office. Critical Gender Studies will accept up to two upper-division courses that overlap requirements for the two majors.

Critical Gender Studies Major Course Checklist

During advising sessions with the CGS faculty director or staff, Critical Gender Studies majors make use of a checklist to determine how courses already taken fulfill the major's requirements. An example of the checklist may be found at the CGS Web site.

MINOR PROGRAM (AND PROGRAM OF CONCENTRATION)

Critical Gender Studies minors are required to complete Critical Gender Studies 2A-B, 100, and 101. In addition, minors are required to take three upper-division courses, two of which must be upper-division CGS courses, and one upper-division elective. Students who declare the Critical Gender Studies minor (or program of concentration) with

junior or senior standing may petition to substitute an upper-division CGS course or a departmental elective course of comparable content for Critical Gender Studies 2A or 2B. Critical Gender Studies permits one lower-division course and one upper-division course to be taken P/NP. College grading options vary. Please consult with college academic advisors and Critical Gender Studies advisor.

SPECIAL STUDIES, INTERNSHIPS, AND GRADE OPTIONS

Many Critical Gender Studies majors and minors elect to do gender research under the rubrics of Directed Group Study (198), Independent Study (199), internships, and mentor programs. Because these courses can be taken only with a P/NP grade option, the number of such courses to be applied to the major should be carefully discussed with a Critical Gender Studies advisor. Some graduate and professional schools will consider it easier to evaluate a student's transcript if there are more letter grades. College guidelines and requirements for grade options also vary. Please see college academic advisors and Critical Gender Studies advisor.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

CGS 2A. Introduction to Critical Gender Studies: Social Movements (4)

The role of social movements in contesting rights and representation in comparative and historical contexts. Historical examples in the U.S. and other locations, including civil rights, men's movements, antiracist feminism, women's movements, AIDS activism, transgenderism, immigrant rights, and the labor movement in the U.S.

CGS 2B. Introduction to Critical Gender Studies: Gender and Institutions (4)

This course examines how gender organizes and is organized by institutions. Domains of inquiry may include family, education, medicine, technology, law, media, the workplace, immigration, and citizenship.

CGS 87. Critical Gender Studies Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

UPPER-DIVISION

CGS 100. Conceptualizing Gender: Theories and Methods (4)

This course will compare the uses of gender as a category of analysis across academic disciplines in the humanities, social sciences, and natural sciences with particular attention to research methodologies.

CGS 101. Gender, Modernity, and Globalization (4)

The global effects of modernity, modernization, and globalization on men and women. Topics: international consumer culture; international divisions of labor; construction of sexuality and gender within global movements; the migrations of people, capital, and culture. **Prerequisite:** upper-division standing or consent of instructor.

CGS 102. Selected Topics in Critical Gender Studies (4)

An interdisciplinary course focusing on one of a variety of topics in gender studies, such as gender and science, the body, reproductive technologies, public policy. May be taken for credit three times when topics vary. **Prerequisite:** upper-division standing or consent of instructor.

CGS 103. Feminist Theory (4)

An interdisciplinary course in feminist theory. Topics may range from a general survey of feminist theory in a variety of disciplines to a more focused interdisciplinary theoretical topic such as postmodernism and feminism. May be taken for credit three times when topics vary. **Prerequisite:** upper-division standing or consent of instructor.

CGS 104. Advanced Topics in Comparative Perspectives (4)

Focuses on the relationship between gender and culture from a multiplicity of perspectives. Possible topics could include gender and ethnicity, gender across class, and other topics to be examined in a cross-cultural framework. May be taken for credit two times when topics vary. **Prerequisite:** upper-division standing or consent of instructor.

CGS 105. Queer Theory (4)

Examines the different methodological and disciplinary histories that together constitute the interdisciplinary project called queer studies. Of particular interest will be how these different methodologies and history construe and construct the relations between gender, race, class, and nation. **Prerequisite:** upper-division standing or consent of instructor.

CGS 106. Gender Equality and the Law (4)

Explores the legal treatment of discrimination on the basis of gender, including equal protection doctrine and some statutory law such as Title VII. Topics include the meaning of gender equality in such areas as single-sex education, military service, sexual harassment, discrimination on the basis of pregnancy, and other current issues. **Prerequisite:** upper-division standing or consent of instructor.

CGS 107. Gender and Reproductive Rights (4)

Legal treatment of gender, reproductive rights, and the family, particularly as evolving law, primarily in the U.S., has created conflicting rights, roles, and responsibilities. Topics include abortion, fetal rights, surrogacy, marriage, and child custody issues. **Prerequisite:** upper-division standing or consent of instructor.

CGS 109B. Gender and Information Technology (4)

Explores how gender and racialized gender affect and are affected by information technology. Through the use of feminist and race-critical approaches, the course examines the impact of information technology on workplaces, the family, gender identity, and the environment. **Prerequisite:** upper-division standing or consent of instructor.

CGS 110. Gender and Sexuality in Sports (4)

Examines gender and sexuality in the world of sports. Topics may include Title IX and sports; sports, gender and race; sports in school; masculinity and sports; femininity and sports; sports through international comparison. **Prerequisite:** upper-division standing or consent of instructor.

CGS 111. Gender and the Body (4)

Various approaches to the study of gendered bodies. Possible topics to include masculinities/femininities; life-cycles; biology, culture, and identity; medical discourses; and health issues. May be taken for credit three times when topics vary. **Prerequisite:** upper-division standing or consent of instructor.

CGS 112. Sexuality and Nation (4)

(Cross-listed with ETHN 127.) This course explores the nexus of sex, race, ethnicity, gender, and nation and considers their influence on identity; sexuality; migration movement and borders; and other social, cultural, and political issues that these constructs affect. **Prerequisite:** upper-division standing or consent of instructor.

CGS 113. Gender and Sexuality in the Arts (4)

Examines gender and sexuality in artistic practices: music, theater, dance, performance, visual arts, and new media. Topics may include study of specific artists,

historical moments, genres, cross-cultural analyses, and multiculturalism. May be taken three times when topics vary. **Prerequisite:** upper-division standing or consent of instructor.

CGS 190. Honors Seminar (4)

Interdisciplinary readings in feminist theory and research methodology to prepare students for writing an honors thesis. Open to critical gender studies majors who have been admitted to Critical Gender Studies Honors Program. May be applied toward primary concentration in critical gender studies major. **Prerequisites:** admission to Critical Gender Studies Honors Program and department stamp required.

CGS 192: Senior Seminar in Critical Gender Studies (1)

The senior seminar is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in critical gender studies (at the upper-division level). Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times with a change in topic and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** upper-division standing; department stamp and/or consent of instructor.

CGS 196A. Critical Gender Studies Honors Research (4)

A program of independent study providing candidates for critical gender studies honors to develop, in consultation with an advisor, a preliminary proposal for the honors thesis. An IP grade will be awarded at the end of this quarter. A final grade for both quarters will be given upon completion of Critical Gender Studies 196B. **Prerequisites:** consent of instructor and department stamp required.

CGS 196B. Honors Thesis (4)

Honors thesis research and writing for students who have completed Critical Gender Studies 190 and 196A. A letter grade for both Critical Gender Studies 196A and 196B will be given at the completion of this quarter. **Prerequisites:** consent of instructor and department stamp required.

CGS 198. Directed Group Study (4)

Directed group study on a topic not generally included in the Critical Gender Studies curriculum. **Prerequisites:** consent of instructor and director of Critical Gender Studies Program and department stamp required.

CGS 199. Independent Study (4)

Tutorial; independent study on a topic not generally included in the curriculum. **Prerequisites:** consent of instructor and director of Critical Gender Studies Program and department stamp required.

CGS 500. Apprentice Teaching in Critical Gender Studies (4)

Consideration of pedagogical methods appropriate to undergraduate teaching in Critical Gender Studies courses under supervision of instructor of course. Instructor will define apprentice's responsibilities in preparing class presentations, directing student discussions, evaluating and grading students' work, and maintaining productive association with students.

APPLICABLE AND PETITIONABLE COURSES

Departmental courses available to CGS majors and minors fall into two categories. Applicable courses are those approved as always applying to the CGS major and minor. Petitionable courses are either new and therefore not yet approved as applicable or are "topics" courses that focus on gender only in particular quarters. Petitionable courses may be approved by petition to the major/minor during the quarters in which they appear in the CGS quarterly lists.

QUARTERLY LISTS

Each quarter, when the upcoming quarter's *Schedule of Classes* is published, the Critical

Gender Studies quarterly list is available in the CGS office and on the Web site. It is an important, comprehensive source of information about CGS course offerings as well as those from departments throughout the campus. It identifies by cluster areas both applicable as well as petitionable courses for a given quarter. For reference, the office and the Web site maintain archives of quarterly lists.

CRITICAL GENDER STUDIES APPLICABLE COURSES

(Note: Only applicable courses are listed here. For petitionable courses, please see the quarterly lists)

SOCIAL SCIENCE COURSES

ANSC 125. Gender, Sexuality, and Society

COCU 123. Black Women Filmmakers

COCU 132. Gender and Media

COCU 137. Politics of Bodies

COCU 138. Feminist Theory

COCU 139. Reproductive Discourse and Gender

COCU 141B. Media and Technology: Gender and Biomedicine

COCU 160. Performance and Cultural Studies

COCU 163. Popular Culture in Contemporary Life

COHI 136. Gender and Science

COSF 124. Black Women, Feminism, and the Media

COSF 185. Gender, Labor, and Culture in the Global Economy

ETHN 129. Asian and Latina Immigrant Workers in the Global Economy

ETHN 128. Hip Hop: The Politics of Culture

ETHN 165. Sex and Gender in African American Communities

ETHN 183. Gender, Race, Ethnicity, and Class

LIGN 174. Gender and Language in Society

POLI 104M. Law and Sex

POLI 115A. Gender and Politics

POLI 116A. Feminist Theory

PSYCH 134. Eating Disorders

PSYCH 172. The Psychology of Human Sexuality

SOC/B 113. Sociology of the AIDS Epidemic

SOC/B 118. Sociology of Gender and Roles

SOC/B 118A. Gender and Language in Society

SOC/B 119. Sociology of Sexuality and Sexual Identities

SOC/C 129. The Family

SOC/C 132. Gender and Work

SOC/C 139. Social Inequality: Class, Race, and Gender

SOC/C 184. Gender and Film

ARTS AND HUMANITIES COURSES

HIEA 125. Women and Gender in East Asia

HIEA 137. Women and Family in Chinese History

HIEA 162/262. History of Women in China

HIEU 133. Gender in Antiquity and the Early Medieval Mediterranean

HIEU 147. The History of Women in Europe: Middle Ages to the Early Modern Era

HIEU 147A. Women in the Middle Ages

HIEU 148. European Women: The Enlightenment to the Victorian Era

HIEU 149. History of Women in Europe: 1870 to Present

HIEU 180. Topics in European Women's History

HILA 124A. History of Women and Gender in Latin America

HILA 161. History of Women in Latin America

HILA 164/264. Women's Work and Family Life in Latin America

HISC 103. Gender and Science in Historical Perspective

HISC 118. History of Sexology

HISC 167/267. Gender and Science

HITO 106. Love and Family in the Jewish Past

HIUS 115. History of Sexuality in the United States

HIUS 130. Cultural History from 1607 to the Civil War

HIUS 131. Cultural History from the Civil War to the Present

HIUS 156. American Women, American Womanhood

HIUS 157. American Women, American Womanhood 1870 to Present

HIUS 173. Topics in American Women's History

HIUS 176. Race and Sexual Politics

LTAM 105. Gender and Sexuality in Latino/a Cultural Production

LTAM 106. Modern Chicana and Mexican Women Writings

LTCS 130. Gender, Race/Ethnicity, Class, and Culture

LTCS 135. Interdisciplinary Approaches to Lesbian, Gay, Bisexual, and Transgendered Studies

LTCS 115. Performance Culture

LTCS 131. Topics in Queer Cultures/Queer Subcultures

LTCS 132. Special Topics in Social Identities and the Media

LTCS 172. Special Topics in Screening Race/Ethnicity, Gender, and Sexuality

LTEA 143. Gender and Sexuality in Korean Literature and Culture

LTEN 120E. Women in the Eighteenth Century

LTEN 146. Women and English/American Literature

LTEN 150. Gender, Text, and Culture

LTEN 185. Themes in African American Literature

LTEU 147. Women in Italy

LTSP 175. Gender, Sexuality, and Culture

LTWL 102. Women in Antiquity

LTWL 155. Gender Studies

LTWL 160. Women and Literature

MUSIC 115. Women in Music

TDHT 112. Gay and Lesbian Themes in U.S. Latino Theatre

VIS 117B. Theories of Representation

VIS 117H. Constructing Gender in Fifth-Century B.C. Athens and Eighteenth-Century France

Culture, Art, and Technology

OFFICE: Pepper Canyon Hall, Second Floor
<http://sixth.ucsd.edu/>

The Sixth College core sequence in Culture, Art, and Technology offers an opportunity for students to explore the ways in which human beings have come to express and shape themselves and their world through their own creations. The core sequence takes an interdisciplinary, integrated approach to the college theme, with students examining a series of problems and issues from multiple perspectives. These issues center on how culture, art, and technology have developed over time in different societies, how they interact with each other, how human beings have used them to address challenges and how their uses have generated fresh challenges by reshaping peoples' relationships to each other and to their environment. The sequence spans the whole range of human experience, from the prehistoric through the present, ending with a consideration of future possibilities.

The college writing program is imbedded in the core sequence, with writing-intensive quarters in CAT 2 and CAT 3. Students learn to use writing to probe and experiment with new ideas as well as to express themselves clearly and effectively to others in their own voices. The core sequence provides students with instruction and multiple opportunities for practice so they may develop a repertoire of strategies and tools for communication.

Students in CAT learn through a combination of lectures, discussions, questions, readings, guest speakers, hands-on activities, writing assignments, and multimedia projects. Sixth College offers a learning environment that extends beyond the classroom and emphasizes teamwork, critical thinking, close reading, pattern recognition, and creative approaches to problems, drawing on models and methods from a variety of fields.

The core sequence prepares Sixth College students to become self-motivated, lifelong learners. They will have broadened and deepened their visions of themselves and the world and will have developed an appreciation of the diversity and powers both of ideas and of the social body. Through inquiry into problems and issues of Culture, Art, and Technology, our students will know how to ask and answer. Good questions lead not just to answers but to more penetrating, more fruitful questions and approaches to problems, which can then lead in many cases to more effective solutions.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

CAT 1. Culture, Art, and Technology 1 (4)

A global historical overview of principles and patterns of human development, with emphasis on technology and the arts. Traces causes and consequences of cultural variation. Explores interactions of regional environments (geographic, climatic, biological) with social and cultural forces. **Prerequisites:** Sixth College students only; may be taken concurrently with SDCC 1.

CAT 2. Culture, Art, and Technology 2 (6)

Fundamental shifts in one area of endeavor can have a profound impact on whole cultures. Examines select events, technologies, and works of art that revolutionized ways of inhabiting the world. Intensive instructions in university-level writing: featured sections on information literacy. **Prerequisites:** completion of UC Entry Level Writing requirement and CAT 1; Sixth College students only.

CAT 3. Culture, Art, and Technology 3 (6)

Students engage with various interdisciplinary modes of apprehending the near-future. Working in teams on community projects, they are challenged to listen and communicate across cultures and develop cogent technological and artistic responses to local problems. Writing and information literacy instruction. **Prerequisites:** CAT 1, CAT 2; Sixth College students only.

CAT 24. Introduction to Special Projects/Topics (2 or 4)

Lower-division students are introduced to projects/topics exploring the interplay of culture, art, and technology. Topics and projects will vary. **Prerequisite:** consent of instructor.

CAT 87. Freshman Seminar (1)

The freshman seminar program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students with preference given to entering freshmen. **Prerequisites:** none.

CAT 97. Culture, Art, and Technology Lower-Division Internship (2 or 4)

Course designated for lower-division Sixth College students to have the opportunity to work on a community-based or industry-based project supervised by a faculty member and community or industry mentor. **Prerequisites:** lower-division standing and cumulative GPA of 3.0.

CAT 98. Culture, Art, and Technology Lower-Division Group Study (2 or 4)

Course designated for lower-division Sixth College students to have the opportunity to work together as a group or team on a project supervised by a faculty member in a specific department, not included in a regular curriculum, where group emphasis would be more beneficial and constructive than individual special studies. **Prerequisites:** lower-division standing and cumulative GPA of 3.0.

CAT 99. Culture, Art, and Technology Lower-Division Independent Research (2 or 4)

Course designated for lower-division Sixth College students to have the opportunity to work on a research project supervised by a faculty member in a specific department, where the subject of content of the project cannot be represented by the academic department or faculty member. **Prerequisites:** lower-division standing and cumulative GPA of 3.0.

UPPER-DIVISION

CAT 124. Sixth College Practicum (4)

Students initiate, plan, and carry out community-based and/or research-based projects that connect classroom-based experiences and knowledge to the outlying community, and that explicitly explore the interplay of culture, art, and technology. **Prerequisites:** upper-division standing and consent of instructor.

CAT 124P. Sixth College Practicum (2,4)

Students initiate, plan, and carry out community-based and/or research-based projects that connect classroom-based experiences and knowledge to the outlying community, and that explicitly explore the interplay of culture, art, and technology. Topics and projects will vary. Some projects may last more than one quarter. **Prerequisites:** upper-division standing and consent of instructor. P/NP grading option only.

CAT 125. Sixth Practicum Writing (4)

Writing to report and reflect on the practicum experience. Students will link general education to practicum projects, practice communicating with people of various constituencies; use writing as a tool for penetrating culture and for understanding self in relation to community. **Prerequisites:** upper-division standing, completion of CAT 1, 2, and 3 or (for transfer students) completion of general-education requirements, including lower-division writing requirement. Completion of the Practicum course/project. CAT 125 should be taken within one quarter of completion of the practicum project (CAT 124).

CAT 192. Senior Seminar in Culture, Art, and Technology (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in Culture, Art, and Technology (at the upper-division level). Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times with a change in topic and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** upper-division standing; departmental stamp and/or consent of instructor.

CAT 195. Apprentice Teaching (4)

Undergraduate instructional assistance. Responsibilities in areas of learning and instruction. May collect course material and assist with course projects, digital workshops, and collection, organization and analysis of formative assessment data. **Prerequisites:** upper-division standing; 3.0 cumulative GPA; consent of instructor.

CAT 197. Culture, Art, and Technology Field Studies (4)

Supervised community-based or industry-based field work. Designated for Sixth College students to have the opportunity to work on a community-based or industry-based project supervised by a faculty member and community or industry mentor, where the subject/content of the project cannot be represented by a specific academic department. Students will submit written evaluations each week of their ongoing field study. **Prerequisites:** upper-division standing, completion of CAT 1, 2, and 3 or (for transfer students) completion of general-education requirements, including lower-division writing requirement.

CAT 198. Culture, Art, and Technology Directed Group Studies (4)

Directed group studies or, in group, field studies of a creative project. Designated for Sixth College students to have the opportunity to work together as a group or team on a project supervised by a faculty member in a specific department, not included in a regular curriculum, where group emphasis would be more beneficial and constructive than individual special studies. **Prerequisites:** upper-division standing, completion of CAT 1, 2, and 3 or (for transfer students) completion of general-education requirements, including lower-division writing requirement.

CAT 199. Culture, Art, and Technology Independent Studies (4)

Individual independent research or creative project. Designated for Sixth College students to have the opportunity to work on a project supervised by a faculty member in a specific department, where the subject or content of the project cannot be represented by the academic department of the faculty member. **Prerequisites:** upper-division standing, completion of CAT 1, 2, and 3 or (for transfer students) completion of general-education requirements, including lower-division writing requirement.

Dimensions of Culture

OFFICE: 132 Sequoyah Hall, Marshall College
(858) 534-2742

<http://marshall.ucsd.edu/current/doc>

The Dimensions of Culture program (DOC) is a multidisciplinary, issues-oriented, writing-intensive three-quarter social science and humanities sequence required of all first-year students at Thurgood Marshall College. Successful completion of the DOC sequence satisfies the University of California writing requirement.

DOC's course content closely identifies with the educational philosophy and goals of Thurgood Marshall College, in particular its concerns for social justice, the history and cultural experience of minorities and otherwise underrepresented groups, and the development of intelligent citizenship. Central to the course objective is the question of how scholars move from knowledge to action.

Offered each fall, DOC 1, "Diversity," introduces students to basic distinctions in academic inquiry about systematic social differences among human individuals and groups. The aim is to convey a range of stratifications that shape our human attachments to self, work, community, and nation; in short, a descriptive sociology of our differences as they intersect along lines of race, ethnicity, class, gender, religion, and ability—themes that DOC 2 and DOC 3 will revisit from different academic perspectives.

DOC 2, "Justice," offered each winter quarter, introduces students to fundamental concepts in political and social theory and moral philosophy, presenting them in concrete historical and contemporary social contexts. The course provides special focus on political and constitutional implications of American diversity and pluralistic society. Course readings include numerous original sources, especially Supreme Court opinions, as well as pieces drawn from the rich field of American history.

DOC 3, "Imagination," presented each spring, investigates the ways in which these same publicly significant social differences examined in DOC 1 and DOC 2 have been imagined and re-imagined in a wide variety of cultural productions. In particular, they will examine how primary texts such as films, television, short stories, poetry, music, technology, journalism, and advertisements imaginatively represent public tensions in the U.S. as they have emerged and changed over time.

Satisfaction of the UC Entry Level Writing requirement (formerly called the Subject A requirement) is a prerequisite for both DOC 2 and DOC 3. Transfer students should see their college academic advisor regarding which DOC courses are required of them.

For further details on Marshall College requirements, see "[Marshall College, General-Education Requirements.](#)"

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

1. Dimensions of Culture: Diversity (4)

This course focuses on sociocultural diversity in examining class, ethnicity, race, gender, and sexuality as significant markers of differences among persons. Emphasizing American society, it explores the cultural understandings of diversity and its economic, moral, and political consequences. Three hours of lecture, one hour of discussion. Open to Marshall College students only. (Letter grade only.) (F)

2. Dimensions of Culture: Justice (6)

This course considers the nature of justice in philosophical, historical, and legal terms. Topics include racial justice, political representation, economic justice, gender and justice, the rights of cultural minorities, and crime and punishment. The course offers intensive instruction in writing university-level expository prose. Three hours of lecture, two hours of discussion and writing instruction. Open to Marshall College students only. (Letter grade only.) **Prerequisite:** completion of UC Entry Level Writing requirement. (W)

3. Dimensions of Culture: Imagination (6)

Using the arts, this course examines the evolution of pluralistic culture to the modern period. There is a special emphasis on the interdisciplinary study of twentieth-century American culture, including music, literature, art, film, and photography. The course offers intensive instruction in writing university-level expository prose. Three hours of lecture, two hours of discussion and writing instruction. Open to Marshall College students only. (Letter grade only.) **Prerequisite:** completion of UC Entry Level Writing requirement. (S)

Economics

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ECONOMICS STUDENT SERVICES:

245 Sequoyah Hall
<http://economics.ucsd.edu>

INTRODUCTION

Economics is the study of how individuals, organizations, and societies deal with scarcity—the fact that resources are not sufficient to satisfy everyone's wants. Because scarcity requires choice among alternative uses of resources, economists study both the technology by which resources are turned into the products people want and the preferences through which people choose among alternatives. Further, since society is composed of many individuals and groups, economists study markets, governments, and other institutions through which a society might gain the advantages of cooperation and resolve the conflicts due to competing goals. The economics curriculum develops tools and uses them to analyze a wide range of societal problems, and also to study the role of the government in solving these problems.

Economics is a different discipline from business administration. However, there are substantial overlaps. Both disciplines study the behavior of people and firms within the context of market, legal, and other institutions. In evaluating economic institutions, economists tend to emphasize the viewpoint of the larger society, and business scholars tend to emphasize the viewpoint of firms.

Information on the undergraduate program can be found on the undergraduate program's Web site at <http://economics.ucsd.edu/ugrad/index.php>. The Web site contains answers to frequently asked questions, gives practical tips for avoiding problems, and provides a more detailed discussion of the department's majors than is possible in the general catalog. It is important for students contemplating a major in the department to be familiar with the Web site and the prerequisite requirements listed therein. Time-sensitive information, job and internship announcements, and other important information are sent to all declared majors and minors through campus e-mail.

Students interested in the Education Abroad Program (EAP) are encouraged to check out the brochure *Opportunities in Business and Economics* that is available at the EAP office.

Transfer students should see the department Web site at <http://economics.ucsd.edu/ugrad/ugradTransStudInfo/index.php>.

THE UNDERGRADUATE PROGRAM

LOWER-DIVISION ECONOMIC COURSES

Microeconomics and Macroeconomics—ECON. 1-2-3

The department offers three lower-division economics classes, ECON 1-2-3. ECON 1 is an introduction to the study of the economic system from the micro, or individual decision maker's perspective. The focus of ECON 1 is the allocation of resources and the distribution of income in perfectly competitive markets. ECON 2 is a continuation of the study of microeconomics with a focus on the allocation of resources in monopoly and other imperfectly competitive markets, market imperfections, and the role of government in markets. ECON 3 introduces macroeconomics: unemployment, inflation, business cycles, and monetary and fiscal policy. ECON 1 is a prerequisite for both ECON 2 and ECON 3. ECON 2 and ECON 3 can be taken in any order and may be taken concurrently.

ACCOUNTING COURSE

The department offers an accounting course, ECON 4. ECON 4 is a lower-division requirement for the B.S. in management science and the management science minor. ECON 4 is open to students who take no other courses from the department.

UPPER-DIVISION ECONOMICS CORE COURSES

The upper-division economics and management science core courses are expected to be offered according to the following academic schedule:

Fall—100A-B-C, 110A, 120A-B-C, 171, 172A, and 173A
Winter—100A-B-C, 110A-B, 120A-B-C, 172A-B, and 173A-B
Spring—100A-B-C, 110B, 120A-B-C, 171, 172B, and 173B

The 100, 110, 120, 172, and 173 core courses are sequential. That is, A must be taken before B and when applicable B before C.

ENTRY TO THE MAJORS

Any student in good standing may declare a major in the department. The major codes are as follows: Economics, EN 25; Management Science, EN 26; and Joint Mathematics-Economics, EN 28.

THE ECONOMICS MAJOR (B.A.)

The economics B.A. program is designed to provide a broad understanding of resource-allocation and income-determination mechanisms. Both the development of the tools of economic analysis and their application to contemporary problems and public policy are stressed.

When choosing which mathematics series to take, Math. 10A-B-C or Math. 20A-B-C, it is important to remember that only Math. 20A-B-C allows students access to Math. 20F and several upper-division Math. courses that are recommended as preparation for Ph.D. study in economics and business administration, as well as for graduate studies for professional management degrees, including the MBA. Therefore, while we require economics

majors to take Math. 10A-B-C, we recommend that economics students take Math. 20A-B-C.

A student majoring in economics must meet the following requirements:

1. Lower-division mathematics courses.
Math. 10A-B-C (required) or Math. 20A-B-C (recommended).
2. Lower-division economics courses. ECON 1 and ECON 3.
3. Upper-division economics core courses. ECON 100A-B-C (microeconomics), ECON 110A-B (macroeconomics), and ECON 120A-B-C (econometrics).
4. Upper-division economics electives. Five more economics courses at the upper-division level. *At least two of these elective courses must be "advanced electives."* The economics advanced electives are

ECON 103. International Monetary Relations

ECON 104. Economics of Network Industries

ECON 105. Industrial Organization and Firm Strategy

ECON 109. Game Theory

ECON 113. Mathematical Economics

**ECON 119. Law and Economics:
Contracts and Corporations**

ECON 121. Applied Econometrics

ECON 125. Demographic Analysis and Forecasting

ECON 141. Economics of Health Consumers

ECON 142. Behavioral Economics

ECON 143. Experimental Economics

ECON 147. Economics of Education

ECON 150. Public Economics: Taxation

ECON 151. Public Economics: Expenditures I

ECON 152. Public Economics: Expenditures II

ECON 155. Political Economics

ECON 171. Decisions Under Uncertainty

ECON 172A. Operations Research A

ECON 172B. Operations Research B

ECON 173A. Financial Markets

ECON 173B. Corporate Finance

ECON 174. Financial Risk Management

ECON 176. Marketing

ECON 178. Economic and Business Forecasting

Note that many of these advanced economics electives recommend 100C as a prerequisite for the class. In the fall quarter of 2010, 100C will become a prerequisite for the advanced electives that currently only recommend 100C as a prerequisite. Therefore, economics majors are strongly encouraged to take ECON 100A-B-C and either ECON 110A-B or ECON 120A-B-C in their sophomore year.

The following schedule, though not the only possibility, is a well-constructed one for majoring in economics.

FRESHMAN YEAR

ECON 1 and ECON 3
Math. 10A-B-C (required) or
Math. 20A-B-C (recommended)

SOPHOMORE YEAR

ECON 100A-B-C
ECON 120A-B-C

JUNIOR YEAR

ECON 110A-B
Economics Electives

SENIOR YEAR

Economics Electives

A detailed description of the economics major is available in the Undergraduate Program section of the department Web site at <http://economics.ucsd.edu/ugrad/index.php>.

THE MANAGEMENT SCIENCE MAJOR (B.S.C.)

Management science builds on a set of related quantitative methods commonly used to solve problems arising in the private (business and finance) and public (government) sectors. While students will gain some familiarity with the traditional functional fields of business management, this program is more tightly focused and more quantitative than a traditional business administration major. It is not, however, a program in applied mathematics or operational research, since the economic interpretation and application of the tools are continually stressed. Rather, it is a quantitative major in applied economics with a management focus.

A student majoring in management science must meet the following requirements:

1. Lower-division mathematics courses. Math. 20A-B-C and Math. 20F.
2. Lower-division economics courses. ECON 1, ECON 3, and ECON 4.
3. Upper-division economics core courses. ECON 100A-B-C (microeconomics), ECON 120A-B-C (econometrics), ECON 171 (decisions under uncertainty), ECON 172A-B (operations research) and ECON 173A-B (finance).
4. Upper-division economics electives. Four more economics courses at the upper-division level. *At least two of these elective courses must be "advanced electives."* The management science advanced electives are

ECON 103. International Monetary Relations

ECON 104. Economics of Network Industries

ECON 105. Industrial Organization and Firm Strategy

ECON 109. Game Theory

ECON 113. Mathematical Economics

**ECON 119. Law and Economics:
Contracts and Corporations**

ECON 121. Applied Econometrics

ECON 125. Demographic Analysis and Forecasting

ECON 150. Public Economics: Taxation

ECON 151. Public Economics: Expenditures I

ECON 152. Public Economics: Expenditures II

ECON 155. Political Economics

ECON 174. Financial Risk Management

ECON 176. Marketing

ECON 178. Economic and Business Forecasting

Note that many of these advanced management science electives recommend 100C as a prerequisite for the class. In the fall quarter of 2010, 100C will become a prerequisite for the advanced electives that currently only recommend 100C as a prerequisite. Therefore, management science majors are strongly encouraged to take ECON 100A-B-C and ECON 120A-B-C in their sophomore year. The following schedule, though not the only possibility, is a well-constructed one for a student majoring in management science.

FRESHMAN YEAR

ECON 1 and ECON 3
ECON 4
Math. 20A-B-C

SOPHOMORE YEAR

ECON 100A-B-C
ECON 120A-B-C
Math. 20F

JUNIOR YEAR

ECON 171
ECON 172A-B
ECON 173A-B
Economics Electives

SENIOR YEAR

Economics Electives

A detailed description of the management science is available in the Undergraduate Program section of the department Web site at <http://economics.ucsd.edu/ugrad/index.php>.

JOINT MAJOR IN MATHEMATICS AND ECONOMICS (B.S.C.)

This major is considered to be excellent preparation for the Ph.D. study in economics and business administration, as well as for graduate studies for professional management degrees, including the M.B.A.

Majors in economics generally recognize the importance of mathematics to their discipline. Undergraduate students who plan to pursue doctoral study in economics or business need the more advanced mathematics training prescribed in this major. Majors in mathematics often feel the need for a more formal introduction to issues involving business applications of science and mathematics. Extending their studies into economics provides this application and can provide a bridge to successful careers or advanced study. This major provides a formal framework making it easier to combine study in economics and mathematics.

Course requirements of the joint major in mathematics and economics consist principally of the required courses of the mathematics major and the economics/management science majors:

Lower-Division Requirements

- One of the following sequences:
 - Calculus and Linear Algebra. Math. 20A-B-C-D and 20F
 - Honors Calculus. Math. 31AH-BH, Math 20D
- Introductory economics. ECON 1 and ECON 3.

Upper-Division Requirements

Fifteen upper-division courses in mathematics and economics, with a minimum of seven courses from one department and eight from the other department, chosen from the courses listed below (prerequisites are strictly enforced):

- Mathematical Reasoning. Math. 109 (**Note:** Students completing Math. 31CH may substitute a four-unit upper-division math. elective for Math. 109.)
- One of the following:
 - Applied Linear Algebra. Math. 102
 - Numerical Linear Algebra. Math. 170A
 - Modern Algebra. Math. 100A-B
- One of the following:
 - Foundations of Analysis. Math. 140A
 - Advanced Calculus. Math. 142A
- One of the following:
 - Ordinary Differential Equations. Math. 130A
 - Foundations of Analysis. Math. 140B
 - Advanced Calculus. Math. 142B
- Microeconomics. ECON 100A-B-C
- Econometrics/Statistics. One of the following:
 - ECON 120A-B-C
 - Math. 180A and ECON 120B-C
 - Math. 180A and 181A and ECON 120C
- One of the following:
 - Macroeconomics. ECON 110A-B
 - Mathematical Programming: Numerical Optimization. Mathematics 171A-B
 - Introduction to Operations Research. ECON 172A-B
 - Decisions Under Uncertainty. ECON 171 and Introduction to Operations Research. ECON 172A

When choosing across the Math. 140 or the Math. 142 series, it is recommended that students take Math. 142. Other courses which are strongly recommended are Math. 130B, 131, 181B, 190, and 193A-B and ECON 109, 113, 173A-B, 174, and 178.

Further information may be obtained in the mathematics and economics undergraduate advising offices.

HONORS

Economics Majors

To graduate with the phrase “with distinction” on your diploma, you must complete two additional advanced electives (for a total of seven electives, four of which are advanced). You must also have an upper-division GPA in your major greater than or equal to 3.5. The upper-division major GPA will only include grades for courses taken at universities in the UC system and through EAP.

To graduate with the phrase “with highest distinction” on your diploma, you must complete two additional advanced electives (for a total of seven electives, four of which are advanced), take the honors sections of at least two upper-division courses (ECON 100AH-BH-CH, ECON 110AH-BH, and ECON 120AH-BH-CH), and take the Senior Essay Seminar (ECON 191A-B). You must also have an upper-division GPA in your major greater than or equal to 3.5. The major GPA in your honors sections and ECON 191A-B must be 3.5 or above. Admission to honors sections and ECON 191A-B is by special permission; check with the undergraduate advisors in the Economics Student Services Office. Note that we generally offer A honors sections in the fall, B honors sections in the winter, and the C honors sections in the spring.

Management Science Majors

To graduate with the phrase “with distinction” on your diploma, you must have an upper-division GPA in your major greater than or equal to 3.5. The upper-division major GPA will only include grades for courses taken at universities in the UC system and through EAP.

To graduate with the phrase “with highest distinction” on your diploma, you must complete the honors sections of at least two upper-division courses (ECON 100AH-BH-CH or ECON 120AH-BH-CH), and take the Senior Essay Seminar (ECON 191A-B). You must also have an upper-division GPA in your major greater than or equal to 3.5. The major GPA in your honors sections and ECON 191A-B must be 3.5 or above. Admission to honors sections and ECON 191A-B is by special permission; check with the undergraduate advisors in the Economics Student Services Office. Note that we generally offer A honors sections in the fall, B honors sections in the winter, and the C honors sections in the spring.

Joint Mathematics/Economics Majors

To graduate with honors requires the following:

- At least one quarter of the Student Colloquium, Math. 196. (**Note:** Math. 196 is only offered in the fall quarter.)
- At least one Economics honors course: ECON 100AH, 100BH, 100CH, 110AH, 110BH, 120AH, 120BH, 120CH. [**Note:** enrollment in these honors classes is by special permission; check with the undergraduate advisors in the Economics Student Services Office, (SH 245).]
- An Honors Thesis. The research and writing of the thesis will be conducted over two quarters of the senior year under the supervision of a faculty advisor. The completed thesis must be approved by the Joint Mathematics and Economics Honors Committee, which comprises the Mathematics Honors Committee and the Economics Honors Committee, and presented orally at the Undergraduate Research Conference or another appropriate occasion.

- If the student is a declared major in the mathematics department (MA33), this thesis will be credited as eight units of Math. 199H. Enrollment in Math. 199H is by special permission; check with the advisors in the

mathematics department Undergraduate Affairs Office (AP&M 7018) or the Mathematics Advising Office (AP&M 6016).

- If the student is a declared major in the economics department (EN28), the student must enroll in ECON 191A-B. Enrollment in ECON 191 is by special permission; check with the undergraduate advisors in the Economics Student Services Office (SH 245).
- A minimum GPA of 3.0 overall, 3.5 in the upper-division courses required for the major and a 3.5 in the following four classes: Math. 196, Economics Honors class, and either ECON 191A-B or two quarters of Math. 199H.

The Joint Mathematics and Economics Honors Committee will determine the level of honors to be awarded, based on the student's GPA in the major and the quality of the honors work.

GRADE RULES FOR MAJORS

All courses used in meeting requirements for a departmental major must be taken on a letter-grade basis, and must be passed with a grade of C– (C minus) or better. These rules apply to lower-division courses, upper-division courses, and to required courses taken from other departments (such as required mathematics courses). Exceptions are ECON 195, ECON 198, and ECON 199, for which P/NP grading is mandatory. No more than twelve units of ECON 195, ECON 198, and ECON 199 taken P/NP may be counted toward a major. Further, no more than eight units of ECON 195 may be counted toward a major.

ECONOMICS DEPARTMENT RESIDENCY REQUIREMENT

To receive a bachelor of arts or bachelor of science degree from the economics department, all students must pass with a C– (C minus) or better at least nine of the required upper-division courses (at least four units each) for the major, taken through the UCSD economics department, while officially enrolled at UCSD, to satisfy the residency requirement.

ADVANCED PLACEMENT CREDITS

Because no high school economics course provides the kind of background needed for upper-division economics and management science courses, the department is strict on allowance of credits. The policy is as follows: If the AP score is 5, accept AP Micro (AP Macro) as equivalent to ECON 1 (ECON 3) in meeting major or minor requirements. If the score is 3 or 4, the student is required to take ECON 1 (ECON 3) for the major or minor. There is not an advanced placement exam equivalent to ECON 2.

Minors and Programs of Concentration The economics minor or program of concentration consists of eight courses: introductory microeconomics (ECON 1); microeconomic applications (ECON 2) or ECON 100A; introductory macroeconomics (ECON 3) or ECON 110A; and five additional upper-division economics courses, which are otherwise not restricted.

The management science minor, paralleling the economics minor, consists of nine courses: introductory microeconomics (ECON 1); microeconomic applications (ECON 2) or ECON 100A; introductory

macroeconomics (ECON 3) or ECON 110A; financial accounting (ECON 4), and any additional five classes from the following list (Caution: All courses have prerequisites).

ECON 100A. Microeconomics A
ECON 100B. Microeconomics B
ECON 100C. Microeconomics C
ECON 120A. Econometrics A
ECON 120B. Econometrics B
ECON 120C. Econometrics C
ECON 171. Decisions Under Uncertainty
ECON 172A. Operations Research A
ECON 172B. Operations Research B
ECON 173A. Financial Markets
ECON 173B. Corporate Finance
ECON 174. Financial Risk Management
ECON 176. Marketing
ECON 178. Economic and Business Forecasting

Grades of P/NP are acceptable for minor courses. If courses are taken for a letter grade, passing is considered with a C- (C minus) or better. To declare a minor or program of concentration, complete an Undergraduate Declaration of Minor using the Major/Minor tool found on [TritonLink](#). Students should check with their colleges regarding area of focus, programs of concentration, and project minors.

THE GRADUATE PROGRAM

The department offers a Ph.D. degree in economics, designed to provide a solid, analytically oriented training in microeconomics, macroeconomics, econometrics, and advanced specialties. Since the program is structured as a doctoral program, only students who intend to pursue a doctorate should apply.

The main economics Ph.D. requirements are that a student pass qualifying exams in microeconomics, macroeconomics, econometrics, and select courses of specialization, and prepare an acceptable dissertation.

Detailed descriptions of the Ph.D. program are available on the Internet at the department Web site at <http://economics.ucsd.edu/>. Residence and other campuswide regulations are described in the graduate studies section of this catalog.

DEPARTMENTAL PH.D. TIME LIMIT POLICIES

Students must be advanced to candidacy by the end of five years. Total university support cannot exceed six years. Total registered time at UC San Diego cannot exceed seven years. Students will not be permitted to continue beyond the pre-candidacy and total registered time limits. Students will not be permitted to receive UCSD administered financial support beyond the support limit.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

1. Principles of Microeconomics (4)

Introduction to the study of the economic system. Course will introduce the standard economic models used to examine how individuals and firms make decisions in perfectly competitive markets. Credit not allowed for both ECON 1 and ECON 1A.

2. Market Imperfections and Policy (4)

Analysis of monopoly and imperfectly competitive markets, market imperfections and the role of government. **Prerequisite:** ECON 1 or 1A.

3. Principles of Macroeconomics (4)

Introductory macroeconomics: unemployment, inflation, business cycles, monetary and fiscal policy. Credit not allowed for both ECON 1B and ECON 3. **Prerequisite:** ECON 1 or 1A.

4. Financial Accounting (4)

(Cross-listed with MGT 4.) Recording, organizing, and communicating financial information relating to business entities. No prerequisites.

87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen. May be repeated when course topics vary. (P/NP grades only.)

UPPER-DIVISION

100A. Microeconomics A (4)

Economic analysis of household determination of the demand for goods and services, consumption/saving decisions, and the supply of labor. Credit not allowed for both ECON 100A and ECON 170A. **Prerequisites:** ECON 1A or 1; and Math. 10C or 20C.

100B. Microeconomics B (4)

Analysis of firms' production and costs, the supply of output and demand factors of production. Analysis of perfectly competitive markets. Credit not allowed for both ECON 100B and ECON 170B. **Prerequisite:** ECON 100A or 170A.

100C. Microeconomics C (4)

Analysis of the effects of imperfect market structure, strategy, and imperfect information. **Prerequisite:** ECON 100B or 170B.

100AH. Honors Microeconomics A (1)

Honors sequence expanding on the material taught in ECON 100A. ECON 100A must be taken with ECON 100AH. Credit not allowed for both ECON 100AH and ECON 170AH. GPA of 3.5 or better. **Prerequisite:** department stamp required.

100BH. Honors Microeconomics B (1)

Honors sequence expanding on the material taught in ECON 100B. ECON 100B must be taken with ECON 100BH. Credit not allowed for both ECON 100BH and ECON 170BH. GPA of 3.5 or better. **Prerequisite:** department stamp required.

100CH. Honors Microeconomics C (1)

Honors sequence expanding on the material taught in ECON 100C. ECON 100C must be taken with ECON 100CH. GPA of 3.5 or better. **Prerequisite:** department stamp required.

101. International Trade (4)

Examines theories of international trade in goods and services as well as international migration and capital flows. The course discusses comparative advantage, motives for trade policies, and the effects of trade barriers and trading blocs on income distribution and welfare. **Prerequisites:** ECON 1A-B or 2 or 100B or 170B.

103. International Monetary Relations (4)

Analyzes exchange rates and the current account, and relates their joint determination to financial markets and the domestic macroeconomy. Discusses macroeconomic

policies under different exchange rate regimes and implications for financial stability and current account sustainability. **Prerequisite:** ECON 110B or 173A or 175.

104. Economics of Network Industries (4)

Economics of industries with network effects such as telecommunications, internet, software, and airlines. Analysis of standards, complementarities, switching costs, economies of scale, and optimal price setting in the presence of network effects. ECON 100C is recommended. **Prerequisite:** ECON 100B or 170B.

105. Industrial Organization and Firm Strategy (4)

Theory of monopoly and oligopoly pricing, price discrimination, durable goods pricing, cartel behavior, price wars, strategic entry barriers, mergers, pro- and anti-competitive restraints on business. ECON 100C is recommended. **Prerequisite:** ECON 100B or 170B.

107. Economic Regulation and Antitrust Policy (4)

Detailed treatment of antitrust policy: Sherman Act, price fixing, collusive practices, predatory pricing, price discrimination, double marginalization, exclusive territories, resale price maintenance, refusal to deal, and foreclosure. Theory of regulation and regulatory experience in electrical utilities, oil, telecommunications, broadcasting, etc. **Prerequisites:** ECON 1A-B or 2 or 100B or 170B; and Math. 10C or 20C.

109. Game Theory (4)

Introduction to game theory. Analysis of people's decisions when the consequences of the decisions depend on what other people do. This course features applications in economics, political science, and law. ECON 100C is recommended. **Prerequisite:** ECON 100B or 170B or Math. 109.

110A. Macroeconomics A (4)

Analysis of the determination of long run growth and models of the determination of output, interest rates, and the price level. Analysis of inflation, unemployment, and monetary and fiscal policy. **Prerequisites:** ECON 1A-B or 3; and Math. 10C or 20C.

110B. Macroeconomics B (4)

Analysis of the determination of consumption spending at the aggregate level; extension of the basic macro model to include exchange rates and international trade; the aggregate money supply, and the business cycle. **Prerequisite:** ECON 110A.

110AH. Honors Macroeconomics A (1)

Honors sequence expanding on the material taught in ECON 110A. ECON 110A must be taken with ECON 110AH. GPA of 3.5 or better. **Prerequisite:** department stamp required.

110BH. Honors Macroeconomics B (1)

Honors sequence expanding on the material taught in ECON 110B. ECON 110B must be taken with ECON 110BH. GPA of 3.5 or better. **Prerequisite:** department stamp required.

111. Monetary Economics (4)

Financial structure of the U.S. economy. Bank behavior. Monetary control. **Prerequisites:** ECON 1A-B or 3; and Math. 10A or 20A.

113. Mathematical Economics (4)

Mathematical concepts and techniques used in advanced economic analysis; applications to selected aspects of economic theory. ECON 100C is recommended. **Prerequisite:** ECON 100B or ECON 170B; or Math. 140A or Math. 142A.

114. Economics of Immigration (4)

Impact of immigration on the U.S. economy. Empirical evidence on the labor market and fiscal impacts of immigration. Consequences of U.S. immigration policies on the economy. **Prerequisites:** ECON 1A-B or ECON 1 and 3.

116. Economic Development (4)

Introduction to the economics of less developed countries, covering their international trade, human resources, urbanization, agriculture, income distribution, political economy, and environment. **Prerequisites:** ECON 1A-B or 2 or 100B.

117. Economic Growth (4)

Models of the economic growth of developed economies. **Prerequisite:** ECON 100A or 170A.

118. Law and Economics: Torts, Property, and Crime (4)

Uses economic theory to evaluate the economic effects of U.S. law in several legal fields, including tort law (accidents), products liability law, property law, criminal law (law enforcement), and litigation. Also considers risk bearing and why people buy insurance. Renumbered from ECON 118A. Credit not allowed for both ECON 118 and ECON 118A. **Prerequisites:** ECON 1A-B or 2 or 100A; and Math. 10A or 20A.

119. Law and Economics: Contracts and Corporations (4)

Uses economic theory to evaluate the economic effects of U.S. law in contract law, corporate law (how large firms are organized and governed), debtor-creditor law, and bankruptcy law. ECON 100C and 118 are recommended. **Prerequisite:** ECON 100B or 170B.

120A. Econometrics A (4)

Probability and statistics used in economics. Probability and sampling theory, statistical inference, and use of spreadsheets. Credit not allowed for ECON 120A and any of the following: ECE 109; Math. 180A; Math.183; Math. 186. **Prerequisites:** ECON 1A or 1; and Math. 10C or 20C.

120B. Econometrics B (4)

Basic econometric methods, including the linear regression, hypothesis testing, quantifying uncertainty using confidence intervals, and distinguishing correlation from causality. Credit not allowed for both ECON 120B and Math. 181A. **Prerequisite:** ECON 120A or ECE 109 or Math. 180A or Math. 183 or Math. 186.

120C. Econometrics C (4)

Advanced econometric methods: estimation of linear regression models with endogeneity, economic methods designed for panel data sets, estimation of discrete choice models, time series analysis, and estimation in the presence of autocorrelated and heteroskedastic errors. **Prerequisite:** ECON 120B or Math. 181A.

120AH. Honors Econometrics A (1)

Honors sequence expanding on the material taught in ECON 120A. ECON 120A must be taken with ECON 120AH. GPA of 3.5 or better. **Prerequisite:** department stamp required.

120BH. Honors Econometrics B (1)

Honors sequence expanding on the material taught in ECON 120B. ECON 120B must be taken with ECON 120BH. GPA of 3.5 or better. **Prerequisite:** department stamp required.

120CH. Honors Econometrics C (1)

Honors sequence expanding on the material taught in ECON 120C. ECON 120C must be taken with ECON 120CH. GPA of 3.5 or better. **Prerequisite:** department stamp required.

121. Applied Econometrics (4)

Application of econometric methods to such areas as labor supply, human capital, and financial time series. Concurrent enrollment in ECON 120C is permitted. **Prerequisite:** ECON 120C.

125. Demographic Analysis and Forecasting (4)

Interaction between economic forces and demographic changes are considered, as are demographic composition and analysis; fertility, mortality, and migration processes and trends. Course emphasizes the creation, evaluation, and interpretation of forecasts for states, regions and sub-county areas. ECON 178 is recommended. **Prerequisite:** ECON 120B or Math. 181A.

130. Public Policy (4)

Course uses basic microeconomic tools to discuss a wide variety of public issues, including the war on drugs, global warming, natural resources, health care and safety regulation. Appropriate for majors who have not completed ECON 100A-B-C or ECON 170A-B and students from other departments. **Prerequisites:** ECON 1A-B or 2 or 100A.

131. Economics of the Environment (4)

Environmental issues from an economic perspective. Relation of the environment to economic growth. Management of natural resources, such as forest and fresh

water. Policies on air, water, and toxic waste pollution. International issues such as ozone depletion and sustainable development. **Prerequisites:** ECON 1A-B or 2 or 100A.

132. Energy Economics (4)

Energy from an economic perspective. Fuel cycles for coal, hydro, nuclear, oil, and solar energy. Emphasis on efficiency and control of pollution. Comparison of energy use across sectors and across countries. Global warming. Role of energy in the international economy. **Prerequisites:** ECON 1A-B or 2 or 100A; and Math. 10C or 20C.

133. International Environmental Agreements (4)

Addresses environmental issues that transcend national boundaries, such as climate change, biodiversity loss, over-fishing. Examines why international agreements are required, how they are negotiated and implemented, and studies their effectiveness. Explores whether more effective environmental treaties could be designed. **Prerequisites:** ECON 1A-B or 2 or 100A.

135. Urban Economics (4)

(Cross-listed with USP 102.) Economic analysis of why and where cities develop, problems they cause, and public policies to deal with these problems. Determination of urban land rent/use, reasons for suburbanization. Transportation and congestion in cities, zoning, poverty and housing, urban local government. Credit not allowed for both ECON 135 and USP 102. **Prerequisites:** ECON 1A-B or 2 or 100A; and Math. 10A or 20A.

136. Human Resources (4)

A practical yet theory-based study of the firm's role in managing workers, including issues related to hiring, education and training, promotions, layoffs and buyouts, and the overarching role that worker compensation plays in all of these. **Prerequisite:** ECON 100B or 170B.

139. Labor Economics (4)

Theoretical and empirical analysis of labor markets. Topics include: labor supply, labor demand, human capital investment, wage inequality, labor mobility, immigration, labor market discrimination, labor unions and unemployment. **Prerequisites:** ECON 1A-B or 2 or 100B.

140. Economics of Health Producers (4)

Physician and nurse supply, medical malpractice, incentives to avoid patient injury, patents and pricing in the pharmaceutical industry, not-for-profit firms, and government regulation of healthcare producers. Renumbered from ECON 138A. Credit not allowed for both ECON 140 and ECON 138A. **Prerequisites:** ECON 1A-B or 2 or 100B.

141. Economics of Health Consumers (4)

Demand for health care and health insurance, employer-provision of health insurance and impact on wages and job changes. Cross country comparisons of health systems. ECON 100C is recommended. Renumbered from ECON 138B. Credit not allowed for both ECON 141 and ECON 138B. **Prerequisite:** ECON 100B or 170B.

142. Behavioral Economics (4)

Course will study economic models in which standard economic rationality assumptions are combined with psychologically plausible assumptions on behavior. We consider whether the new models improve ability to predict and understand phenomena including altruism, trust and reciprocity, procrastination, and self-control. ECON 100C is recommended. **Prerequisite:** ECON 100B or 170B.

143. Experimental Economics (4)

Explore use of experiments to study individual and interactive (strategic) decision-making. Topics may include choice over risky alternatives, altruism and reciprocity, allocation and information aggregation in competitive markets, cooperation and collusion, bidding in auctions, strategy in coordination and "outguessing" games. ECON 100C is recommended. **Prerequisite:** ECON 100B or 170B.

144. Economics of Conservation (4)

Examines conservation of biodiversity from an economic perspective. Topics include valuing biodiversity, defining successful conservation, and evaluating the cost effectiveness of policies such as conservation payments, ecotourism, and privatization. Emphasis on forests, coral reefs, elephants, tigers, and sea turtles. **Prerequisites:** ECON 1A-B or 2 or 100A.

145. Economics of Ocean Resources (4)

Economic issues associated with oceans. Economics of managing renewable resources in the oceans, with an emphasis on fisheries, economics of conservation and biodiversity preservation for living marine resources, with an emphasis on whales, dolphins, sea-turtles, and coral reefs. **Prerequisites:** ECON 1A-B or 2 or 100A.

146. Economic Stabilization (4)

Theory of business cycles and techniques used by governments to stabilize an economy. Discussion of recent economic experience. **Prerequisite:** ECON 110B.

147. Economics of Education (4)

Examination of issues in education using theoretical and empirical approaches from economics. Analysis of decisions to invest in education. Consideration of various market structures in education, including school choice and school finance programs. **Prerequisites:** ECON 1A-B or 2 or 100A; and ECON 120B or Math. 181A.

150. Public Economics: Taxation (4)

Overview of the public sector in the U.S. and the scope of government intervention in economic life. Basic principles of taxation, tax incidence, and tax efficiency. Analysis of the U.S. tax system before and after the Tax Reform Act of 1986. ECON 100C is recommended. **Prerequisite:** ECON 100B or 170B.

151. Public Economics: Expenditures I (4)

Overview of the public sector in the U.S. and the scope of government intervention in economic life. Theory of public goods and externalities. Discussion of specific expenditure programs such as education and national defense. ECON 100C is recommended. **Prerequisite:** ECON 100B or 170B.

152. Public Economics: Expenditures II (4)

Overview of the public sector in the U.S. and the justifications for government intervention in economic life. Theory of income redistribution and social insurance. Applications to current policy in such areas as welfare, unemployment insurance, and Social Security. ECON 100C is recommended. Renumbered from ECON 153. Credit not allowed for both ECON 152 and ECON 153. **Prerequisite:** ECON 100B or 170B.

155. Political Economics (4)

An economic analysis of social decision making, including such topics as the desirable scope and size of the public sector, the efficiency of collective decision-making procedures, voting theory and collective vs. market resource allocation. **Prerequisite:** ECON 109.

158. Economic History of the United States I (4)

(Cross-listed with HIUS 140.) The United States as a raw materials producer, as an agrarian society, and as an industrial nation. Emphasis on the logic of the growth process, the social and political tensions accompanying expansion, and nineteenth- and early twentieth-century transformations of American capitalism. Renumbered from 158A. Credit not allowed for ECON 158 and any of the following: ECON 158A; HIUS 140. **Prerequisite:** upper-division standing.

ECON 159. Economic History of the United States II (4)

(Cross-listed with HIUS 141.) The United States as a modern industrial nation. Emphasis on the logic of the growth process, the social and political tensions accompanying expansion, and twentieth-century transformations of American capitalism. Renumbered from 158B. Credit not allowed for ECON 159 and any of the following: ECON 158B; HIUS 141. **Prerequisite:** upper-division standing.

161. Global Integration of Latin America (4)

Examines the integration of Latin American and Caribbean countries into the global economy. Topics include trade in agricultural and manufactured goods, regional trade agreements, international capital flows to Latin America, financial vulnerabilities, and policy responses. **Prerequisites:** ECON 1A-B or ECON 1 and 3.

162. Economics of Mexico (4)

Survey of the Mexican economy. Topics such as economic growth, business cycles, saving-investment balance, financial markets, fiscal and monetary policy, labor markets, industrial structure, international trade, and agricultural policy. **Prerequisites:** ECON 1A-B or ECON 1 and 3.

163. Japanese Economy (4)

Survey of the Japanese economy. Economic growth, business cycles, saving-investment balance, financial markets, fiscal and monetary policy, labor markets, industrial structure, international trade, and agricultural policy. **Prerequisites:** ECON 1A-B or ECON 1 and 3.

165. Middle East Economics (4)

Internal economies of radical religious groups and terrorist organizations. Ottoman economic history, economic demography and migration, Islamic banking, economic development and peace in Palestine, and oil economics. **Prerequisites:** ECON 1A-B or ECON 1 and 3.

171. Decisions Under Uncertainty (4)

Decision-making when the consequences are uncertain. Decision trees, payoff tables, decision criteria, expected utility theory, risk aversion, sample information. **Prerequisites:** ECON 100A or 170A; and ECON 120A or ECE 109 or Math. 180A or Math. 183 or Math. 186.

172A. Operations Research A (4)

Linear and integer programming, elements of zero-sum, two-person game theory, and specific combinatorial algorithms. Credit not allowed for both ECON 172A and Math. 171A. **Prerequisites:** ECON 100A or 170A; and ECON 120A or ECE 109 or Math. 180A or Math. 183 or Math. 186; and Math. 20F.

172B. Operations Research B (4)

Non-linear programming, deterministic and stochastic dynamic programming, queuing theory, search models, and inventory models. Credit not allowed for both ECON 172B and Math. 171B. **Prerequisite:** ECON 172A or Math. 171A.

173A. Financial Markets (4)

Financial market functions, institutions and instruments: stocks, bonds, cash instruments, derivatives (options), etc. Discussion of no-arbitrage arguments, as well as investors' portfolio decisions and the basic risk-return trade-off established in market equilibrium. Renumbered from ECON 175. Credit not allowed for both ECON 173A and ECON 175. **Prerequisites:** ECON 100A or 170A; and ECON 120B or Math. 181A.

173B. Corporate Finance (4)

Introduces the firm's capital budgeting decision, including methods for evaluation and ranking of investment projects, the firm's choice of capital structure, dividend policy decisions, corporate taxes, mergers and acquisitions. Renumbered from ECON 173. Credit not allowed for both ECON 173B and ECON 173. **Prerequisites:** ECON 4; and ECON 173A or 175.

174. Financial Risk Management (4)

Risk measures, hedging techniques, value of risk to firms, estimation of optimal hedge ratio, risk management with options and futures. ECON 171 is recommended. **Prerequisite:** ECON 173A or 175.

176. Marketing (4)

Role of marketing in the economy. Topics such as buyer behavior, marketing mix, promotion, product selection, pricing, and distribution. Concurrent enrollment in ECON 120C is permitted. **Prerequisite:** ECON 120C.

178. Economic and Business Forecasting (4)

Survey of theoretical and practical aspects of statistical and economic forecasting. Such topics as long-run and short-run horizons, leading indicator analysis, econometric models, technological and population forecasts, forecast evaluation, and the use of forecasts for public policy. Concurrent enrollment in ECON 120C is permitted. **Prerequisite:** ECON 120C.

180. Topics in Econometrics (4)

Selected topics in econometrics. May be repeated for credit, as topics vary. **Prerequisites:** ECON 120C, consent of department is required.

181. Topics in Finance (4)

Selected topics in finance. May be repeated for credit as topics vary. **Prerequisites:** ECON 173A or 175; consent of department is required.

182. Topics in Microeconomics (4)

Selected topics in microeconomics. ECON 100C is recommended. **Prerequisite:** ECON 100B or 170B, consent of department is required.

191A. Senior Essay Seminar A (4)

Senior essay seminar for students with superior records in department majors. Students must complete ECON 191A and ECON 191B in consecutive quarters. **Prerequisite:** department stamp required.

191B. Senior Essay Seminar B (4)

Senior essay seminar for students with superior records in department majors. Students must complete ECON 191A and ECON 191B in consecutive quarters. **Prerequisite:** department stamp required.

192. Senior Seminar in Economics (1)

The senior seminar is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in economics at the upper-division level. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisite:** department stamp and/or consent of instructor.

195. Introduction to Teaching Economics (4)

Introduction to teaching economics. Each student will be responsible for a class section in one of the lower-division economics courses. Limited to advanced economics majors with at least a 3.5 GPA in upper-division economics work. (P/NP grades only.) Students may not earn more than eight units credit in 195 courses. **Prerequisite:** consent of the department.

198. Directed Group Study (2 or 4)

Directed study on a topic or in a group field not included in regular department curriculum by special arrangement with a faculty member. **Prerequisites:** upper-division standing and consent of instructor. May be repeated up to three times when course topics vary. (P/NP grades only.)

199. Independent Study (2 or 4)

Independent reading or research under the direction of and by special arrangement with a Department of Economics faculty member. (P/NP grades only.) **Prerequisites:** consent of instructor and departmental approval.

GRADUATE

200A-B-C. Microeconomics (4-4-4)

Background mathematical techniques, static and intertemporal consumer and producer theory, partial and general equilibrium, modern producer and consumer theory, risk, time, and interdependence, modern welfare economics.

201. Advanced Economic Theory (4)

An intensive examination of selected topics in economic theory. Course topic nonrepetitive in a three-year cycle. **Prerequisites:** ECON 207 and 213.

202A-B-C. Workshop in Economic Theory (0-4/0-4/0-4)

An examination of recent research in economic theory, including topics in general equilibrium, welfare economics, duality, and social choice; development of related research topics by both graduate students and faculty. Course may be repeated an unlimited number of times. (S/U grades only.) **Prerequisite:** ECON 207 or consent of instructor.

205. Mathematics for Economists (4)

Advanced calculus review for new graduate students.

206. Decisions (4)

Further topics in consumer and producer theory, intertemporal optimization, and decision-making under uncertainty. (Previously numbered ECON 200D.) **Prerequisites:** ECON 200A-B-C or consent of instructor.

208. Games and Information (4)

Further topics in game theory and the economics of information. (Previously numbered ECON 200F.) **Prerequisites:** ECON 200A-B-C or consent of instructor.

210A-B-C. Macroeconomics (4-4-4)

Neoclassical and Keynesian theories of employment, income, interest rate, price level, and other aggregate variables; macroeconomic policy; balance of payments and exchange rates; conflicts between external and internal balance; disequilibrium theory; growth theory.

211. Advanced Macroeconomics (4-4-4)

Covers various topics in macroeconomics at the frontiers of research, including theory, computation, and empirical work. Emphasis depends on the instructor. Students will read the latest working papers and publications in the covered areas. **Prerequisites:** graduate standing and ECON 210A-B-C or consent of instructor.

212A-B-C. Workshop in Macroeconomics (0-4/0-4/0-4)

Examination of recent research in macroeconomics; development of own research by graduate students and faculty. Course may be repeated an unlimited number of times. (S/U grades only.) **Prerequisite:** ECON 210C.

213. Advanced Macroeconomic Theory (4)

This course develops purely theoretical models for problems in macroeconomics. Topics include dynamic general equilibrium, asset market equilibrium, and economic growth and distribution. **Prerequisites:** ECON 210A-B-C or consent of instructor.

215. Macroeconomic Policy (4)

This course focuses on theoretical models and empirical analysis aimed at understanding and directing macroeconomic policy, including monetary, fiscal, and structural policies. **Prerequisites:** ECON 210A-B-C or consent of instructor.

216. Computation for Macroeconomics (4)

This course covers advanced computation techniques that are widely used in macroeconomics, finance, and other fields. Students will learn a range of numerical methods for handling systems of equations, integration, optimization, and other problems. **Prerequisites:** ECON 210A-B-C or consent of instructor.

219. Readings in Macroeconomics (4)

This course will cover numerical analysis of dynamic macroeconomic models. Topics include numerical techniques, dynamic programming, linear systems, solution algorithms, and applications to dynamic general equilibrium. **Prerequisite:** graduate standing or consent of instructor.

220A-B-C-D-E-F. Econometrics (4-4-4-4-4-4)

The construction and application of stochastic models in economics. This includes both single and simultaneous equations models. Matrix algebra and basic statistics are covered. Also covered (in 220F) are empirical applications to micro and macroeconomics. These require the completion of an empirical project.

221. Advanced Econometrics (4)

Advanced Topics in Econometrics. Topics may vary from year to year, covering areas such as cross-section, time-series, panel, limited dependent variables, conditional quantile estimation, bootstrapping, and large- and small-sample distribution theory. **Prerequisites:** graduate standing and ECON 220A, 220B, 220C, 220D, and 220E or consent of instructor.

222A-B-C. Workshop in Econometrics (4-4-4)

Examination of recent econometric research; development of own research by students and faculty. Course may be repeated an unlimited number of times. (S/U grades only.)

224. Readings in Econometrics (1)

Examination of recent research in econometrics to facilitate the development of thesis research by graduate students. (S/U grades only.)

225. Forecasting (4)

Topics include testing for rationality of forecasts, Mincer-Zarnowitz regressions, asymmetric loss functions, tests for equal (superior) predictive ability, multivariate forecasting. **Prerequisites:** graduate standing and ECON 220A, 220B, 220C, 220D, and 220E or consent of instructor.

226. Bayesian and Numerical Methods (4)

Topics include Bayesian inference and decision theory, loss functions, estimation of dynamic stochastic general

equilibrium models, nonlinear time series, state-space models, spatial-temporal models, and high-frequency data. **Prerequisites:** graduate standing and ECON 220A, 220B, 220C, 220D, and 220E or consent of instructor.

227. Nonparametric and Semi-Parametric Models (4)
Topics include neural networks, kernels, series, splines, estimation of densities and spectra, smoothing parameter selection, semi-parametric models, efficiency and adaptation, forecasting with nonlinear models, over-fit, computation, and interpretation. **Prerequisites:** graduate standing and ECON 220A, 220B, 220C, 220D, and 220E or consent of instructor.

228. Nonstandard Inference (4)
Topics include weak instruments, unit roots, break tests, switching models, set-based inference, maximum likelihood estimation and meaning of misspecified models, consistency, asymptotic normality, consistent covariance matrix estimation, and tests of model misspecification. **Prerequisites:** graduate standing and ECON 220A, 220B, 220C, 220D, and 220E or consent of instructor.

229. Estimating Causal Effects (4)
Topics include the definition, identification, and estimation of causal effects. Topics include White and Chalak's settlable systems, Granger causality, treatment effects, parametric and non-parametric estimation methods, extensions of IV methods, and tests for structural identification. **Prerequisites:** graduate standing and ECON 220A, 220B, 220C, 220D, and 220E or instructor approval.

230. Public Economics: Taxation (4)
Exploration of existing theoretical literature evaluating the efficiency and distribution effects of income and commodity taxes. Characterization of an "optimal" tax structure, and examination of problems faced in tax administration. Scrutiny of behavioral responses to existing tax structures. **Prerequisites:** ECON 200A-B-C and ECON 220A-B-C.

231. Public Economics: National Government Expenditures (4)
Examination of possible normative justification of government expenditures (public goods, externalities, and market failures). Exploration of positive government-behavior models. Analysis of behavioral responses to key existing government-expenditure programs (social security, Medicare, and unemployment insurance). Overview of cost-benefit analysis. **Prerequisites:** ECON 200A-B-C and ECON 220A-B-C.

232. Public Economics: Redistribution and Social Insurance (4)
Justifications for government involvement in redistribution and insurance markets. Optimal design of transfer and social insurance programs. Overview of program-evaluation methods. Theoretical and empirical analyses of specific programs, such as welfare, unemployment insurance, and social security. **Prerequisites:** ECON 200A-B-C and ECON 220A-B-C.

235A-B-C. Workshop in Applied Economics (0-4/0-4/0-4)
Examination of recent research in applied economics; development of own research by graduate students and faculty. Course may be repeated an unlimited number of times. (S/U grades only.)

237. Political Economy: Microeconomic Perspectives (4)
The course will examine recent research investigating the behavior of key actors in the political arena: voters, candidates, legislatures, interest groups, political parties, and the media, and then assessing the resulting political and economic outcomes. **Prerequisite:** graduate standing.

240. Economic Development (4)
Theoretical and empirical issues in economic development. **Prerequisite:** consent of instructor.

241. Microeconomics of Development (4)
Course introduces the household as a decision-making unit, and the contracts and institutions that emerge to compensate for imperfect markets. Emphasis is placed on data and identification strategies that can be used to measure the impact of policy interventions. **Prerequisite:** graduate standing or consent of instructor.

242. Macroeconomics of Development (4)
Course begins with measurement of development and continues to history of division of world into industrial and agricultural countries. Roles of trade, finance, and investment in aggregate growth are then studied. Course concludes by covering income distribution and political economy. **Prerequisite:** graduate standing or consent of instructor.

245. International Trade (4)
This course covers the determinants of the pattern and volume of trade in goods and services, the interaction of international trade with income distribution and economic growth, and commercial policy. The emphasis is on theory, with some empirical illustration and motivation. **Prerequisite:** consent of instructor.

246. International Macroeconomics (4)
This course presents open-economy macroeconomics and international finance. Topics include theories of the exchange rate, foreign-exchange regimes, current account adjustments, and international portfolio investments. The course examines real and monetary explanations, and implications of international capital market integration. **Prerequisite:** consent of instructor.

247. Empirical Topics in International Economics (4)
This course examines the empirical work in international trade or international macroeconomics. International trade topics include empirical tests of theories of international trade and international capital movements. International macroeconomic topics include empirical studies of exchange rate and relative price adjustments. **Prerequisite:** consent of instructor.

249A. International Development Workshop I (1-4)
Presentation of recent research in international and development economics by faculty and graduate students, covering micro and macroeconomic aspect of both areas. Regular attendance is required. **Prerequisite:** graduate standing or consent of instructor.

249B. International Development Workshop II (1-4)
Presentation of recent research in international and development economics by faculty and graduate students, covering micro and macroeconomic aspect of both areas. Regular attendance is required. **Prerequisite:** graduate standing or consent of instructor.

249C. International Development Workshop III (1-4)
Presentation of recent research in international and development economics by faculty and graduate students, covering micro and macroeconomic aspect of both areas. Regular attendance is required. **Prerequisite:** graduate standing or consent of instructor.

250. Labor Economics (4)
Theoretical and empirical issues in labor economics. (Previously numbered ECON 236A-B.) **Prerequisite:** consent of instructor.

260. Industrial Organization (4)
Theoretical and empirical issues in industrial organization. (Previously numbered ECON 234.) **Prerequisite:** ECON 220F or consent of instructor.

261. Industrial Organization II (4)
This course covers theory and empirical applications in the following areas of industrial organization: mergers, vertical integration, and innovation. Optional topics include network effects, technology adoption, and regulation. **Prerequisite:** ECON 220F or consent of instructor.

264. Experimental Economics (4)
Design and interpretation of controlled experiments using human subjects. (Previously numbered ECON 207.) **Prerequisite:** consent of instructor.

266. Economics of Natural Resources (4)
Theoretical and empirical issues in natural resource economics. (Previously numbered ECON 242.) **Prerequisite:** consent of instructor.

267. Topics in Environmental and Resource Economics (4)
The course will cover any of a variety of topics in environmental and resource economics, including climate change, exhaustible and renewable resources, international

environmental agreements, nonmarket valuation, energy economics, and water allocation. **Prerequisite:** graduate standing.

270. Finance—Core Asset Pricing (4)
Theoretical and empirical issues in finance. (Previously numbered ECON 214A.)

272. Finance—Theory and Testing of Intertemporal Asset Pricing Models (4)
Theoretical and empirical issues in finance. (Previously numbered ECON 214C.)

280. Computation (2)
Introduction to econometric computing. (S/U grades only.)

281. Special Topics in Economics (4)
Lecture course at an advanced level on a special topic. May be repeated for credit if topic differs. (Previously numbered ECON 267.) **Prerequisite:** consent of instructor.

282. Introduction to Research and Literature Review (4)
Introduction to research methods and the literature, including overviews of active research areas, formulation of research ideas, critical reviewing, and data sources. Students write a critical review of a body of literature including a proposal for an original research paper. **Prerequisite:** graduate standing.

285. Pre-Candidacy Presentation (2)
This course is a workshop in which students make formal presentations on the literature and on their own projects and receive input from other students and the instructor. **Prerequisite:** graduate standing.

286. Graduate Research Presentation Workshop (3)
The aim of the course is to train students to present their research effectively to a broad audience. Students are required to prepare a formal presentation, and then to provide feedback on the presentations made by other students. Depending on student demand, meetings may be divided into multiple sections, based on field interests. **Prerequisites:** graduate standing, ECON 285.

291. Advanced Field Advising (4)
Controlled reading and discussion with advisor; literature survey. May be repeated for credit. (S/U grades only.)

296. Original Research Paper (1-12)
In this course, students are guided toward the formulation of an original research idea and the writing of an original paper. Students receive support and input through group discussion and also through interaction with the instructor. **Prerequisite:** graduate standing.

297. Independent Study (1-5)
(S/U grades only.)

299. Research in Economics for Dissertation (1-9)
(S/U grades only.)

500A-B-C. Teaching Methods in Economics (4-4-4)
The study and development of effective pedagogical materials and techniques in economics. Students who hold appointments as teaching assistants must enroll in this course, but it is open to other students as well. (S/U grades only.)

UC Education Abroad Program (EAP)

Sharon Rose, *Linguistics, Faculty Director*

Paula Levin, *Education Studies, Associate Faculty Director*

Lynn Anderson, *Dean of International Education*

Kimberly Burton, *Director of Programs Abroad*

Molly Ann McCarren, *EAP Advisor*

Tonia Pizer, *EAP Advisor*

Maribeth Erlich, *EAP Advisor*

Rachel Rigoli, *EAP Advisor*

Kathleen McLaren-Hawking, *EAP Advisor*

Derek Kolb, *EAP Advisor*

Kelly O'Sullivan, *Academic Integration Officer*

Christine Trinidad, *Office Manager*

OFFICE: Programs Abroad Office in the International Center (corner of Gilman Drive and Library Walk) (858) 534-1123

E-mail: abroad@ucsd.edu

<http://programsabroad.ucsd.edu>

Administered by the University of California, the Education Abroad Program (EAP) has established study centers in Argentina, Australia, Barbados, Brazil, Canada, Chile, China, Costa Rica, Denmark, Egypt, France, Germany, Ghana, Hong Kong (S.A.R.), Hungary, India, Ireland, Israel, Italy, Japan, Korea, Mexico, the Netherlands, New Zealand, the Philippines, Russia, Singapore, South Africa, Spain, Sweden, Taiwan, Thailand, Turkey, the United Kingdom, and Vietnam. EAP offers full-year and short-term programs in a wide range of academic disciplines. Please see the EAP Web site (<http://eap.ucop.edu>) for the most up-to-date information about all aspects of the program. Students may use the EAP Program Search (<https://myeap.eap.ucop.edu/galileo/service/programsearch/ProgramSearch.aspx>) to search for programs by country, specific areas of study, language of instruction, etc. EAP participants are eligible for financial aid and many scholarships.

PURPOSE

The Education Abroad Program offers undergraduate (sophomores, juniors, and seniors) and graduate students opportunities to integrate into the academic and social life of select foreign universities while continuing to work in major fields of study or otherwise fulfilling UC requirements. EAP provides students access to distinguished academic programs that complement those of the UC campuses and where students can make normal progress toward their degrees at a cost as close as possible to that of education on a UC campus. EAP helps students acquire the knowledge, sensitivities, and skills necessary to function confidently and compete successfully in our global environment.

The program stimulates the intellectual development of the participants, broadening their general education, and giving a new depth to their particular academic interests. Many gain fluency in a language other than their own, and all grow in their ability to engage in independent study. Perhaps most valuable of all are increased self-understanding, clarified life purpose, and a broadening and deepening of personal values.

The University of California also hosts reciprocity students from more than one hundred institutions in approximately thirty countries. Reciprocal exchange students attend the University of California for up to one academic year on a no-fee-exchange, nondegree basis. Students on the Education Abroad Program earn degrees at their home university though they are enrolled at a university abroad. Undergraduate and graduate reciprocity students are nominated by partner institutions under the provisions of specific contractual agreements.

THE ACADEMIC PROGRAM

The Education Abroad Program places students at the finest universities abroad. In most cases students take courses side by side with local students in a wide range of academic fields. In some programs EAP students pursue language study and take special courses designed for foreign students. In others, they pursue specialized studies in their major, take courses to add breadth to their general education, concentrate on language or area studies, and conduct research.

Each student is concurrently enrolled on the home campus of the University of California and at the host university. Full academic credit is received for courses satisfactorily completed. With advance planning and wise choice of courses abroad, most students can make normal progress toward completion of major, minor, and/or general-education requirements for their UCSD degree.

ACADEMIC PLANNING AND ADVISING

In order to make normal progress toward graduation, students should counsel in advance with departmental advisors and an academic advisor in their college provost's office in order to ascertain how participation will affect their academic program. Descriptions of individual courses currently approved for UC credit may be found on the EAP Web site (<https://myeap.eap.ucop.edu/Galileo/service/coursecatalog/Coursecatalog.aspx>). Many of the same or similar courses will be available in future years, but students should plan programs that are sufficiently flexible to allow them to take alternate courses. Each year new courses taken by UC students are added to a center's approved offerings. Although courses approved by the University of California carry full credit, each department retains the right to determine the extent to which it will accept specific courses to fulfill requirements for its own majors.

In order to facilitate the academic work of the students, University of California professors serve as directors and associate directors of many study centers. They work with their counterparts in the host university in developing the academic program and advise students on their course work. In addition, the

directors are responsible for all aspects of student welfare and conduct.

COST, FINANCIAL AID, AND SCHOLARSHIPS

The regents endeavor to bring the program within the reach of all students, regardless of their financial resources. The cost of studying abroad is often comparable to the cost of studying on a UC campus. Additional program costs may include a program fee, round-trip transportation, on-site orientation, and personal expenses beyond what normally would be spent at home. Programs in some countries actually cost less than a comparable period of study at a UC campus.

Many forms of financial assistance are available to EAP students. Those already receiving UC financial aid maintain their eligibility for grants, loans, and scholarships while studying on EAP. Financial aid is based on the cost of studying at each EAP location and on individual need. Students who might not normally be eligible for financial aid may qualify for the period they are on EAP. In addition to UC financial aid, scholarships are also available from EAP, the Friends of the International Center, various campus offices and departments, and outside organizations. Annually, UCSD students access about \$500,000 in special scholarships available only for study abroad. Information about these scholarships is available in the Programs Abroad Office and on the UCSD Financial Aid Web site (<http://fao.ucsd.edu>).

Prospective participants who require financial assistance should counsel early with the Student Financial Services Office.

APPLICATIONS

Students receive access to Education Abroad Program online application instructions following group and individual advising at the Programs Abroad Office. Information on deadlines and related matters such as course offerings, selection, schedules of departures, and payment of fees may be obtained from the Programs Abroad Office, and online at <http://eap.ucop.edu> and <http://programsabroad.ucsd.edu>.

It is not too early to begin planning for an experience abroad prior to or during one's freshman year. Students are then able to take the language classes needed for certain programs, as well as plan which degree requirements to fulfill at UCSD and which to take abroad. Early planning also allows students to apply for the many programs now open to sophomores. General group information sessions about the programs are held during Welcome Week and in October and January. First Steps workshops are held throughout the year.

SELECTION

Undergraduate selection is generally open to students with the following qualifications: 2.85/3.0 cumulative grade-point average at the time of application, depending on the program (some programs are available to students with at least a 2.0 GPA); at least sophomore or junior standing by time of departure, depending on the specific program; support of the UCSD EAP Selection Committee; and completion of university-level language courses

RELATED PROGRAMS

For other study abroad opportunities, see [“Opportunities Abroad Program \(OAP\)”](#) and [“UC San Diego Global Seminars \(GS\)”](#).

when required (one, two, or three years, depending on the host institution) with a 3.0 grade-point average in language. Exceptions to these requirements may be made on a case-by-case basis, in consultation with the EAP advisor.

In addition to academic criteria for selection, the faculty committee looks for indications of the student’s seriousness of purpose, maturity, and capacity to adapt to the experience of study abroad. As part of the planning process, students are required to consult with their college academic and department advisors.

GRADUATE STUDENTS

Graduate students can be accommodated at most EAP-affiliated host universities. Graduate students may take courses, conduct research, and participate in short-term language programs for a semester or year. Students must meet EAP minimum requirements, including language prerequisites; have completed at least one year of graduate work; and have the support of their academic department and graduate dean.

TRANSFER STUDENTS

Transfer students from other colleges and universities are eligible for EAP. Applications may be submitted prior to their first quarter at UCSD if appropriate for the specific program. Please contact the Programs Abroad Office for further information.

SAFETY, STUDENT CONDUCT, AND PARENTAL APPROVAL

EAP considers student health and safety while abroad one of its top priorities. All participants in EAP are covered by a mandatory health insurance policy while abroad. While no one can guarantee student security either in the U.S. or abroad, the program makes every reasonable effort to assure a safe environment in its programs abroad, and to counsel students on potential risks and necessary precautions. In return, participants have a responsibility to pay careful attention to safety and health information provided in predeparture materials and at orientations in the U.S. and abroad.

It is anticipated that the students selected for the Education Abroad Program will be of high caliber, committed to profiting from both the intellectual and social aspects of the experience. Since they will be guests in another country and at another university, their conduct will reflect on both the University of California and the United States.

Participation in the program by students who are minors must be approved by their parents or guardians. In approving such participation, parents and guardians should be aware that a greater degree of personal freedom is afforded to students in the foreign university and that the University of California cannot take responsibility for closely supervising the activities of individual students. The directors and staff of the centers will be available to students with problems and will maintain contact with the student group as a whole. The university provides for comprehensive medical and hospitalization coverage for all participants.

Education Studies

DIRECTOR

Amanda Datnow

ASSOCIATE DIRECTOR

Tom L. Humphries

COORDINATOR OF TEACHER EDUCATION

Cheryl Forbes

PROFESSORS

Mark I. Appelbaum, Ph.D., *Psychology*

Julian Betts, Ph.D., *Economics*

Linda Brodkey, Ph.D., *Literature*

Janet Chrispeels, Ed.D., *Education Studies*

Michael Cole, Ph.D., *Communications*

Amanda Datnow, Ph.D., *Director, Education Studies Program*

Grant Goodall, Ph.D., *Linguistics*

Guershon Harel, Ph.D., *Mathematics*

James D. Hollan, Ph.D., *Cognitive Science*

James Levin, Ph.D., *Education Studies*

Hugh B. Mehan, Ph.D., *Sociology*

Carol A. Padden, Ph.D., *Communication*

Sally Ride, Ph.D., *Emerita, Physics*

Stefan A. Tanaka, Ph.D., *History*

Kathryn A. Woolard, Ph.D., *Anthropology*

Ana Celia Zentella, Ph.D., *Emerita, Ethnic Studies*

ASSOCIATE PROFESSORS

Gerald J. Balzano, Ph.D., *Music*

Amy Binder, Ph.D., *Sociology*

Gedeon O. Deák, Ph.D., *Cognitive Science*

Brian Goldfarb, Ph.D., *Communication*

Tom L. Humphries, Ph.D., *Education Studies and Communication*

Claire L. Ramsey, Ph.D., *Education Studies*

Olga V. Vasquez, Ph.D., *Communication*

ASSISTANT PROFESSORS

Alan Daly, Ph.D., *Education Studies*

Nora E. Gordon, Ph.D., *Economics*

Alison Wishard-Guerra, Ph.D., *Education Studies*

SENIOR LECTURERS WITH SECURITY OF EMPLOYMENT

Paula F. Levin, Ph.D., *Education Studies, Graduate advisor*

Barbara Sawrey, Ph.D., *Chemistry and Biochemistry, AVC Undergraduate Education*

Randall Souviney, Ph.D., *Emeritus*

Gabrielle Weinhausen, Ph.D., *Biological Sciences—Molecular Biology, Associate Dean, Education (Biology)*

LECTURERS WITH SECURITY OF EMPLOYMENT

Chris Halter, M.A., Ed.D.

Carolyn Huie-Hofstetter, Ph.D.

LECTURERS

Bobbie Allen, Ph.D.

Bernard (Rusty) Bresser, M.A.

Elizabeth Butler, M.A., Ed.D., *Secondary Math/Educational Technology*

Luz Chung, M.A., Ed.D.

Cheryl Forbes, M.A., Ed.D., *Coordinator of Teacher Education*

Caren Holtzman, M.A.

Rachel Millstone, M.A.

Susan Scharton, M.A., Ed.D.

Marcia Sewall, M.A., Ed.D.

Patrick Velasquez, Ph.D.

DISTINGUISHED TEACHER IN RESIDENCE

Kathy Melanese, M.A.

PART-TIME LECTURER

Pamela Long, *Lecturer/Striving Readers/Artsbridge*

OFFICE: Pepper Canyon Hall, Third Floor

University Center

<http://eds.ucsd.edu>

Education Studies (EDS) at UC San Diego offers the Master of Education Degree/California Preliminary Multiple Subject Teaching Credential for elementary school teachers; the Master of Education Degree/California Preliminary Single Subject Teaching Credential in English, mathematics, biology, chemistry, geosciences, and physics for secondary school teachers; the Master of Arts in Teaching and Learning with an emphasis in curriculum design; the Master of Arts in Deaf Education; the Doctor of Education (Ed.D.) in Teaching and Learning, a joint Doctor of Education with Cal State University, San Marcos in Educational Leadership; and three undergraduate minors in Education Studies.

A primary focus of Education Studies is to provide equity of educational access for all students in public schools. We require candidates to master the subject matter that they will teach and develop a repertoire of effective teaching practices that utilize their students' cultural knowledge and language diversity as educational resources.

UNDERGRADUATE PROGRAMS

MINORS IN EDUCATION STUDIES

The Education Studies program offers three specific minor programs. These minors are designed for students considering K–12 teaching as a career; those interested in teaching at the college level; and students who are interested in becoming better, more reflective learners. The minor in Education Studies provides course work and field experience for students interested in elementary teaching, or for English, mathematics, science, or engineering students who decide to pursue teaching during their junior or senior years. The Mathematics and Science Education minors explore teaching and learning practices specific to these disciplines along with the

components of the knowledge base necessary to teach K–12 science and mathematics successfully. All courses for these minors must be taken for a letter grade except for EDS 39 and EDS 139. Depending on students' majors and career plans, they may select from the following minor options:

- Minor in Education Studies
- Minor in Mathematics Education
- Minor in Science Education

Minor in Education Studies

Students must complete a minimum of one practicum course in Teaching and Learning (EDS 130, 134, 136, 138, 128AB, or 129ABC) and a minimum of one course from two of the remaining three categories of Learning Environments (EDS 114, 115, 118, 119), Language and Culture (EDS 117 or 125), or School and Society (EDS 126 or 125).

Students planning to apply for the UC San Diego graduate credential program must take specific courses in all four categories above (except for the minor in Mathematics Education, and the minor in Science Education). These two minors have their own specific courses, described below. Please contact EDS for specific minor courses that meet the prerequisite requirements for admission to the graduate credential program. The EDS minor requires a minimum of twelve units in EDS courses. A maximum of eight units of practicum (EDS 139) may be applied to this minor (total of twenty-eight quarter units).

Minor in Mathematics Education

- MATH 95. Introduction to Teaching Mathematics
- EDS 39. Practicum in Science and Mathematics Teaching/Learning
- EDS 117. Language, Culture and Education
- MATH 121A. Foundations of Teaching and Learning Mathematics I
- MATH 121B. Foundations of Teaching and Learning Mathematics II
- EDS 129A. Introduction to Teaching and Learning
- EDS 139. Practicum in Teaching/Learning
- EDS 129B. Introduction to Teaching and Learning
- EDS 139. Practicum in Teaching/Learning
- EDS 129C. Introduction to Teaching and Learning
- EDS 139. Practicum in Teaching/Learning (total of thirty-four quarter units)

Minor in Science Education

- CHEM 96. Introduction to Teaching Science
- EDS 39. Practicum in Science and Mathematics Teaching/Learning
- EDS 117. Language, Culture and Education
- CHEM 187. Teaching and Learning Science
- CHEM 188. Capstone Seminar in Science
- EDS 129A. Introduction to Teaching and Learning
- EDS 139. Practicum in Teaching/Learning

- EDS 129B. Introduction to Teaching and Learning
- EDS 139. Practicum in Teaching/Learning
- EDS 129C. Introduction to Teaching and Learning
- EDS 139. Practicum in Teaching/Learning (total of thirty-four quarter units)

Students interested in pursuing a graduate teaching credential program at UCSD should contact EDS for the specific prerequisite requirements for admission to the UCSD graduate credential program.

GRADUATE PROGRAMS

MASTER OF EDUCATION (M.ED.)/CREDENTIAL PROGRAM

The M.Ed. articulates with the Preliminary Multiple Subject and Preliminary Single Subject credential programs. It is a rigorous fifteen- to twenty-four-month professional degree program designed specifically to prepare preservice elementary and secondary teachers earning their initial teaching credential at UC San Diego. This course of study allows candidates to earn a Preliminary California Teaching Credential and the M.Ed. degree from UCSD prior to entering the teaching profession. The program seeks applicants with strong subject matter preparation and clear career intentions.

M.Ed./Credential Admissions Process

The application deadline for the M.Ed./Credential programs is February 1. All applicants must apply online at <http://eds.ucsd.edu>.

Applicants interested in financial aid should complete the FAFSA application by March 2, and may contact Graduate Student Financial Services at (858) 534-3807.

Each applicant is carefully reviewed for admission by a committee. The selection committee ensures that applicants have completed the prerequisite course requirements for admission and evaluates each applicant on the basis of the following criteria:

1. A strong interest in multicultural approaches to education; a strong desire to improve the quality of American education; a strong desire to develop self-activated learners;
2. Experience working with children in educational environments, especially with students from diverse backgrounds;
3. Participation in public service activities;
4. Academic excellence in their undergraduate and graduate studies.

More information about the entire application process is available on the EDS Web site at <http://eds.ucsd.edu>.

M.ED./PRELIMINARY MULTIPLE SUBJECT (ELEMENTARY) CREDENTIAL

Students working toward any major at UCSD may complete the prerequisite admission requirements and educational foundations courses while they are undergraduates for the M.Ed./Multiple Subject Credential Program.

Candidates who have already received a bachelor of arts or science from any University of California campus, or an appropriate equivalent degree from another institution, must apply for graduate status as an M.Ed. Preliminary Multiple Subject Credential student.

Students applying for admission to the UCSD graduate credential program must contact EDS for information on the required prerequisite course requirements.

Examples of majors from other universities not eligible for application to the M.Ed./Multiple Subject Credential program include business, education, liberal studies, marketing, and recreation.

Prerequisite Requirements for the Multiple Subject Preliminary Credential

- 1. A 3.0 cumulative GPA is required from the institution awarding the bachelor's degree.
- 2. Subject Matter Competence: This requirement is satisfied by providing evidence of satisfactory completion of the California Subject Examinations for Teachers (CSET).
- 3. The California Basic Educational Skills Test (CBEST): Evidence of passing the CBEST (or CSET Writing Skills exam) satisfies this requirement. Satisfactory scores on the CSU EAP Placement Tests or the ELM and EPT Placement Tests will also satisfy this requirement.
- 4. U.S. Constitution requirement: This requirement is satisfied by either
 - Completion of a course covering the provisions and principles of the U.S. Constitution, or
 - Passage of an appropriate exam offered through the County Office of Education (Contact the EDS office for information.)
- 5. Sensitivity to second language learning: Applicants must demonstrate, through course work or equivalent experience, an informed sensitivity to the challenges of second language learning and acquisition. This can be fulfilled in one of three ways:
 - Completion of nine quarter units of college course work in a single language that is not the applicant's native language, or
 - Completion of three years of secondary school course work in a language other than English. The course work must be taken in grades 7 through 12, with at least a B average, or
 - Demonstration of an "equivalent experience" in a second language situation. Applicants who wish to satisfy this requirement by one of the three options listed below must submit an essay that describes the length and circumstances of the experience, including at least three specific examples of situations that helped you gain personal knowledge and appreciation of issues surrounding second language acquisition in a diverse cultural setting. The three equivalent experience options are
 - The applicant has lived for prolonged period of time in a country where the language spoken was not native to the

applicant, and where the applicant was continuously required to speak that second language (e.g., Peace Corps).

- The applicant has had an extended experience immersed in a multilingual community in his/her native country.
 - The applicant was raised in a multilingual community.
6. Satisfactory scores on the Graduate Record Exam (GRE) General Test
 7. Satisfactory completion of the education foundations prerequisites for the Multiple Subject Credential (contact EDS for the current prerequisite requirements).
 8. Prerequisites for Bilingual Authorization in Spanish or American Sign Language options: These authorizations are designed for students who have sufficient bilingual skills to effectively teach in English and either Spanish or American Sign Language. Students interested in applying for admission to the Bilingual Authorization program must demonstrate
 - *Spanish or American Sign Language fluency:*
 - Spanish:* Completion of two Spanish literature courses (Spanish/English Bilingual Authorization only), at least one of which must be upper-division in either Latin American or Chicano literature, and completion of the EDS Spanish Language Assessment, with an FSI score of at least 3 (scores of 3– will be accepted, but students must receive a score of 3 prior to being recommended for the Bilingual Authorization). EDS coordinates these exams; please contact the program in January prior to your application to the credential program.
 - American Sign Language:* Completion of the EDS American Sign Language assessment with a rating of "acceptable" by a panel of assessors
 - *Cultural knowledge:*
 - Spanish:* One history course and one culture course covering Chicano or Latin American-related topics
 - American Sign Language:* At least one course on the language or culture of deaf people in the U.S. or intensive experience living among deaf people in the U.S.
 - History, Politics, and Theory of Bilingual Education: EDS 125 or ETHN 140.
 9. A desire to teach in a bilingual setting.

Multiple Subject Professional Preparation

The professional preparation component of the Preliminary Multiple Subject credential consists of twelve courses and fifteen weeks of student teaching in elementary school classrooms.

A typical student schedule for the Multiple Subject Professional Preparation Program is shown in Table 1:

Table 1: Schedule of Professional Preparation Activities for the M.Ed./Preliminary Multiple Subject Credential

FALL	WINTER	SPRING	SUMMER
EDS 351 (4)	EDS 361B (6)	EDS 361C (4)	EDS 204 (4)
EDS 361A (6)	EDS 369A (9)	EDS 369B (9)	EDS 206 (4)
EDS 190 (4)	EDS 205A (2)	EDS 382 (4)	
EDS 201 (4)		EDS 205B (4)	
EDS 203 (4)			
EDS 250 (4)			
For Bilingual Authorization Candidates:			
EDS 352A (2)	EDS 352B (2)		

M.ED./PRELIMINARY SINGLE SUBJECT (SECONDARY) CREDENTIAL

UCSD students working towards a literature, linguistics, mathematics, engineering or any science major may complete the prerequisite single subject credential requirements if they take specified courses for one of the EDS Minors while they are undergraduates. Contact EDS for the prerequisite requirements for admission to the UCSD graduate credential program.

Prerequisite Requirements for the Single Subject Preliminary Credential

- Undergraduates working toward selected majors at UCSD may complete the foundation requirements for the Preliminary Single Subject Credential prior to completing their degree. Students must be working toward a major in the discipline corresponding to that of the desired credential:
 - English: any UCSD literature or linguistics major, or equivalent
 - Mathematics: any UCSD mathematics, engineering, or computer science major, or equivalent,
 - Biology, chemistry, geosciences, or physics: any UCSD natural science major, or equivalent.
- Candidates, who have already received a literature, linguistics, mathematics, or science Bachelor of Arts or Science degree from any University of California campus, or an appropriate equivalent degree from another institution, must apply for graduate status as an M.Ed./Preliminary Single Subject credential student.
- A 3.0 cumulative GPA is required from the institution awarding the bachelor's degree.
- Subject Matter Competence: This requirement is satisfied by either
 - Providing evidence of satisfactory completion of the appropriate sections of the California Subject Examinations for Teachers (CSET) or
 - Having completed the entire subject matter preparation program (for Math SS credential candidates only).
- The California Basic Educational Skills Test (CBEST): Evidence of passing the CBEST satisfies this requirement. Satisfactory scores on the CSU EAP Placement Tests or the ELM and EPT Placement Tests will also satisfy this requirement.
- U.S. Constitution requirement
 - Completion of a course covering the provisions and principles of the U.S. Constitution or

- Passage of an appropriate exam offered through the County Office of Education (Contact the EDS office for information.)
- Sensitivity to second language learning: Applicants must demonstrate, through course work or equivalent experience, an informed sensitivity to the challenges of second language learning and acquisition. This can be fulfilled in one of three ways:
 - Completion of nine quarter units of college course work in a single language that is not the applicant's native language or
 - Completion of three years of secondary school course work in a language other than English. The course work must be taken in grades 7 through 12, with at least a B average or
 - Demonstration of an "equivalent experience" in a second language situation. Applicants who wish to satisfy this requirement by one of the three options listed below must submit an essay that describes the length and circumstances of the experience, including at least three specific examples of situations that helped you gain personal knowledge and appreciation of issues surrounding second language acquisition in a diverse cultural setting. The three equivalent experience options are:
 - The applicant has lived for a prolonged period of time in a country where the language spoken was not native to the applicant, and where the applicant was continuously required to speak that second language (e.g., Peace Corps).
 - The applicant has had an extended experience immersed in a multilingual community in his/her native country.
 - The applicant was raised in a multilingual community.

- Satisfactory scores on the Graduate Record Exam (GRE) General Test.
- Satisfactory completion of the education foundations prerequisites for the Single Subject Credential (contact EDS for the current prerequisite requirements).
- Prerequisites for for Bilingual Authorization in Spanish: This authorization is designed for students who have sufficient bilingual skills to effectively teach in English and Spanish. Students interested in applying for admission to the Bilingual Authorization program must demonstrate
 - Spanish Language Fluency:
 - Completion of two Spanish literature courses, at least one of which must be upper-division in either Latin American or Chicano literature, and
 - Completion of the EDS Spanish Assessment, with an FSI score of at least 3 (Scores of 3- will be accepted, but student must receive a score of 3 prior to being recommended for the Bilingual Authorization.) EDS coordinates these exams; please contact the program in January prior to application to the credential program.

- Cultural Knowledge: One history course and one culture course covering Chicano or Latin American-related topics.
 - History, Politics, and Theory of Bilingual Education: EDS 125 or ETHN 140.
- A desire to teach in a bilingual setting.

Note: A grade of B- or higher is required for all Bilingual Authorization courses.

Single Subject Professional Preparation

Students engage in an intensive program of professional preparation, including five teaching methods courses in the summer prior to the internship, and seminars offered throughout the academic year that address classroom management techniques and strategies for dealing with individual teaching situations.

Students admitted to the M.Ed./Preliminary Single Subject Credential Program are eligible to be interviewed in the summer for a paid internship in a local middle or high school for the following school year. Availability of internship positions is not guaranteed, though EDS attempts to facilitate internship positions for all Single Subject students. Students who do not receive an internship position will do their practicum as student teachers instead. Interns are responsible for teaching classes in their subject area under the guidance of an EDS supervisor and an on-site support-provider. Interns are typically hired as part-time teachers and receive a salary from the school district commensurate with the number of sections taught.

A typical student schedule for the Preliminary Single Subject Professional Preparation Program is shown in Table 2.

Table 2: The Professional Preparation Program for the M.Ed./Preliminary Single Subject Credential

SUMMER	FALL	WINTER	SPRING	SUMMER (2)
EDS 373 (4) or (374 or 375)	EDS 379A (8)	EDS 379B (8)	EDS 379B (8)	EDS 204 (4)
EDS 376 (4)	EDS 351 (4)	EDS 381 (4)	EDS 381 (4)	EDS 382 (4)
EDS 201 (4)		EDS 205A (2)	EDS 205B (2)	
EDS 203 (4)				
EDS 250 (4)				
For Bilingual Authorization Candidates:				
EDS 352A (2)	EDS 352B (2)			

THE MASTER OF ARTS IN TEACHING AND LEARNING: CURRICULUM DESIGN

The M.A. in Teaching and Learning (Curriculum Design) offers professional educators in elementary and secondary schools an extensive overview of principles of educational research and curriculum design.

A key feature of the M.A. program is the integration of research and practice. M.A. students remain

full-time teachers for the duration of the program. They design, implement, and evaluate curricular innovations in their own classrooms. The culmination of the M.A. work is a thesis describing the rationale, development, and effectiveness of these innovations.

Examples of M.A. Research Projects

The topics of the M.A. theses in past years are varied, and have included: multimedia approaches to secondary biology and chemistry instruction; writing revision among emergent writers; building partnerships between families and schools; activities which link home and school experiences in the content areas of reading and writing, mathematics, science, and social studies; improved integration of curriculum and assessment; motivation and art; using technology for mathematics and geography teaching; and embedding ESL in native-language instruction.

The M.A. Course of Study (Teaching and Learning: Emphasis in Curriculum Design)

The M.A. program requirements consist of forty quarter units of course work, including the master's thesis. Courses are usually offered for four quarter units of credit, and are typically offered one night per week, from 5:00–8:00 p.m. Core course work comprises twenty-eight units, with the remaining twelve units consisting of elective course work.

A typical program consists of

Core M.A. Course Work

First Summer (mid-June to late August)

- EDS 231. Advanced Instructional Practices or EDS 232. Special Topics in Education (offered alternating summers)
- EDS 229. Introduction to Educational Resources

Fall, Winter, and Spring

- EDS 230A-B-C. Research in Curriculum Design
- EDS 233A-B. Topics in Education Research and Design
- EDS 290. Research Practicum

Second Summer (mid-June to late August)

- EDS 231. Advanced Instructional Practices or EDS 232. Special Topics in Education (offered alternating summers)
- EDS 295. M.A. Thesis
- Completion of M.A. thesis writing

Admission Requirements

Admission to the M.A. program in teaching and learning at UCSD is competitive. Factors considered by the selection committee include

- Teaching experience
- Professional development activities
- Experience and interest in curriculum design

- Academic record

Admission to graduate standing at UCSD requires a minimum cumulative GPA of 3.0 for any prior graduate work, and for the bachelor's degree. Official scores from the GRE verbal, analytic, and quantitative sections are also required. The application deadline is February 1.

THE MASTER OF ARTS IN TEACHING AND LEARNING: BILINGUAL EDUCATION (ASL-ENGLISH)

Education Studies (EDS) at UCSD offers a master of arts in Teaching and Learning: Bilingual Education (ASL-English) and the California Deaf and Hard-of-Hearing Specialist Teaching Credential and the Preliminary Multiple Subject Teaching Credential with Bilingual Authorization for elementary school teachers. This program of study includes extensive practicum experience combined with the latest research and innovation in bilingual education and deaf education. Students in the program participate in research and development on the leading edge of bilingual, multicultural education for deaf and hard-of-hearing children.

In keeping with its aim of training teachers who will be able to meet the needs of deaf and hard-of-hearing children from various language and cultural backgrounds, EDS requires fluency in ASL for acceptance into the program. EDS's teacher training program is designed to prepare teachers to work in various types of school settings from residential school classrooms to local public school classrooms for deaf and hard-of-hearing children. EDS recognizes that deaf and hard-of-hearing children need teachers who are bilingual and knowledgeable about the role of culture in human development.

Prerequisite Course Requirements

Prior to admittance to the credential and master's study, foundation students (or UCSD undergraduates pursuing the minor in education studies) complete the following five courses offered during the first summer. UCSD students can complete these prerequisites as part of the Minor in Education Studies. Contact EDS for more information on the graduate credential prerequisite requirements:

- EDS 128A-B. Introduction to Teaching and Learning (Elementary)
- EDS 115. Cognitive Development and Education
- EDS 117. Language, Culture and Education
- EDS 125. History, Politics, and Theory of Bilingual Education

Program of Study for the Deaf and Hard-of-Hearing Specialist Credential, the Preliminary Multiple Subject Teaching Credential with Bilingual Authorization, and the Master of Arts in Teaching and Learning

After completion of the prerequisite component, students complete a program of study resulting in the California Deaf and Hard-of-Hearing Specialist Credential at the elementary level. Students also qualify for the Preliminary Multiple Subject Credential with Bilingual Authorization.

This program of study consists of courses in bilingual education theory, methods, and applications to deaf education in addition to intensive classroom practice. During the second year of study the focus is on designing, implementing and evaluating a research-based project. This integration of research and practice is central to the goal of the M.A. program to develop teachers as researchers.

A typical program of study includes the following:

Year 1

Fall

- COHI 124. Voice. Deaf People in America
- EDS 342A. ASL-English Bilingual Education Practices
- EDS 361A. Innovative Instructional Practices
- EDS 390. Research Practicum (four units)
- EDS 203. Technology, Teaching, and Learning
- EDS 201. Introduction to Resources for Teaching and Learning, and
- EDS 250. Equitable Educational Research and Practice

Winter

- EDS 342B. ASL-English Bilingual Education Practices
- EDS 361B. Innovative Instructional Practices
- EDS 369A. Practicum in Student Teaching

Spring

- EDS 342C. ASL-English Bilingual Education Practices
- EDS 361C. Innovative Instructional Practices
- EDS 369B. Practicum in Student Teaching, and
- EDS 382. Inclusive Educational Practices

Year 2

Fall

- EDS 351. Teaching the English Language Learner
- EDS 240A. Research in ASL-English Bilingual Education, and
- EDS 241. Advanced Topics in Deaf Education

Winter

- EDSS 233A. Topics in Education Research and Design
- EDS 240B. Research in ASL-English Bilingual Education, and
- EDS 290. Research Practicum

Spring

- EDS 349. Education Specialist Student Teaching

- EDS 240C. Research in ASL-English Bilingual Education

Summer

- EDS 295. M.A. Thesis

Admission Requirements

Candidates will apply for graduate admission to the foundation component of this program. Upon satisfactory completion of the prerequisite component, students will advance to the professional/master's component, which requires two years of study. The following are the minimum eligibility requirements for admission to the graduate prerequisite component. Applications are available beginning in January. The application deadline is March 1.

1. A bachelor's degree with a 3.0 cumulative GPA
2. Official Graduate Record Exam (GRE) scores
3. Subject matter competence (CSET)
4. The California Basic Educational Skills Test (CBEST). Evidence of passing the CBEST (or CSET Writing Skills exam) satisfies this requirement. Satisfactory scores on the CSU EAP Placement Tests or the ELM and EPT Placement Tests will also satisfy this requirement.
5. Completion of a course including the provisions and principles of the U.S. Constitution, or passage of the appropriate exam
6. Official Graduate Application and fee
7. Statement of Purpose and reference letters
8. Fluency in American Sign Language
9. Knowledge and experience of the social and cultural life of deaf people
10. A desire to teach deaf children of varying language and cultural backgrounds
11. Admission to graduate standing at UCSD requires a minimum cumulative GPA of 3.0 for any prior graduate work, and for the bachelor's degree. Official scores from the GRE verbal, analytic, and quantitative sections are also required.

DOCTOR OF EDUCATION (ED.D.) IN TEACHING AND LEARNING

Education Studies at UCSD offers a doctor of education (Ed.D.) degree in Teaching and Learning. This cohort-based four-year doctorate is designed to enable professional educators to participate in a research-based program while working in an educational setting. The Ed.D. course of study provides a research perspective on educational reform, with the expectation of developing regional leadership for K-12 and postsecondary teaching and learning. With its rich tradition of research and technological innovation, UCSD is uniquely positioned in the region to provide the research expertise for this program.

The doctor of education in Teaching and Learning program provides professional educators with the knowledge and skills to serve as faculty of pre-service teacher education and leaders of professional development for practicing teachers. Students take courses which address the topics

of school reform and educational equity; learning and educational technology; curriculum research and theory; qualitative and quantitative research methods; cognition and learning theory; the social organization of schooling; language and culture; and research on teaching and learning.

The following is a typical course of study:

Year 1

Summer

- EDS 229. Introduction to Educational Resources
- EDS 231. Advanced Instructional Practices, or EDS 232. Special Topics in Education (offered alternating summers)

Fall-Winter-Spring

- EDS 230A-B-C. Research in Curriculum Design

Summer

- EDS 295. M.A. Thesis
- EDS 231. Advanced Instructional Practices, or EDS 232. Special Topics in Education (offered alternating summers)

Year 2

Fall

- EDS 260A. Educational Research and Evaluation Design
- EDS 270. Leadership and Equity in Educational Reform

Winter

- EDS 260B. Educational Research and Evaluation Design
- Elective Graduate Seminar

Spring

- EDS 260C. Educational Research and Evaluation Design
- Elective Graduate Seminar

Year 3

Fall-Winter-Spring

- EDS 261A-B-C. Advanced Research and Evaluation Methods
- Elective Graduate Seminar

Year 4

Fall-Winter-Spring

- EDS 262A-B-C. Dissertation Writing Seminar
- EDS 299. Dissertation Research

Admission Requirements

See the EDS Web site for current admission requirements. The application deadline is February 1.

DOCTOR OF EDUCATION (ED.D.) IN EDUCATIONAL LEADERSHIP

The doctor of education in Educational Leadership is offered through a partnership between UCSD and California State University, San Marcos (CSUSM). The program is designed as a professional degree for P-12 and postsecondary educators who will develop advanced leadership and research skills related to their own institutional settings. Students are typically mid-career working professional educators who attend classes on weeknights and weekends over a thirty-six-month period. Students take courses designed to develop four specific leadership capacities: (1) leadership for learning; (2) leadership for a diverse society; (3) leadership for organizational change; and (4) leadership for organizational development. This program prepares leaders for culturally, linguistically, and economically diverse educational settings. Students will conduct research on professional practice within their own institutions, addressing specific local problems that have national implications for teaching and learning, school reform, and professional development. Students completing the program will receive a joint degree from UCSD and CSUSM.

The following is a typical course of study taught by UCSD and CSUSM faculty:

Year 1

Winter

- EDS 280. Re-Thinking Leadership
- EDS 287A. Educational Research and Evaluation Design
- EDS 291A. Leadership Research Practicum

Spring

- EDS 281. Leadership for Learning
- EDS 287B. Educational Research and Evaluation Design
- EDS 291B. Leadership Research Practicum

Summer

- EDS 282. Leadership for a Diverse Society
- EDS 287C. Educational Research and Evaluation Design
- EDS 291C. Leadership Research Practicum

Fall

- EDS 286. Advanced Topics in Leadership
- EDS 292. Qualifying Paper Preparation

Year 2

Winter

- EDS 283. Leadership for Organizational Change
- EDS 288A. Advanced Research and Evaluation Methods
- EDS 293A. Advanced Leadership Practicum

Spring

- EDS 284. Leadership for Organizational Development,
- EDS 288B. Advanced Research and Evaluation Methods,
- EDS 293B. Advanced Leadership Practicum

Summer

- EDS 285. Leadership for the Future,
- EDS 288C. Advanced Research and Evaluation Methods,
- EDS 293C. Advanced Leadership Practicum

Fall

- EDS 286. Advanced Topics in Leadership,
- EDS 299. Dissertation Research

Year 3

Winter

- EDS 299. Dissertation Research
- EDS 289A. Dissertation Writing Seminar
- EDS 294A. Colloquium on Educational Leadership

Spring

- EDS 299. Dissertation Research
- EDS 289B. Dissertation Writing Seminar
- EDS 294B. Colloquium on Educational Leadership

Summer

- EDS 299. Dissertation Research
- EDS 289C. Dissertation Writing Seminar
- EDS 294B. Colloquium on Educational Leadership

Fall

- EDS 299. Dissertation Research
- EDS 289D. Dissertation Writing Seminar

Admission Requirements

See the EDS Web site for current admission requirements. The application deadline is July 31.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

The Education Studies Program offers the following courses. Students are encouraged to consult with an EDS advisor to determine which courses satisfy credential requirements. Undergraduate students may enroll in graduate seminars with the consent of instructor.

LOWER-DIVISION

EDS 20. Introduction to Principles of Learning (4)

Students will study discipline-specific principles of effective learning, including critical thinking, problem solving, collaboration and group communication, laboratory and hypothesis testing, library research and writing skills, and self-assessment. Students will explore concepts and procedures in mathematics, science, and economics as the context for making explicit these often-tacit principles of learning. **Prerequisite:** Summer Bridge participation. Available to undergraduate students on a space-available basis.

EDS 30/Math. 95. Introduction to Math Teaching (2)

Revisit students' learning difficulties in mathematics in more depth to prepare students to make meaningful observations of how K-12 teachers deal with these difficulties. Explore how instruction can use students' knowledge to pose problems that stimulate students' intellectual curiosity. **Prerequisite:** Math. 87. Teaching Math and Science: The Challenge. Available to undergraduate students on a space-available basis.

EDS 31/Chem. 96. Introduction to Teaching Science (2)

Revisit students' learning difficulties in science in more depth to prepare students to make meaningful observations of how K-12 teachers deal with these difficulties. Explore how instruction can use students' knowledge to pose problems that stimulate students' intellectual curiosity. **Prerequisite:** Math. 87. Teaching Math and Science: The Challenge. Available to undergraduate students on a space-available basis.

EDS 39. Practicum in Science and Math Teaching/Learning (2)

Undergraduate students are placed in local schools and work with children in classrooms and the community. Students work on educational activities with K-12 students a minimum of 20 hours/quarter. **Prerequisites:** department stamp; concurrent enrollment in either Math 87: Teaching Math.: The Challenge, or Chem. 87: Teaching Science: The Challenge.

EDS 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen. Seminars are open to sophomores, juniors, and seniors on a space-available basis.

UPPER-DIVISION

EDS 105. Teaching and Learning Physics (4)

(Same as PHYS 180.) A course on how people learn and understand key concepts in Newtonian mechanics. Reading in physics and cognitive science plus fieldwork teaching and evaluating K-12 students. Useful for students interested in teaching. **Prerequisites:** three quarters of lower-division physics.

EDS 114. Cognitive Development and Interactive Computing Environments (4)

Learning and development considered as an evolving interplay between "internal representations" and "external representations" of the world, with special attention devoted to the design, history, and educational implications of computer-based tools and learning environments. **Prerequisite:** upper-division standing.

EDS 115. Cognitive Development and Education (4)

This course examines the development of thinking and language in preschool and elementary school children, with implications for education. Themes include facilitating children's learning, and individual differences in cognition. Examples of topics covered are word learning, mathematical knowledge, and scientific thinking. Letter grade only.

EDS 116. The Psychology of Teaching and Structures of Information for Human Learning (4)

College students tutoring college students. Curriculum: basic applied learning principles, specifying objectives, planning and designing instruction, testing, evaluation, interpersonal communication skills, study skills. Objectives will be specified for each area. Competency will be assessed by project completion and practicum feedback. This course is not creditable toward professional preparation requirements for the multiple subject credential. **Prerequisite:** departmental approval (consent of instructor)—department stamp restriction.

EDS 117. Language, Culture, and Education (4)

(Same as Soc/B 117)The mutual influence of language, culture, and education. Explanations of students' school success and failure that employ linguistic and cultural variables, bilingualism, and cultural transmission through education are explored. **Prerequisite:** upper-division standing.

EDS 118. Adolescent Development and Education (4)

This course introduces prospective secondary teachers to the cognitive, social, and emotional development of adolescents, including developmental learning theory, the teaching/learning process, effective learning environments, and cross-cultural variation in development. Implications for classroom practice are drawn.

EDS/LIGN 119. First and Second Language Learning: From Childhood through Adolescence (4)

An examination of how human language learning ability develops and changes over the first two decades of life, including discussion of factors that may affect this ability. **Prerequisite:** upper-division standing or consent of instructor.

EDS 121A/Math. 121A. Foundations of Teaching and Learning Mathematics I (4)

Develop teachers' knowledge base (knowledge of mathematics content, pedagogy, and student learning) in the context of advanced mathematics. This course builds on the previous courses where these components of knowledge were addressed exclusively in the context of high-school mathematics. **Prerequisites:** EDS 30/Math. 95, and Calculus 10C or 20C.

EDS 121B/Math. 121B. Foundations of Teaching and Learning Math II (4)

Examine how learning theories can consolidate observations about conceptual development with the individual student as well as the development of knowledge in the history of mathematics. Examine how teaching theories explain the effect of teaching approaches addressed in the previous courses. **Prerequisite:** EDS 121A/Math. 121A.

EDS 122/Chem. 187. Foundations of Teaching and Learning Science (4)

Examine theories of learning and how they are important in the science classroom. Conceptual development in the individual student, as well as the development of knowledge in the history of science. Key conceptual obstacles in science will be explored. **Prerequisites:** EDS 31/Chem. 87: Introduction to Teaching Science, Chemistry 6C.

EDS 123/Chem. 188. Capstone Seminar in Science Education (4)

In the lecture and observation format, students continue to explore the theories of learning in the science classroom. Conceptual development is fostered, as well as continued

development of knowledge of science history. Students are exposed to the science of teaching science in actual practice. **Prerequisite:** EDS 122/Chem. 187.

COHI 124. Voice: Deaf People in America (4)

The relationship between small groups and dominant culture is studied by exploring the world of deaf people who have for the past twenty years begun to speak as a cultural group. Issues of language, communication, self-representation, and social structure are examined. **Prerequisite:** Com/HIP 100 or consent of the instructor.

EDS 125. History, Politics, and Theory of Bilingual Education (4)

This course provides a historical overview and models of bilingual education in the United States. Students will examine socio-cultural, theoretical, and policy issues associated with native language and second-language instruction, and legal requirements for public bilingual program.

EDS 126. Social Organization of Education (4)

(Same as Soc/C 126)The social organization of education in the U. S. and other societies; the functions of education for individuals and society; the structure of schools; educational decision-making; educational testing; socialization and education; formal and informal education; cultural transmission. **Prerequisite:** upper-division standing.

EDS 127A-B-C. Practicum in Interactive Computing (4-4-4)

The course focuses on interactional computing in teaching/learning. Course work concentrates on interactive computing, application to teaching, learning, bilingualism, and communication. Concurrent with course work, students are assigned to a school or community field site implementing interactive computing. Students will write research reports integrating course work and field experience. (F,W,S)

EDS 128 A-B. Introduction to Teaching and Learning (Elementary) (4-4)

This course series is for undergraduates who are exploring a career in elementary school teaching. Topics addressed include: theories of teaching and learning; research on cognition and motivation; and the cultural context of classroom teaching and learning. EDS 128A focuses on the learner in the teaching-learning interaction and EDS 128B focuses on the teacher in the teaching-learning interaction. **Prerequisites:** department stamp required; EDS 139 must be taken as corequisite. EDS 130 or 134 must be completed before EDS 128A, and 128A for 128B. EDS 128A and EDS 128B are restricted for students applying to the EDS M.Ed./Multiple Subject Credential Program.

EDS 129 A-B-C. Introduction to Teaching and Learning (Secondary) (4-4-4)

This course series is for undergraduates who are exploring a career in teaching secondary school. Topics addressed include: theories of teaching and learning processes and motivation for science, mathematics, and English instruction. EDS 129A focuses on the analysis of the needs of individual learners and small group instruction techniques; EDS 129B emphasizes the various roles of the classroom teacher and planning individual lessons; and EDS 129C emphasizes the assessment of student work and longer-range curriculum planning. **Prerequisites:** department stamp; EDS 139 must be taken as corequisite. Must have successfully completed EDS 136, 138, or 129A for 129B, and 129B for 129C. EDS 129B and 129C are restricted for students applying to the EDS M.Ed./Single Subject Credential Program.

EDS 130. Introduction to Academic Mentoring of Elementary/School Students (4)

This course focuses on the role of undergraduate mentors in raising academic expectations for students and families traditionally underrepresented at the university. The relationship between the school and community, the social and political organization of elementary schools, and the academic achievement of elementary children are examined. **Prerequisites:** department stamp required; EDS 139 must be taken as a corequisite.

EDS 131. Introduction to Early Childhood Education (4)

Course examines effective practices for literacy, numeracy, and socio-emotional development in early childhood

education. Field experience and seminar focus on social relationships between the UCSD student, the teacher and children, developmentally appropriate teaching and learning practices in literacy and numeracy, and community service. **Prerequisite:** department stamp; EDS 139 must be taken as a corequisite.

EDS 134. Introduction to Literacy and Numeracy Tutoring (4)

This course examines effective practices for language arts and mathematics learning for elementary school children. The field experience and seminar focus on the tutor/student relationship, teaching and learning processes for literacy and numeracy, and community service. **Prerequisites:** department stamp required; EDS 139 must be taken as a corequisite.

EDS 136. Introduction to Academic Tutoring of Secondary School Students (4)

This course focuses on the role of undergraduate tutors in building academic resiliency in secondary students traditionally underrepresented at the university. The relationship between the school and community, the social and political organization of secondary schools, the philosophical, sociological, and political issues which relate to the U.S. secondary educational system, and the academic achievement of secondary children are examined. **Prerequisites:** department stamp required; EDS 139 must be taken as a corequisite.

EDS 137. Introduction to Discipline-Specific Teaching and Learning (4)

This course examines effective practices for teaching and learning in specific academic content areas in PreK-12 school or community settings. The field experience and seminar focus on relationship building between mentors and learners, discipline-relevant teaching and learning processes, and community service. **Prerequisite:** EDS 139 must be taken as a corequisite.

EDS 138. Introduction to Academic Tutoring at the Preuss School (4)

This course focuses on effects of the Charter School movement on public education in the U.S., the role of the research universities in K-12 education, the social and political organization of the schools, the philosophical, sociological, and political issues which relate to the U.S. secondary educational system, and the academic achievement of secondary children. Students investigate the role of undergraduate tutors in building academic resiliency in secondary students traditionally underrepresented at the university. **Prerequisites:** department stamp required; EDS 139 must be taken as a corequisite.

EDS 139. Practicum in Teaching/Learning (2)

Students are placed in local schools and work with students in classrooms and the community. Students work on educational activities with K-12 students a minimum of four hours/week. **Prerequisites:** department stamp required; one of the following courses (may be taken concurrently) EDS 109, or EDS 127A-B-C, or EDS 128A-B, or 129A-B-C, or 130, or 134, or 136, or 138.

EDS 190. Research Practicum (1-6)

Supervised research studies with individual topics selected according to students' special interests. Students will develop a research proposal and begin to gather and analyze data. **Prerequisite:** consent of instructor. (F,W,S)

EDS 195. Apprentice Teaching (2-4)

Advanced EDS students are prepared in effective methods of supervising the preparation of UCSD students serving as paraprofessionals in K-12 classrooms. Topics covered include: classroom management, interpersonal relations, supervision techniques, multi-cultural and multi-lingual education, politics in the school, and curriculum development. Each student serves as a discussion leader and conducts at least two workshops. **Prerequisites:** department stamp required and TE79 or TE80 major code.

EDS 198. Directed Group Study (4-2)

Directed group study, guided reading, and study involving research and analysis of activities and services in multicultural education, bilingual education, the teaching-learning process, and other areas that are not covered by the present curriculum. **Prerequisite:** consent of instructor.

EDS 199. Special Studies (4)

Individual guided reading and study involving research and analysis of activities and services in multicultural education, bilingual education, the teaching-learning process, and other areas that are not covered by the present curriculum. **Prerequisite:** consent of instructor.

EDS 342A. ASL-English Bilingual Education Practices (4)

Students will examine the history, current theory, philosophy, legislation, and trends in deaf education. Methods of first- and second-language development, communication, and literacy skills for deaf and hard-of-hearing children will be introduced. **Prerequisites:** EDS 115, EDS 117, EDS 126, EDS 128A, EDS 128B. Must be a ED76 major. (F)

EDS 342B. ASL-English Bilingual Education Practices (2)

Students will investigate formal and informal assessment techniques used for deaf and hard-of-hearing children, bilingual/multicultural education practices across the curriculum, effective learning environments and approaches for educating and interacting with families and communities. **Prerequisites:** EDS 342A, EDS 361A. Must be an ED76 major. Concurrent enrollment in EDS 361B and 369A. (W)

EDS 342C. ASL-English Bilingual Education Practices (2)

Students will continue to investigate formal and informal assessment techniques used for deaf and hard of hearing children, bilingual/multicultural education practices across the curriculum, effective learning environments and approaches for educating and interacting with families and communities. **Prerequisites:** EDS 342A, EDS 342B, EDS 361A. Must be an ED76 major.

EDS 349. Deaf Education Specialist Student Teaching Practicum (9)

Education specialist credential candidate performs student teaching in participating schools for a minimum of seven weeks full-time under the supervision of a cooperating teacher and university supervisor. The field experience provides professional preparation and diversified teaching responsibilities for post-baccalaureate students pursuing the California Deaf and Hard of Hearing Specialist and BCLAD Credential. **Prerequisite:** must be an ED76 major, Teaching and Bilingual Education (ASL-English)

EDS 351. Teaching the English Language Learner (4)

Students will examine the principles of second language acquisition and approaches to bilingual education. They will develop a repertoire of strategies for teaching in elementary or secondary content areas. **Prerequisite:** ED76 or ED78 major: Elementary Multiple Subject or Single Subject candidates at UCSD who have advanced to student teaching or internship. (F)

EDS 352A. Bilingual Instructional Practices I (2)

First course in a two-course sequence. Provides a theoretical and practical grounding in various pedagogical techniques for teaching Spanish as a native language. Students will study native language methods, strategies and approaches, assessment materials, and techniques of transition for implementing curricula across disciplines in a bilingual classroom. **Prerequisite:** ED78 major.

EDS 352B. Bilingual Instructional Practices II (2)

Second course in the sequence. Provides a theoretical and practical grounding in various pedagogical techniques for teaching Spanish as a native language. Students will study native language methods, strategies and approaches, assessment materials, and techniques of transition for implementing curricula across disciplines in the bilingual classroom. **Prerequisites:** EDS 352A, and student must be an ED78 major.

EDS 355A. Advanced Mathematics Teaching Practices for Grades K-6 (2)

First course in a three-course sequence. Provides a theoretical and practical grounding in pedagogy and professional factors influencing high-quality elementary mathematics education. Students will review research literature and various content standards, assessment materials, and curriculum materials in preparation for specialized mathematics instruction in elementary classrooms. **Prerequisites:** admission into the ED78: Multiple Subject (MS-2 program),

and concurrent enrollment in EDS 361A or consent of instructor.

EDS 355B. Advanced Mathematics Teaching Practices for Grades K–6 (2)

Second course in the sequence. Provides a theoretical and practical grounding in pedagogy and professional factors influencing high-quality elementary mathematics education. Students will review research literature and various content standards, assessment materials, and curriculum materials in preparation for specialized mathematics instruction in elementary classrooms. **Prerequisites:** EDS 355A, admission into the ED85: Multiple Subject (MS-2 program), and concurrent enrollment in EDS 361B or consent of instructor.

EDS 355C. Advanced Mathematics Teaching Practices for Grades K–6 (2)

Third course in the series, which provides a theoretical and practical grounding in pedagogy and professional factors influencing high-quality elementary mathematics education. Students will review research literature and various content standards, assessment materials, and curriculum materials in preparation for specialized mathematics instruction in elementary classrooms. **Prerequisites:** EDS 355B, admission into the ED85: Multiple Subject (MS-2 program), and concurrent enrollment in EDS 361C or consent of instructor.

EDS 361A. Innovative Instructional Practices I (6)

First course in a three-course sequence. It provides pedagogical methods for multiple-subject teaching. Diverse subject areas (math, science, fine arts, P.E., and social studies) are integrated into a single intercurricular course of study by emphasizing activity/inquiry techniques of instruction. **Prerequisite:** must be an ED76 major: Teaching and Learning Bilingual Education (ASL-English) or ED78 major only for Elementary Multiple Subject candidate who has advanced to student teaching. (F)

EDS 361B. Innovative Instructional Practices II (6)

Second course in three course sequence. It provides pedagogical methods for multiple subject teaching. Diverse subject areas (language arts, English language development, health education, mathematics, sciences, social studies, fine arts, and physical education) are integrated into a single intercurricular course of study by emphasizing activity/inquiry techniques of instructions. **Prerequisites:** EDS 361A, ED76 major: Teaching and Learning Bilingual Education (ASL-English) or ED78 major only for Elementary Multiple Subject candidate who has advanced to student teaching.

EDS 361C. Innovative Instructional Practices III (4)

Last course in a three course sequence. It provides pedagogical methods for multiple subject teaching. General teaching methods are integrated into a single intercurricular course of study by emphasizing activity/inquiry techniques of instruction. **Prerequisites:** EDS 361B, ED76 major: Teaching and Learning Bilingual Education (ASL-English) or ED78 major only for Elementary Multiple Subject candidate who has advanced to student teaching.

EDS 369A. Multiple Subject (Elementary) Student Teaching Practicum-I (9)

First course in a series. The elementary credential candidate performs student teaching in participating schools for seven to eight weeks full-time for each course (fifteen weeks total) under the supervision of a cooperating teacher and university supervisor. The student teaching experience offers professional preparation and diversified teaching responsibilities for post-baccalaureate students pursuing the California Multiple Subject Teaching Credential. **Prerequisites:** ED78 major for Elementary Multiple Subjects only. Affirmed Multiple Subject Credential candidate at UCSD who has advanced to student teaching.

EDS 369B. Multiple Subject (Elementary) Student Teaching Practicum-II (9)

Second course in a two-course series. The elementary credential candidate performs student teaching in participating schools for seven to eight weeks full-time for each course (fifteen weeks total) under the supervision of a cooperating teacher and university supervisor. The student teaching experience offers professional preparation and diversified teaching responsibilities for post-baccalaureate

students pursuing the California Multiple Subject Teaching Credential. **Prerequisites:** ED 269A, ED78 major for Elementary Multiple Subjects only. Affirmed Multiple Subject Credential candidate at UCSD who has advanced to student teaching.

EDS 373. Secondary English Teaching Practices (4)

The course introduces prospective secondary teachers to principles and strategies of teaching English language arts. Topics include: writing processes, reading processes, integrated language arts, assessment, the second language learner, the classroom community, the California English Language Arts Framework. **Prerequisite:** ED78 Single Subject major only. Affirmed Single Subject candidate at UCSD who has advanced to internship or consent of instructor.

EDS 374. Secondary Mathematics Teaching Practices (4)

Mathematics teaching techniques including, curriculum design, California Model Curriculum Standards, instructional methods, computer applications, selection and use of textbooks, student assessment, lesson planning, and classroom organization. Professional matters including curriculum planning, professional organizations, para-professionals, professional ethics, education law, and parent involvement are addressed. **Prerequisite:** ED78 Single Subject major only. Affirmed Single Subject candidate at UCSD who has advanced to internship or consent of instructor.

EDS 375. Secondary Science Teaching Practices (4)

Science teaching techniques, including science curriculum design, California Model Curriculum Standards, instructional methods, computer applications, selection and use of textbooks, student assessment, lesson planning, and classroom organization. Professional matters including curriculum planning, professional organizations, para-professionals, professional ethics, education law, and parent involvement are addressed. **Prerequisite:** ED78 Single Subject major only. Affirmed Single Subject candidate at UCSD who has advanced to internship or consent of instructor.

EDS 376. Language and Learning Instruction (4)

This course satisfies the California Commission on Teacher Credentialing requirement for preparation in reading theory and methods for all credential candidates. Theories of reading development, integration of the language arts, reading and writing in the content areas, teaching methods, and literature. **Prerequisite:** ED78 Elementary Multiple Subject or Single Subject candidates at UCSD who have advanced to student teaching or internship.

EDS 379A. Single Subject (Secondary) Internship Practicum I (8)

The secondary credential candidate teaches approximately one academic quarter for each course in this series (one public school academic year) under the guidance of a university supervisor with additional support provided by an on-site teacher. The internship offers extensive professional preparation and diversified teaching experience under actual classroom conditions for post-baccalaureate students pursuing the California Single Subject Teaching Credential. **Prerequisites:** ED78 Single Subject major only. Affirmed Single Subject candidate at UCSD who has advanced to internship or consent of instructor.

EDS 379B. Single Subject (Secondary) Internship Practicum II (8)

Second course in the series. The secondary credential candidate teaches approximately one academic quarter for each course in this series (one public school academic year) under the guidance of a university supervisor with additional support provided by an on-site teacher. The internship offers extensive professional preparation and diversified teaching experience under actual classroom conditions for post-baccalaureate students pursuing the California Single Subject Teaching Credential. **Prerequisites:** EDS 379A, ED78 Single Subject major only. Affirmed Single Subject candidate at UCSD who has advanced to internship.

EDS 379C. Single Subject (Secondary) Internship Practicum III (8)

Third course in the series. The secondary credential candidate teaches approximately one academic quarter for each course in this series (one public school academic

year) under the guidance of a university supervisor with additional support provided by an on-site teacher. The internship offers extensive professional preparation and diversified teaching experience under actual classroom conditions for post-baccalaureate students pursuing the California Single Subject Teaching Credential. **Prerequisites:** EDS 379B, ED78 Single Subject major only. Affirmed Single Subject candidate at UCSD who has advanced to internship.

EDS 381. Health Education (4)

This course satisfies the Commission on Teacher Credentialing requirement for Health Education. Topics include: physical education, substance abuse, sex education, cardio-pulmonary resuscitation, nutrition, and first aid. **Prerequisite:** ED78 major: Elementary Multiple Subject or Single Subject candidates at UCSD who have advanced to student teaching or internship.

EDS 382. Inclusive Educational Practices (4)

This course satisfies the Commission on Teacher Credentialing requirements for Special Education. Topics include: teaching methods for accommodating special-needs students in the regular classroom, developing an Individual Education Plan, characteristics of special-needs students, lesson planning to accommodate individual differences, and legislated mandates. **Prerequisite:** ED78 or ED81 major: Elementary Multiple Subject or Single Subject candidates at UCSD who have advanced to student teaching or internship and department stamp required.

EDS 385. Elementary School Mathematics Content and Pedagogy (4)

Examines the underlying mathematical concepts of the elementary school mathematics curriculum and related pedagogical implications for teaching. Topics include number concepts, algebraic thinking, geometry, and data collection and analysis. **Prerequisite:** students must be ED78 majors: M.Ed./Elementary-Multiple Subject Credential candidates who have advanced to student teaching or internship. (MS-2).

EDS 390. Graduate Research Practicum (1–6)

Supervised research studies with individual topics selected according to student's special interests. Students will develop a research proposal, gather and analyze data. **Prerequisite:** Consent of instructor.

EDS 398. Directed Group Study (1–6)

Study and analysis of teaching and learning topics for credential students under the guidance of a faculty member. Offered for repeated registration. **Prerequisite:** Consent of instructor.

EDS 399. Independent Study (1–6)

Individual guided study and/or research in an area not covered by present curriculum course offerings for credential graduate students. Offered for repeated registration. **Prerequisite:** Consent of instructor.

GRADUATE

Soc. 270. The Sociology of Education (4)

A consideration of the major theories of schooling and society, including functionalist, conflict, critical, and interactional; selected topics in the sociology of education will be addressed in a given quarter, including: the debate over inequality, social selection, cultural reproduction and the transition of knowledge, the cognitive and economic consequences of education. Major research methods will be discussed and critiqued.

EDS 201. Introduction to Resources for Teaching and Learning (4)

This course introduces students to educational resources, both in print and on-line. Students compile and evaluate research studies, curricular materials, and instructional approaches in preparation for future projects in developing and evaluating various approaches to teaching and learning. **Prerequisite:** students must be registered EDS graduate students (ED 76, 77, 78, 79, 80).

EDS 203. Technology, Teaching, and Learning (4)

This course will review current literature on effective applications of technology in the classroom. Students will also become fluent in the use of productivity tools, presentation

software, and Web development for teaching and learning; critique software relevant to their area of teaching; and develop an educational activity based on their review of the literature that harnesses the power of technology. **Prerequisite:** students must be registered EDS graduate students (ED 76, 77, 78, 79, 80).

EDS 204. Technology and Professional Assessment (2)

Advanced techniques for using network-based resources for teaching and learning will be introduced. Students will review relevant research on advanced technologies related to assessment of professional performance and student achievement. Students will present a Web-based professional Teaching Performance Assessment Portfolio that reflects teaching performance during their student teaching or internship field experience. **Prerequisite:** students must be registered EDS graduate students.

EDS 205A. Reflective Teaching Practice (2)

This course introduces principles and practices of reflective teaching. Student teachers and interns will systematically document their practice teaching and analyze observation data to improve performance. Students will collaborate with supervisors and expert teachers throughout the yearlong preservice teaching experience. **Prerequisites:** students must be registered EDS graduate students.

EDS 205B. Reflective Teaching Practice (2)

This course introduces principles and practices of reflective teaching. Student teachers and interns will systematically document their practice teaching and analyze observation data to improve performance. Students will collaborate with supervisors and expert teachers throughout the yearlong preservice teaching experience. **Prerequisites:** EDS 205A, and students must be registered EDS graduate students.

EDS 206. Teaching Performance Assessment Portfolio (4)

This course introduces the use of a Teaching Performance Assessment Portfolio for assessment of teaching performance. Student teachers and interns will design an electronic portfolio that demonstrates acceptable performance on essential credential standards. National Board of Professional Teaching Standards will also be introduced. **Prerequisite:** students must be registered EDS graduate students.

EDS 229. Introduction to Educational Resources (4)

This course prepares K–12 teacher-researchers to design, implement, and evaluate classroom research. Students learn how to access and evaluate research studies, curricular materials, and instructional approaches both on-line and in print. **Prerequisite:** students must be registered TE76 majors.

EDS 230A-B-C. Research in Curriculum Design (4-4-4)

A year-long course sequence which provides an extensive overview of curriculum design principles appropriate for K–12 instruction. Consensus and model building methods will be discussed using case studies of curriculum research and development projects appropriate for various subject areas and grade levels. Participants will design, implement, and evaluate a curriculum project in their own classrooms. **Prerequisite:** must be TE76 major or consent of instructor. (F,W,S)

EDS 231. Advanced Topics in Instructional Practices (4)

Selected advanced topics in K–12 instructional practices in various subject areas. Techniques for teaching higher-level cognitive processes and advanced applications of computers and other technology will be stressed. Participants will conduct a field study of promising teaching practices appropriate to their grade level(s) and subject area(s) of instruction. **Prerequisite:** must be TE76 major or consent of instructor. (Su)

EDS 232. Special Topics in Education (4)

This course explores topical issues in education. It focuses on recent developments which have broad implications for research and practice in teaching and learning. Course topics will vary each time the course is offered. **Prerequisite:** TE76 major or consent of instructor.

EDS 233A. Topics in Education Research and Design (2)

Current topics and issues in education and educational research methodology, including action research, participant observation, ethnography, and survey research. This is the first in a two-course series. **Prerequisite:** TE76 major or consent of instructor.

EDS 233B. Topics in Education Research and Design (2)

Current topics and issues in education and educational research methodology, including action research, participant observation, ethnography, and survey research. This is the second in a two-course series. **Prerequisite:** EDS 233A: TE76 major or consent of instructor.

EDS 240A. Research in ASL-English Bilingual Education (4)

A three-course sequence in which participants conduct an overview of research and design and conduct a study related to bilingual, bicultural education for deaf children. **Prerequisite:** TE81 major: Teaching and Learning Bilingual Education (ASL-English) or consent of instructor.

EDS 240B. Research in ASL-English Bilingual Education (4)

A three-course sequence in which participants conduct an overview of research and design and conduct a study related to bilingual, bicultural education for deaf children. **Prerequisites:** EDS 240A, and TE81 major: Teaching and Learning Bilingual Education (ASL-English) or consent of instructor.

EDS 240C. Research in ASL-English Bilingual Education (4)

A three-course sequence in which participants conduct an overview of research and design and conduct a study related to bilingual, bicultural education for deaf children. **Prerequisites:** EDS 240A/EDS 240B, and TE81 major: Teaching and Learning Bilingual Education (ASL-English) or consent of instructor.

EDS 241. Advanced Topics in Deaf Education (2)

Topics in human development and education that relate to deaf and hard-of-hearing children and the relationship between home, community/culture, and classroom. **Prerequisite:** TE81 major or consent of instructor.

EDS 250. Equitable Educational Research and Practice (4)

This course introduces students to research studies and educational practices of educational equity, both in general and within specific content areas. Research studies relevant to educational equity will be examined, as will practices that have attempted to enable all students to achieve to the best of their abilities. **Prerequisite:** students must be registered EDS graduate students.

EDS 260A. Educational Research and Evaluation Design (4)

This course integrates a variety of social and behavioral science perspectives and research methodologies in examining topics of central relevance to education. Students have opportunities to design and apply to educational-research questions a variety of methodologies, including survey, interview, ethnographic, case study, video data analysis, and discourse analysis methods. This is the first of a three-course series. **Prerequisite:** admission into the Ed.D. program or consent of instructor.

EDS 260B. Educational Research and Evaluation Design (4)

This course integrates a variety of social and behavioral science perspectives and research methodologies in examining topics of central relevance to education. Students have opportunities to design and apply to educational-research questions a variety of methodologies, including survey, interview, ethnographic, case study, video data analysis, and discourse analysis methods. This is the second of a three-course series. **Prerequisites:** EDS 260A, and admission into the Ed.D. program or consent of instructor.

EDS 260C. Educational Research and Evaluation Design (4)

This course integrates a variety of social and behavioral science perspectives and research methodologies in examining topics of central relevance to education. Students

have opportunities to design and apply to educational research questions a variety of methodologies, including survey, interview, ethnographic, case study, video data analysis, and discourse analysis methods. This is the third of a three-course series. **Prerequisites:** EDS 260B, and admission into the Ed.D. program or consent of instructor.

EDS 261A. Advanced Research and Evaluation Methods (4)

This course addresses more advanced topics in research design and methodology. Students hone the requisite research skills to conduct dissertation research. Students gain varied hands-on experiences in collecting and analyzing data relevant to schooling, as well as learn how to develop, manage, and analyze large data files. Students create a research agenda and develop skills needed in proposal writing: development, organization and coherence, conceptualization of research design, and attention to audience and writing style. This is the first of a three-course series. **Prerequisite:** admission into the Ed.D. program or consent of instructor.

EDS 261B. Advanced Research and Evaluation Methods (4)

This course addresses more advanced topics in research design and methodology. Students hone the requisite research skills to conduct dissertation research. Students gain varied hands-on experiences in collecting and analyzing data relevant to schooling, as well as learn how to develop, manage, and analyze large data files. Students create a research agenda and develop skills needed in proposal writing: development, organization and coherence, conceptualization of research design, and attention to audience and writing style. This is the second of a three-course series. **Prerequisites:** EDS 261A, and admission into the Ed.D. program or consent of instructor.

EDS 261C. Advanced Research and Evaluation Methods (4)

This course addresses more advanced topics in research design and methodology. Students hone the requisite research skills to conduct dissertation research. Students gain varied hands-on experiences in collecting and analyzing data relevant to schooling, as well as learn how to develop, manage, and analyze large data files. Students create a research agenda and develop skills needed in proposal writing: development, organization and coherence, conceptualization of research design, and attention to audience and writing style. This is the third of a three-course series. **Prerequisites:** EDS 261B, and admission into the Ed.D. program or consent of instructor.

EDS 262A. Dissertation Writing Seminar (4)

This seminar provides an opportunity for doctoral candidates to present and critique in-progress dissertation research and writing. Topics addressed will also include writing for professional publications and presenting research findings to varied audiences. This is the first of a three-course series. **Prerequisite:** admission into the Ed.D. program or consent of instructor.

EDS 262B. Dissertation Writing Seminar (4)

This seminar provides an opportunity for doctoral candidates to present and critique in-progress dissertation research and writing. Topics addressed will also include writing for professional publications and presenting research findings to varied audiences. This is the second of a three-course series. **Prerequisites:** EDS 262A, and admission into the Ed.D. program or consent of instructor.

EDS 262C. Dissertation Writing Seminar (4)

This seminar provides an opportunity for doctoral candidates to present and critique in-progress dissertation research and writing. Topics addressed will also include writing for professional publications and presenting research findings to varied audiences. This is the third of a three-course series. **Prerequisites:** EDS 262B, and admission into the Ed.D. program or consent of instructor.

EDS 270. Leadership and Equity in Educational Reform (4)

This course provides a framework for understanding school reform movements that integrates relevant theory and research from a number of academic disciplines. **Prerequisite:** admission into the Ed.D. program or consent of instructor.

EDS 271. Language and Diversity in the Schooling Process (4)

This course examines current research and theory which relate language and diversity to educational outcomes. Topics addressed include the development of language and literacy in schools and other settings, socio-cultural perspectives on language learning, and implications for educational policy and practice. **Prerequisite:** admission into the Ed.D. program or consent of instructor.

EDS 272. Education and Culture (4)

This course examines schooling from an anthropological perspective, focusing on the impact of social and cultural forces on teaching and learning in U.S. public schools using comparative materials from other societies and settings. **Prerequisite:** admission into the Ed.D. program or consent of instructor.

EDS 273. Research in Teaching and Learning: Reading and Writing (4)

This seminar will address current theories and research on the teaching and learning of reading and writing, as well as how research can be used to analyze and foster effective teaching practices. **Prerequisite:** admission into the Ed.D. program or consent of instructor.

EDS 274. Research in Teaching and Learning: Mathematics (4)

This seminar will address current theories and research on the teaching and learning of mathematics, as well as how research can be used to analyze and foster effective teaching practices. **Prerequisite:** admission into the Ed.D. Program or consent of instructor.

EDS 275. Research in Teaching and Learning: Science (4)

This seminar will address current theories and research on the teaching and learning of science, as well as how research can be used to analyze and foster effective teaching practices. **Prerequisite:** admission into the Ed.D. Program or consent of instructor.

EDS 276. Research in Teaching and Learning: English Language Learning (4)

This seminar will address current theories and research on the teaching and learning of second-language learning, as well as how research can be used to analyze and foster effective practices in teaching English to non-native speakers. **Prerequisite:** admission into the Ed.D. Program or consent of instructor.

EDS 277. Research in Teaching and Learning: History and Social Sciences (4)

This seminar will address current theories and research on the teaching and learning of social sciences, as well as how research can be used to analyze and foster effective teaching practices. **Prerequisite:** admission into the Ed.D. Program or consent of instructor.

EDS 278/COGR 278. Talking Culture, Culture Talking: Voices of Diversity (4)

This course explores the discourse of culture in American society and the problem of "silenced" or unheard voices. The interaction of individual and collective voice, language, and identity are discussed as they bear on the ways that culture moves through important social institutions such as schools. Of particular interest are issues of teaching, learning, displacement, inclusion, marginality, and the "speaking center." **Prerequisite:** graduate status or consent of instructor.

EDS 280. Re-Thinking Leadership (4)

This course will present the evolution of leadership thought and theory, with an emphasis on the distinction between, and interrelatedness of, effective management and leadership. The ethics of leadership practice and epistemological perspectives of emerging leadership styles will be explored, and students will have opportunities to reflect on the nature of leadership as it is practiced in educational settings. Applying critical, self-reflective leadership practice through structured activities is also an element of this course.

EDS 281. Leadership for Learning (4)

This course will explore various models of curriculum and instruction in response to students' learning needs. It also will examine models of school organization and the leader's role and responsibility in developing a school culture that

promotes student achievement, using evidence-based decision-making. A major emphasis will be on evaluating research on which theories and practice are based. **Prerequisite:** Joint Ed.D. in Educational Leadership student status.

EDS 282. Leadership for a Diverse Society (4)

This course will address theories and practices for achieving schools and classrooms that are informed by and built around the participation of diverse communities and cultures. The emphasis is on how leadership intersects with socio-historical and socio-cultural theories that suggest that the organization of schools and instruction is critical to student inclusion and outcomes. A basic premise of this course is that a socially just learning theory begins with using all of the resources and knowledge of families, communities, and cultures in formulating policy and practice. **Prerequisite:** Joint Ed.D. in Educational Leadership student status.

EDS 283. Leadership for Organizational Change (4)

This course will present multiple theories of organizational change, explore group processes and identify models of decision-making, and analyze human motivation theories. Establishing and nurturing a purpose-driven organization, while dealing with competing demands, will be discussed. A major emphasis in this course is on people as agents of change and on the creation of high-quality ethical and productive workplaces where employees can achieve success and satisfaction, while advancing the mission of the educational organization. **Prerequisite:** Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 284. Leadership for Organizational Development (4)

This course will investigate the skills and dispositions needed for students to lead the development of learning organizations. Faculty will teach and model concepts of working with people within educational organizations and programs. Emphasis will be placed on individual's team development and facilitation, organizational communications, adult learning, and professional development. **Prerequisite:** Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 285. Leadership for the Future (4)

This course addresses interdisciplinary influences on leadership practice within learning organizations. Contributions from scholars in futures' studies, including those influenced by modernism and postmodernism, will be used to explore topics such as long-range planning, demographic trends, technology, and brain theory. **Prerequisite:** Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 286. Advanced Topics in Leadership (4)

This course explores topical issues in the field of leadership. It focuses on recent developments that have broad implications for research and practice in educational leadership. Course topics will vary each time the course is offered. **Prerequisite:** Joint Ed.D. in Educational Leadership student status.

EDS 287A. Educational Research and Evaluation Design (4)

This course integrates a variety of social and behavioral science perspectives and research methodologies in examining topics of central relevance to education. Students have opportunities to design and apply to educational-research questions a variety of methodologies, including experimental and quasi-experimental survey, interview, ethnographic, case study, video data analysis, and discourse analysis methods. This is the first in a three-course sequence. **Prerequisite:** EDS Education Doctorate student or consent of instructor.

EDS 287B. Educational Research and Evaluation Design (4)

This course integrates a variety of social and behavioral science perspectives and research methodologies in examining topics of central relevance to education. Students have opportunities to design and apply to educational-research questions a variety of methodologies, including experimental and quasi-experimental survey, interview, ethnographic, case study, video data analysis, and

discourse analysis methods. **Prerequisites:** EDS 287A, and EDS Education Doctorate student or consent of instructor.

EDS 287C. Educational Research and Evaluation Design (4)

This course integrates a variety of social and behavioral science perspectives and research methodologies in examining topics of central relevance to education. Students have opportunities to design and apply to educational-research questions a variety of methodologies, including experimental and quasi-experimental survey, interview, ethnographic, case study, video data analysis, and discourse analysis methods. **Prerequisites:** EDS 287B, and EDS Education Doctorate student or consent of instructor.

EDS 288A. Advanced Research and Evaluation Methods—Data and Introduction to Inferential Statistics (4)

This first course in a three-course series focuses on the importance of data interpretation. Students hone the requisite research skills to conduct dissertation research as it pertains to gathering, collecting, analyzing, and reporting data in a meaningful way. This course provides an overview of data use in educational systems as well as an introduction to survey design and inferential statistics. Students create a research agenda to develop skills needed in proposal writing. **Prerequisite:** Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 288B. Advanced Research and Evaluation Methods (4)

Second course in a three-course series. Focuses on student's skill development in qualitative research with emphasis on designing qualitative studies with a strong focus on case study method and second level statistics. Students will learn and practice a variety of qualitative data collection approaches such as observing, interview, and documenting analysis. In addition, students will develop competence in evaluation using Appreciative Inquiry and active research tools that can assist organizations (schools, districts) in evaluating programs. **Prerequisite:** Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 288C. Advanced Research and Evaluation Methods (4)

A continuation of 288B, this course focuses on analyzing data. Students will deepen knowledge and skill on data collection and analysis and using data to prepare and report findings. Students will have an opportunity to use the qualitative data software program N-Vivo to code and sort data. In collaborative groups, students will also explore other research methods of their choosing and will develop and conduct a small pilot study relevant to dissertation topics. **Prerequisite:** Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 289A. Dissertation Writing Seminar (4)

This seminar provides an opportunity for doctoral candidates to present and critique in-progress dissertation research and writing. Topics addressed will also include writing for professional publications and presenting research findings to varied audiences. This is the first in a four-course series. **Prerequisite:** Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 289B. Dissertation Writing Seminar (4)

This seminar provides an opportunity for doctoral candidates to present and critique in-progress dissertation research and writing. Topics addressed will also include writing for professional publications and presenting research findings to varied audiences. This is the second in a four-course series. **Prerequisites:** EDS 289A, and Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 289C. Dissertation Writing Seminar (4)

This seminar provides an opportunity for doctoral candidates to present and critique in-progress dissertation research and writing. Topics addressed will also include writing for professional publications and presenting research findings to varied audiences. This is the third in a four-course series. **Prerequisites:** EDS 289B, and Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 289D. Dissertation Writing Seminar (4)

This seminar provides an opportunity for doctoral candidates to present and critique in-progress dissertation research and writing. Topics addressed will also include writing for professional publications and presenting research findings to varied audiences. This is the fourth course in a four-course series. **Prerequisites:** EDS 289C, and Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 290. Research Practicum (1–12)

Supervised research studies with individual topics selected according to students' special interests. Students will develop a research proposal appropriate for M.A. thesis, begin to gather and analyze data. **Prerequisites:** M.A. candidate and consent of instructor. (S/U grades only.)

EDS 291A. Leadership Research Practicum (2)

Students use their placements in local schools and educational settings to examine leadership research and practice topics raised in the Leadership core courses and Research and Evaluation Design/Methods courses. This is the first in a three-course series. **Prerequisite:** Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 291B. Leadership Research Practicum (2)

Students use their placements in local schools and educational settings to examine leadership research and practice topics raised in the Leadership core courses and Research and Evaluation Design/Methods courses. This is the second course in a three-course series. **Prerequisites:** EDS 291A, and Joint Ed.D. in Educational Leadership student status.

EDS 291C. Leadership Research Practicum (2)

Students use their placements in local schools and educational settings to examine leadership research and practice topics raised in the Leadership core courses and Research and Evaluation Design/Methods courses. This is the third course in a three-course series. **Prerequisites:** EDS 291B, and Joint Ed.D. in Educational Leadership student status.

EDS 292. Qualifying Paper Preparation (2)

This course will provide students with time, resources, and guidance for the purpose of developing a review of literature on a student-related topic, which typically becomes the focus of the dissertation research project. Students will be expected to use a variety of research tools in order to discover and identify relevant information. **Prerequisite:** Joint Ed.D. in Educational Leadership student status. (S/U grade permitted)

EDS 293A. Advanced Leadership Research Practicum (2)

Students use their placements in local schools and educational settings to examine leadership research and practice topics raised in the Leadership core courses and Research and Evaluation Design/Methods courses. This is the first course in a three-course series. **Prerequisite:** Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 293B. Advanced Leadership Research Practicum (2)

Students use their placements in local schools and educational settings to examine leadership research and practice topics raised in the Leadership core courses and Research and Evaluation Design/Methods courses. This is the second course in a three-course series. **Prerequisites:** EDS 293A, and Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 293C. Advanced Leadership Research Practicum (2)

Students use their placements in local schools and educational settings to examine leadership research and practice topics raised in the Leadership core courses and Research and Evaluation Design/Methods courses. This is the third course in a three-course series. **Prerequisites:** EDS 293B, and Joint Ed.D. in Educational Leadership student status or consent of instructor.

EDS 294A. Colloquium on Educational Leadership (2)

Program faculty and visiting lecturers present leadership research in progress. Serves as a forum to discuss current research in educational leadership. This is the first course of a two-course series. **Prerequisite:** graduate student status or consent of instructor.

EDS 294B. Colloquium on Educational Leadership (2)

Program faculty and visiting lecturers present leadership research in progress. Serves as a forum to discuss current research in educational leadership. This is the second course in a two-course series. **Prerequisites:** EDS 294A, and graduate student status or consent of instructor.

EDS 295. MA Thesis (1–8)

Research for the Master's thesis (Educational Research) or Curriculum Design Portfolio thesis (Curriculum Design). Open for repeated registration up to eight units (S/U grade only). **Prerequisites:** consent of instructor.

EDS 297. Directed Group Study (1–6)

Study and analysis of specific topics under the guidance of a faculty member. Offered for repeated registration. **Prerequisite:** consent of instructor.

EDS 298. Independent Study (1–6)

Individual guided study and/or independent research in an area not covered by present course offerings. Offered for repeated registration. **Prerequisite:** consent of instructor.

EDS 299. Dissertation Research (1–12)

Directed research on dissertation topic for students who have been admitted to candidacy for the Ed.D. degree. May be repeated for credit. **Prerequisite:** admission into the Ed.D. program.

Eleanor Roosevelt College

OFFICE: Provost, Eleanor Roosevelt College
ERC Administration Building
<http://roosevelt.ucsd.edu>

THE MAKING OF THE MODERN WORLD/ WRITING PROGRAM

OFFICE: Eleanor Roosevelt College MMW Program
ERC Administration Building

See "[The Making of the Modern World](#)" for Eleanor Roosevelt College writing.

ELEANOR ROOSEVELT COLLEGE HONORS PROGRAM

OFFICE: Provost, Eleanor Roosevelt College
ERC Administration Building

Honors programs at Eleanor Roosevelt College have been established to provide exceptionally motivated and capable students with enhanced educational experiences through close interaction with faculty and other honors students. There are two main components to the program: the Freshman Honors Program and the Sophomore Honors Research Project. Participation in either is by invitation.

In the fall quarter of their freshman year, selected students are invited to enroll in the Freshman Honors Seminar, a two- to three-quarter course. During the fall quarter, students meet with a variety of faculty members to learn more about their research, and about academic enrichment opportunities at UC San Diego. The seminar continues during the winter quarter, focusing on an international theme with faculty speakers. Honors students may receive opportunities for particular cultural and social events. Second-year students with GPAs of 3.5 or higher have the opportunity to pursue independent study with individual faculty.

Additional honors opportunities are offered in the Making of the Modern World (MMW) sequence. Students with excellent grades in MMW 1, 2, and 3 and high cumulative grade-point averages are eligible to take MMW 4H, 5H, and 6H. Students attend regular course lectures but meet in separate honors sections. They may also be invited to special guest lectures and enrichment activities connected with MMW.

There are also opportunities for university-wide honors, including provost's honors. Students who maintain a GPA of 3.5 for a full academic year are awarded certificates of merit by the college.

UCSD's reputation for excellence is also reflected in the numbers of students who enroll in departmental senior honors programs and who earn

college or university honors or election to Phi Beta Kappa.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

10. ERC Freshman Honors Seminar (0)

Weekly seminar with faculty members from a variety of disciplines. This seminar provides students with the opportunity to learn more about research and scholarly activities available to them, and acquaints them with UCSD faculty members. **Prerequisite:** by invitation only. Pass/Not Pass grades only.

20. Freshman Honors Seminar: International Themes (1)

This weekly seminar focuses on a chosen international theme with faculty speakers. The structure of the seminar is informal, giving students the opportunity to participate in interactive discussions. **Prerequisite:** by invitation only. Pass/Not Pass only. May be taken for credit two times.

92. Honors Project (2)

Individual project on a topic chosen by the student, done under direction of a faculty member. **Prerequisite:** by invitation only. Pass/Not Pass only. Repeatable for credit twice, up to a total of six units over three quarters.

196. Honors Project (4)

Senior thesis research project for students who have been accepted into the Eleanor Roosevelt College Individual Studies major. Project will be carried out under supervision of one or more faculty members. Depending on scope of the project, may be taken for four or eight units of credit in a single quarter, or eight units distributed over two quarters. **Prerequisite:** admission to Eleanor Roosevelt Individual Studies major.

199. ERC Independent Studies (4)

The content of this independent study course, which may not duplicate any existing course on campus, will be determined by a supervising faculty member and tailored to fit specific content needs of students pursuing the Eleanor Roosevelt College Individual Studies major. **Prerequisite:** admission to ERC Individual Studies major.

ELEANOR ROOSEVELT SEMINAR

OFFICE: Provost, Eleanor Roosevelt College
ERC Administration Building

90. Undergraduate Seminar (1)

A seminar intended for exposing undergraduate students, especially freshmen and sophomores, to exciting research programs conducted by the faculty. **Prerequisite:** none. Pass/Not Pass only.

Engineering, Jacobs School of

OFFICE: 7310 Engineering Building Unit 1, Warren Mall
<http://www.jacobsschool.ucsd.edu>

The Irwin and Joan Jacobs School of Engineering at UC San Diego comprises the Departments of Bioengineering (BE), Computer Science and Engineering (CSE), Electrical and Computer Engineering (ECE), Mechanical and Aerospace Engineering (MAE), NanoEngineering (NE), and Structural Engineering (SE). The Jacobs School is directed by the dean of engineering. The departments offer eighteen undergraduate programs that fall into three categories: impacted, pre-major, and open major programs as well as many graduate degree programs. For a complete list of engineering undergraduate and graduate programs, please visit our Web site at <http://www.jacobsschool.ucsd.edu>. Students interested in engineering should consult the Web site and the individual department listings which follow this section of the catalog.

UCSD's six undergraduate colleges differ in their general-education requirements. Prospective students should review the general-education requirements and take them into account when planning their college curriculum.

ACCEPTANCE TO DEPARTMENTAL MAJORS IN THE JACOBS SCHOOL OF ENGINEERING

Student demand exceeds program capacity in some of the undergraduate majors. Owing to limited departmental resources, major programs to which more students apply than can be accepted have been declared impacted majors. Acceptance into an impacted engineering major is based on academic excellence demonstrated in high school or at a community college. Acceptance will be granted to the maximum number of students in each of these impacted major programs consistent with maintaining acceptable program quality and in compliance with admissions procedures and criteria approved by the Academic Senate's Committee on Educational Policy.

Remember that admission to the university and to a college does not guarantee acceptance to an impacted major.

FRESHMEN

Freshmen are admitted to engineering majors in one of three ways: open majors, pre-majors and impacted majors.

Open Majors

The following majors are open to all admitted UCSD students: bioengineering: bioinformatics (offered through the BENG department), chemical engineering (offered through the NE department),

computer engineering (offered through the CSE department), computer engineering (offered through the ECE department), computer science, electrical engineering, electrical engineering and society, engineering science (offered through the MAE department), engineering sciences (offered through the SE department), environmental engineering, and structural engineering. All applicants who have been accepted to UCSD and indicated a pre-major or open engineering major on their application are placed directly into that major.

Pre-major Programs

There is one engineering pre-major program offered: (1) engineering physics. Incoming freshmen who identify this pre-major as their first choice on their UCSD admissions application are accepted directly into the pre-major upon admission to UCSD. Subsequent acceptance to the major is dependent on performance in selected mathematics, science, and engineering screening courses as well as competitive grade-point average in the pre-major screening courses.

Pre-major engineering students are expected to apply for acceptance to the major during the spring quarter of their freshman year. Acceptance to the major is based on the grade-point average in the screening courses only. The grade-point average required for acceptance to the major by pre-majors is set individually by each engineering program. Pre-majors should consult their departments concerning the appropriate screening courses and the current grade-point average standards for acceptance. In addition to the courses required by the departments, it is expected that all pre-major students will take twelve to eighteen units of general-education college requirements during their first year.

Pre-major engineering students who are not able to apply before the end of their third quarter, or who wish to reapply following an unsuccessful application, must contact their department as soon as possible for further advising as **acceptance to any engineering major that has a pre-major will not be considered after six quarters of enrollment.**

Impacted Majors

The following engineering majors are impacted: aerospace engineering, bioengineering, bioengineering: biotechnology and mechanical engineering. Applicants must indicate one of these impacted majors as their first choice on their UC application in order to be considered for acceptance to the major by the UC San Diego Office of Admissions.

Effective fall 2001, this selection is based on the freshman review criteria (Comprehensive Review) administered by the UCSD Office of Admissions and Relations with Schools.

It is strongly suggested that all students accepted into engineering programs consult their department's academic advisor at an early stage to plan their lower-division engineering courses, and that they consult with a college academic counselor to arrange general-education courses around the required screening courses. Students admitted fall quarter should attend the engineering department's orientation meetings during Welcome Week.

Bioinformatics Programs

Students interested in applying to either the bioengineering: bioinformatics major (offered by the Department of Bioengineering), or the computer science major with a specialization in bioinformatics (offered by the Department of Computer Science and Engineering) should consult individual department listings which follow this section of the catalog.

TRANSFERS

Following California's Master Plan for Higher Education, UC San Diego gives high priority to students transferring from California community colleges.

Transfer students are admitted to engineering majors in one of three ways: open majors, pre-majors, and impacted majors. For major-specific advising, please contact the relevant departmental undergraduate academic advising office.

Effective **fall 2009**, these courses are **strongly recommended for all engineering transfer students** for success in their major.

- Calculus I—for Science and Engineering (Math. 20A)
- Calculus II—for Science and Engineering (Math. 20B)
- Calculus and Analytic Geometry (Math. 20C)
- Differential Equations (Math. 20D)
- Linear Algebra (Math. 20F)
- Complete calculus-based physics series with lab experience (Physics 2A-B-C)
- Chemistry 6A (except computer science and computer engineering majors)
Note: A total of ten quarter-units of general chemistry (including laboratory) will be recommended for students applying to all majors offered by the Department of Bioengineering.
- Highest level of introductory computer programming language course offerings at the community college*
- Community college equivalent courses can be found at: <http://www.assist.org>

*Refer to the *UC San Diego General Catalog* to select major prerequisite recommendations for computer language courses.

Open Majors

The following majors are open to all admitted UCSD transfer students: aerospace engineering (offered through MAE through spring 2011), bioengineering: bioinformatics (offered through the BENG department), chemical engineering (offered through NE), computer engineering (offered through CSE), computer engineering (offered through ECE), computer science, electrical engineering, electrical engineering and society, engineering science (offered through MAE), engineering sciences (offered through SE), environmental engineering, mechanical engineering (offered through MAE through spring 2011), and structural engineering.

Pre-major Programs

There is one engineering pre-major program offered: (1) engineering physics. Subsequent acceptance to the major is dependent on performance in selected mathematics, science, and engineering screening courses as well as competitive grade-point average in the pre-major screening courses.

Pre-major transfer engineering students are expected to apply for acceptance to the major during their third quarter of their first year at UCSD. Acceptance to the major is based on the grade-point average in the screening courses only. The grade-point average required for acceptance to the major by pre-majors is set individually by each engineering program. Pre-majors should consult their departments concerning the appropriate screening courses and the current grade-point average standards for acceptance. In addition to the courses required by the departments, it is expected that all pre-major students will take twelve to eighteen units of general-education college requirements during their first year.

Pre-major transfer engineering students must apply to the major before the end of their third quarter as acceptance to any engineering major that has a pre-major by a transfer student will not be considered after the end of the third quarter of enrollment.

Impacted Majors

Since acceptance to impacted engineering majors is quite competitive for freshman and transfer applicants alike, academic standards are high.

Transfer students who choose impacted engineering major programs (bioengineering, bioengineering: biotechnology) as their first-choice major on their UC application are strongly encouraged to complete the major preparation classes listed previously.

Acceptance to impacted majors may be limited to the best transfer applicants, e.g., those who have been admitted to UCSD with the most complete lower-division preparation and the highest college grade-point averages. Since acceptance is restricted to these majors, **transfer students are encouraged to apply to more than one major degree program.**

It is strongly suggested that all students accepted into engineering programs consult their department's academic advisor at an early stage to plan their lower-division engineering courses, and that they consult with a college academic counselor to arrange general-education courses around the required screening courses. Students admitted fall quarter should attend the engineering department's orientation meetings during Welcome Week.

For specific program requirements for transfer students, please refer to the appropriate department's listing which follow this section of the catalog.

Bioinformatics Programs

Students interested in applying to either the bioengineering: bioinformatics major (offered by the Department of Bioengineering), or the computer science major with a specialization in bioinformatics (offered by the Department of Computer Science and Engineering) should consult individual

department listings which follow this section of the catalog.

CONTINUING UCSD STUDENTS

Continuing UCSD undergraduate students who wish to change into impacted majors must submit an application to the department on or before the target dates and must meet minimum requirements. Interested students should make an appointment to speak with the departmental undergraduate advisor for more details.

ACCESS OF NON-ENGINEERING MAJORS TO THE JACOBS SCHOOL OF ENGINEERING COURSES

The number of students enrolled in some courses offered by departments in the Jacobs School of Engineering must be restricted to meet the resources available. Students who have successfully completed all prerequisite courses will be enrolled in these restricted courses in the following order:

1. students accepted by the department to a major curriculum
2. students accepted by the department to a minor curriculum
3. students fulfilling a requirement for another major
4. all others, with permission of the department and instructor

Students should check with the departments concerning the limitations on specific courses and the requirements needed prior to attempting to enroll.

DOUBLE MAJORS AND MINORS

It is the policy of the UC San Diego Academic Senate not to approve double majors within engineering. Students who qualify for admission to graduate school and who have the extra time are encouraged to consider co-terminal B.S./Master's degrees in one or two engineering disciplines.

For more information visit http://www.jacobsschool.ucsd.edu/academic/academic_undergrad/bs-ms.shtml.

ORIENTATION TO ENGINEERING

ECE 1A-B-C: This course series has no prerequisites and students will be given an introduction to the engineering profession and our undergraduate program. Exercises and practicums will develop the problem-solving skills needed to succeed in engineering. It is offered fall, winter, and spring.

INTEGRATIVE ENGINEERING EDUCATION

Engineering Student Services: Engineering Student Services (ESS) facilitates and encourages the professional, academic, and personal success of engineering students. The services available through Engineering Student Services are designed to assist students as they pursue their chosen degrees and to prepare them for life outside of the university as engineering professionals and responsible citizens. The staff serve as a resource for those interested in applying to engineering majors; getting involved in

student organizations; seeking internships; accessing tutoring, scholarship, and involvement information; or for those needing a referral to on-campus and community resources. In addition, support is provided to the Teams in Engineering Service (TIES) Program, Team Internship Program, and the California State Summer School for Mathematics and Science (COSMOS). For more information, visit the office in Engineering Building Unit 1, Room 1400, email the staff at ess@soe.ucsd.edu, or visit <http://ess.ucsd.edu>.

Teams in Engineering Service (TIES):

Engineering undergraduates can place their technical and creative skills to work for San Diego nonprofit organizations through the Teams in Engineering Service (TIES) Program. Through TIES, multidisciplinary teams of UCSD students design, build, and deploy projects that solve technology-based problems for local community organizations, and receive technical elective (or academic) credit. For details, visit <http://ties.ucsd.edu>.

Team Internship Program (TIP): Under the direction of the Corporate Affiliates Program, this corporate-sponsored program gives students the opportunity to develop their engineering skills in a multidisciplinary team environment that provides real-world engineering experience in preparation for entering the workforce. In these full-time, competitive summer paid internships, students work on-site with industry partners as a systems-oriented solution team focused on a clearly defined and significant project. For details, visit <http://www.jacobsschool.ucsd.edu/TIP>.

The California State Summer School for Mathematics and Science (COSMOS) is a four-week residential pre-college academic experience in math., science, and engineering for top high school students. Students participate in one of the following eight academic courses (or clusters): 1. Computers in Everyday Life; 2. Engineering Design and Control of Kinetic Sculptures; 3. Living Oceans and Global Climate Change; 4. Earthquakes in Action; 5. Bright Ideas: Light at Work; 6. Exploring the Cosmos; 7. Biological Motivations for Tensegrity Structures; and 8. The Molecular Biology Revolution. In summer 2008, one-third of the admitted students were awarded full financial aid. For more information, visit <http://www.jacobsschool.ucsd.edu/cosmos>.

Bernard and Sophia Gordon Engineering

Leadership Center: The mission of the Gordon Center is to train effective engineering leaders who create new products and jobs that benefit society. The Gordon Center offers an engineering leadership and awards program for undergraduate, graduate, and professional students with leadership potential. The Gordon Scholars participate in a comprehensive engineering leadership training program, which includes leadership workshops and forums, and summer programs that integrate theory and case studies with hands-on practice and mentoring. For details, visit <http://www.jacobsschool.ucsd.edu/GordonCenter/>.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

100A. Team Engineering (2)

Introduction to theory and practice of team engineering, including temperament and work styles; stages of team development; project management; communication, problem-solving, and conflict resolution skills; creativity; leadership; social entrepreneurship; and ethics. Students may not receive credit for both ENG 100 and ENG 100A.

Prerequisites: concurrent enrollment in or completion of one of the following: DOC 2, CAT 2, HUM 2, MMW 2, MCWP 50, or WCWP 10B, or consent of instructor.

100L. Team Engineering Laboratory (2)

Faculty-directed, multi-disciplinary, long-term engineering projects. Students use their technical knowledge to design and develop solutions to real problems in consultation with customers such as community organizations. **Prerequisite:** ENG 100 (required prior to or in concurrent enrollment with ENG 100).

ENG 100B. Engineering Leadership (2)

Engineering leadership attitudes, styles, principles, and approaches; stages of product development and evolution; strategic and critical thinking and problem solving for engineering projects; resource management; quality control; risk-analysis and risk-taking; engineering business economics, law, leadership and corporate ethics. Prerequisite: ENG 100A or ENG 100 or consent of the instructor.

201. Venture Mechanics (4)

Examines the engineering/entrepreneurism interface. Discovery, development, and implementation of new product ideas. Understanding markets, competitors, and selling innovations. Cultivating effective working relationships between research, engineering, manufacturing, and marketing elements of an organization. Priority enrollment given to engineering majors.

202. Enterprise Dynamics (4)

Case studies of start-ups, strategic technology management, practice in use of industrial decision-making tools, and speakers from successful firms combined with experience in making management decisions dynamically in a competitive computer-simulated enterprise. Field study of ongoing processes in a local high technology company. Priority enrollment given to engineering majors.

203. Applied Innovations (4)

Course includes the examination of business plans developed by early stage technology businesses. Students expected to work on the development of business plans for real, innovative business organizations. Will explore all of the business research and analysis that needs to be undertaken in order to develop a complete business plan. Completion of ENG 201 or ENG 202 preferred.

207. Corporate Entrepreneurship for Global Competitiveness (4)

Explore corporate entrepreneurship and innovation process using the medical device industry as a case example. This highly dynamic industry segment provides an approachable model to analyze corporate strategies and behaviors that affect overall competitiveness. **Prerequisites:** ENG 201, ENG 202, ENG 203 or consent of instructor.

Bioengineering

PROFESSORS

G. Cauwenberghs, Ph.D.
S. Chien, M.D., Ph.D., *Director, The Institute of Engineering in Medicine*
Y. C. Fung, Ph.D., *Professor Emeritus*
D. A. Gough, Ph.D.
M. J. Heller, Ph.D.
M. Intaglietta, Ph.D., *Vice Chair*
R. Lal, Ph.D.
A. D. McCulloch, Ph.D.
B. O. Palsson, Ph.D.
R. L. Sah, M.D., Sc.D.
G. W. Schmid-Schönbein, Ph.D.
S. Subramaniam, Ph.D., *Chair*
L. A. Sung, Ph.D.
J. T. Watson, Ph.D.

ASSOCIATE PROFESSORS

J. M. Hasty, Ph.D.
T. G. Ideker, Ph.D.
G. A. Silva, Ph.D.

ASSISTANT PROFESSORS

P. J. Arevalo Cabrales, Ph.D.
K. L. Christman, Ph.D.
A. J. Engler, Ph.D.
X. Huang, Ph.D.
S. Varghese, Ph.D.
K. Zhang, Ph.D.

LECTURER WITH POTENTIAL FOR SECURITY OF EMPLOYMENT

M. K. Micou, Ph.D.

ADJUNCT PROFESSORS

M. W. Berns, Ph.D.
L. M. Bjursten, Ph.D.
C. R. Cantor, Ph.D.
P. Citron
J. S. Lee, Ph.D.
K. Ley, M.D.
G. Paternostro, Ph.D.
P. Tong, Ph.D.

AFFILIATED FACULTY

R. B. Buxton, Ph.D., *Professor, Radiology*
P. C. Chau, Ph.D., *Professor, Mechanical and Aerospace Engineering*
J. W. Covell, M.D., *Professor Emeritus, Medicine*
M. H. Ellisman, Ph.D., *Professor, Neurosciences*
D. J. Hall, Ph.D., *Assistant Adjunct Professor, Radiology*
A. C. Kummel, Ph.D., *Professor, Radiology*
J. Lasheras, Ph.D., *Distinguished Professor, Mechanical and Aerospace Engineering*
R. L. Lieber, Ph.D., *Professor, Orthopaedics*
T. Liu, Ph.D., *Associate Professor, Radiology*
T. Nelson, Ph.D., *Professor, Radiology*
S. Nigam, M.D., *Professor, Department of Pediatrics*
J. H. Omens, Ph.D., *Adjunct Professor, Medicine*
M. Sailor, Ph.D., *Professor, Chemistry and Biochemistry*

S. Thomson, M.D., Ph.D., *Professor in Research, Medicine*
P. D. Wagner, M.D., *Professor, Medicine*
S. Ward, Ph.D., *Assistant Professor, Radiology and Orthopaedic Surgery*
J. B. West, M.D., Ph.D., *Professor, Medicine*

PROFESSIONAL RESEARCH STAFF

C. Barrett, Ph.D., *Assistant Project Scientist*
A. C. Chen, Ph.D., *Associate Project Scientist*
P. C. Chen, Ph.D., *Project Scientist*
B. K. Cho, Ph.D., *Assistant Project Scientist*
J. H. Haga, Ph.D., *Assistant Project Scientist*
Y. L. Hu, Ph.D., *Associate Project Scientist*
R. C. Kerckhoffs, Ph.D., *Assistant Project Scientist*
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A. P. Mihaylova, Ph.D., *Associate Project Scientist*
Z. Shi, Ph.D., *Assistant Project Scientist*
M. Temple-Wong, Ph.D., *Assistant Project Scientist*
A. G. Tsai, Ph.D., *Research Scientist*
C. Vera, Ph.D., *Assistant Project Scientist*
K. Zengler, Ph.D., *Assistant Project Scientist*

STUDENT AFFAIRS:

141 Powell-Focht Bioengineering Hall
Warren College
<http://www.be.ucsd.edu>

DEPARTMENTAL FOCUS

Bioengineering is an interdisciplinary major in which the principles and tools of traditional engineering fields, such as mechanical, materials, electrical, and chemical engineering, are applied to biomedical and biological problems. Engineering plays an increasingly important role in medicine in projects that range from basic research in physiology to advances in biotechnology and the improvement of health-care delivery. By its very nature, bioengineering is broad and requires a foundation in the engineering sciences as well as in physiology and other biological sciences.

The overall mission of the Department of Bioengineering is to improve health and quality of life by applying engineering principles to scientific discovery and technology innovation and to train future leaders in bioengineering through inspiring education and dedicated mentorship.

The educational objectives of the Bioengineering program at UC San Diego are to produce graduates with a modern bioengineering education who will

- apply the central areas of bioengineering, its underlying sciences, and related technologies in a broad range of careers
- use strong communication, learning, and teamwork skills to facilitate bioengineering practice and continued professional advancement
- act professionally, ethically, and in a socially responsible manner

At the undergraduate level, the department offers several four-year engineering majors. One leads to a **B.S. degree in Bioengineering**. This major prepares students for careers in the biomedical device industry and for further education in graduate school. Students completing the B.S. degree in Bioengineering have a broad preparation

in traditional topics in engineering, allowing for a variety of career pathways. This program addresses the bioengineering topics of biomechanics, biotransport, bioinstrumentation, bioelectricity, biosystems, and biomaterials, and the complementary fields of systems and integrative physiology. Education in these areas allows application of bioengineering and other scientific principles to benefit human health by advancing methods for effective diagnosis and treatment of disease, e.g., through development of medical devices and technologies.

The department also offers a **B.S. degree in Bioengineering: Biotechnology**. This major prepares students for careers in the biotechnology industry and for further education in graduate school. The curriculum has a strong engineering foundation with emphasis on biochemical process applications. This program addresses the bioengineering topics of biochemistry, metabolism, kinetics, biotransport, biosystems, bioreactors, bioseparations, tissue engineering, and the complementary fields of cellular physiology. Education in these areas allows application of bioengineering and physicochemical principles to cellular and molecular biology, with the applications that benefit human health.

Although the *Pre-Bioengineering: Premedical* pre-major has been discontinued and the process has been initiated for the discontinuation and phase-out of the four-year major leading to a **B.S. degree in Bioengineering: Premedical**, all required courses will continue to be offered until students in the *Pre-Bioengineering: Premedical* pre-major who satisfy the requirements and transition into the *Bioengineering: Premedical* major and current students in the *Bioengineering: Premedical* major have graduated.

The department also offers a major leading to a B.S. degree in **Bioengineering: Bioinformatics**. Bioinformatics is the study of the flow of information (genetic, metabolic, and regulatory) in living systems to provide an understanding of the properties of cells and organisms. This major has been developed by the Departments of Bioengineering, Chemistry and Biochemistry, Computer Science and Engineering, and Division of Biological Sciences. Students wishing to major in bioinformatics may apply through any of these departments or the division. The *Bioinformatics* major in Bioengineering emphasizes systems engineering and model-based approaches to interpreting and integrating bioinformatics data. The *Bioinformatics* major prepares students for careers in the pharmaceutical, biotechnology, and biomedical software industries, and for further studies in graduate school.

The programs and curricula of Bioengineering emphasize education in the fundamentals of engineering sciences that form the common basis of all engineering specialties. Education with this emphasis is intended to provide students with an interdisciplinary engineering foundation for a career in which engineering practice may expand rapidly. In addition, elements of bioengineering design are incorporated at every level in the curricula. This is accomplished by integration of laboratory experimentation, computer applications, and exposure to real bioengineering problems throughout the program. In the *Bioengineering* and *Bioengineering: Biotechnology* majors, students also work in teams on a senior design project to design a solution to

a multidisciplinary bioengineering problem suggested by professionals in bioengineering industry, academia, or medicine.

The Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET) is an organization with a mission of serving the public through promotion and advancement of education in fields including engineering, and ABET's strategic plans include accreditation of educational programs and promotion of quality and innovation in education (<http://www.abet.org>). At UC San Diego, *Bioengineering* and *Bioengineering: Biotechnology* have a relatively heavy emphasis on engineering, whereas *Bioengineering: Bioinformatics* and *Bioengineering: Premedical* have a relatively heavy emphasis on biological, chemical, and physical sciences. The *Bioengineering* and *Bioengineering: Biotechnology* programs are accredited by EAC/ABET. The *Bioengineering: Bioinformatics* and *Bioengineering: Premedical* programs are not accredited by a Commission of ABET.

At the graduate level, specialized curricula lead to the **M.S., M.Eng. (Master of Engineering)**, and **Ph.D.** degrees, as well as an integrated B.S./M.S. degree. In addition to the Ph.D. degree, the department offers a **Ph.D. degree with a specialization in Bioinformatics**. It is intended for students who have an interdisciplinary persuasion to work across computers, biology, medicine, and engineering. For further information on the specialization, please consult with the Student Affairs Office. The M.Eng. degree is a terminal professional degree whereas the M.S. and Ph.D. degrees are research programs. ([See section on master's degree programs.](#)) The graduate programs are characterized by strong interdisciplinary relationships with the other engineering departments and Departments of Physics, Mathematics, Biology, Chemistry and Biochemistry, Medicine, and others, as well as with campus organizations such as the Institute of Engineering in Medicine, Institute for Mechanics and Materials, and the School of Medicine.

THE UNDERGRADUATE PROGRAM

MAJOR REQUIREMENTS

Specific course requirements for each of the majors are outlined in tables below. In addition to the required technical courses specifically indicated, a suggested scheduling of humanities and social science courses (HSS) is included in the curricula for students to use to meet college general-education requirements. To graduate, students must maintain an overall GPA of at least 2.0, and obtain at least a C- grade in each course required for the major. All courses required for the major must be taken for a letter grade.

Deviations from the required programs of study must be approved by the Undergraduate Studies Committee *prior* to students taking alternative courses. In addition, students must obtain departmental approval of technical elective (TE) course selections *prior* to students taking the course. In the ABET-accredited programs, TE courses are restricted to those that meet ABET standards. Courses such as BENG 196, 197, and 198 are encouraged, but do not count as upper-division technical electives. BENG 195 and 199 can be used as technical electives

under certain conditions. Policy information may be obtained from the Student Affairs Office.

Students with accelerated academic preparation at admission to the university may vary the scheduling of lower-division courses such as mathematics, physics, and chemistry, but must first consult the department. Most lower-division courses are offered more than once each year to permit students some flexibility in their program scheduling. However, most upper-division bioengineering courses are taught only once each year. **Deviations in the scheduling of upper-division Bioengineering courses are strongly discouraged, as such changes usually lead to a delay in graduation.** The curricula shown in the tables below are consistent with the current scheduling of classes.

Minors are not offered in Bioengineering, and double major options are restricted. Students interested in double majors should consult the Student Affairs Office as early as possible.

GENERAL-EDUCATION/COLLEGE REQUIREMENTS

For graduation, each student must satisfy general-education course requirements determined by the student's college, as well as the major requirements determined by the department. The six colleges at UCSD require different general-education courses, and the number of such courses differs from one college to another. Each student should choose his or her college carefully, considering the special nature of the curriculum and the breadth of general education.

The bioengineering programs allow for humanities and social science (HSS) courses so that students can fulfill their college requirements. In the bioengineering ABET-accredited programs, students must develop a program that includes a total of at least forty units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. It should be noted, however, that some colleges require more than the ten HSS courses indicated in the *Bioengineering, Bioengineering: Premedical, Bioengineering: Biotechnology, and Bioengineering: Bioinformatics* curriculum tables. Accordingly, students in these colleges may take longer to graduate than the four years indicated in the schedule. Students must consult with their colleges to determine which HSS courses to take.

BIOENGINEERING

(ABET-Accredited Program)

FALL	WINTER	SPRING
FRESHMAN YEAR		
Math. 20A	Math. 20B	Math. 20C
Chem. 6A	Chem. 6B	BILD 1
MAE 9 or 10	Phys. 2A	Phys. 2B/2BL
HSS4	BENG 12	HSS4
	HSS4	
SOPHOMORE YEAR		
Math. 20D	Math. 20F7	Math. 20E
Chem. 6BL1	MAE 1407	MAE 3
Phys. 2C/2CL	BENG 109	BENG 100
HSS4	HSS4	HSS4
JUNIOR YEAR		
BENG 101	BENG 112A	BENG 112B
BENG 110	BENG 186B	BENG 172
MAE 170	BENG 140A	BENG 140B
HSS4	HSS4	BENG 103B
		BENG 187A

SENIOR YEAR

MAE 107	BENG 122A	BENG 125
BENG 187B	BENG 130	BENG 186A
DE6	BENG 187C	BENG 187D
TE3	DE6	TE3
HSS4	MAE 150	HSS4
	BENG 1915	

- 1 Chem. 6BL may be taken in any quarter within the first two years after completion of Chem. 6B.
- 2 BENG 1 may be taken in sophomore year.
- 3 Technical elective (TE) courses must be selected from a departmental approved list. Consult the Student Affairs Office.
- 4 Ten HSS courses are listed here; individual college requirements may be higher.
- 5 Recommended course, not required. For graduating seniors only.
- 6 Design elective (DE) courses must be selected from a two-quarter sequence, BENG 119AB, 126AB, 127AB, 128AB, 129AB, 139AB, 147AB, 148AB, 149AB, 169AB, 179AB.
- 7 Math. 20F and MAE 140 may be taken concurrently.

BIOENGINEERING: BIOTECHNOLOGY

(ABET-Accredited Program)

FALL	WINTER	SPRING
FRESHMAN YEAR		
Math. 20A	Math. 20B	Math. 20C
Chem. 6A	Chem. 6B	Chem. 6BL1/6C
MAE 9 or 10	Phys. 2A	Phys. 2B
HSS4	BENG 12	HSS4
	HSS4	
SOPHOMORE YEAR		
Math. 20D	Math. 20F	Math. 20E
Chem. 140A	Phys. 2C/2CL	Chem. 140B
BILD 1	BENG 130	BENG 100
HSS4	HSS4	HSS4
JUNIOR YEAR		
BIBC 100	BENG 123	BENG 103B
CENG 101A	BIBC 102	BENG 160
MAE 170	BICD 100	BENG 168
HSS4	HSS4	BENG 187A
		HSS4

SENIOR YEAR

BENG 161A	BENG 161B	BENG 125
BENG 187B	BENG 187C	BENG 187D
BENG 166A	DE6	BENG 186A
DE6	TE3	TE3
BENG 162	HSS4	
	BENG 1915	

- 1 Chem. 6BL may be taken concurrently with Chem. 6C or in any quarter within the first two years after completion of Chem. 6B.
- 2 BENG 1 may be taken in sophomore year.
- 3 Technical elective (TE) courses must be selected from a departmental approved list. Consult the Student Affairs Office.
- 4 Ten HSS courses are listed here; individual college requirements may be higher.
- 5 Recommended course, not required. For graduating seniors only.
- 6 Design elective (DE) courses must be selected from a two-quarter sequence, BENG 119AB, 126AB, 127AB, 128AB, 129AB, 139AB, 147AB, 148AB, 149AB, 169AB, 179AB.

BIOENGINEERING: PREMEDICAL#

(Not accredited by a Commission of ABET.)

#This major is being discontinued. Current students should follow the table of courses below.

FALL	WINTER	SPRING
FRESHMAN YEAR		
Math. 20A*	Math. 20B*	Math. 20C*
Chem. 6A*	Chem. 6B	Chem. 6BL1/6C
MAE 9 or 10*	Phys. 2A*	Phys. 2B*/2BL
HSS4	BENG 12	HSS4
	HSS4	

SOPHOMORE YEAR

Math. 20D	Math. 20F	Math. 20E
BILD 1	Chem. 140A	Chem. 140B
Phys. 2C/2CL	BENG 109	BENG 100
HSS4	HSS4	HSS4

JUNIOR YEAR

BENG 110	BENG 112A	BENG 112B
Chem. 140C5	BICD 100	BIBC 100
Chem. 143A	MAE 140	MAE 170
BILD 2	HSS4	HSS4

SENIOR YEAR

BIPN 140	BENG 186B	BENG 172
BIPN 100	BIPN 102	BENG 186A
BIBC 1023	TE3	TE3
HSS4	HSS4	

* Seven of the eight courses used to compute the performance index upon which Pre-Bioengineering: Premedical majors are admitted to the major at the end of the freshman year. The other course must be in engineering, science, or mathematics.

1 Chem. 6BL may be taken concurrently with Chem. 6C or in any quarter within the first two years after completion of Chem. 6B.

2 BENG 1 may be taken in sophomore year.

3 Technical elective (TE) courses must be selected from a departmental approved list. Consult the Student Affairs Office.

4 Ten HSS courses are listed here; individual college requirements may be higher.

5 Chem. 140C is not required for the major and can be used as a technical elective. Chem. 140C is a requirement for application to most medical schools.

BIOENGINEERING: BIOINFORMATICS

(Not accredited by a Commission of ABET.)

FALL WINTER SPRING

FRESHMAN YEAR

CSE 112	CSE 12	BILD 94
Chem. 6A	Chem. 6B	Chem. 6BL1/6C
Math. 20A	Math. 20B	Math. 20C
HSS4	HSS4	HSS4

SOPHOMORE YEAR

BILD 1	BILD 2	BILD 3
Math. 20D	Chem. 140A	Chem. 140B
Phys. 2A	Phys. 2B	Phys. 2C
HSS4	HSS4	CSE 21/Math. 15B

JUNIOR YEAR

BIBC 102/ Chem. 114B	BIMM 100/ Chem. 114C	BICD 110
BICD 100	CSE 101/ Math. 188	BIMM 101/ Chem. 112B

CSE 100/ Math. 176	Math. 20F	BENG 181
HSS4	Math. 186	HSS4

SENIOR YEAR

BENG 182	BENG 130	BIMM 185
BENG 183	BENG 184	TE3
BIBC 103	TE3	TE3
HSS4	HSS4	HSS4

1 Chem. 6BL may be taken concurrently with Chem. 6C or in any quarter within the first two years after completion of Chem. 6B.

2 Students may take the slower paced version, CSE 8A-B, instead of CSE 11.

3 Technical elective (TE) courses must be selected from a departmental approved list. Consult the Student Affairs Office.

4 Ten HSS courses are listed here; individual college requirements may be higher.

POLICIES AND PROCEDURES

Transfer Student Admission into Bioengineering or Bioengineering: Biotechnology,

General advice: Transfer students are advised to complete the following courses for their major before enrolling at UC San Diego. Preparing well for the major helps students move efficiently toward graduation.

- Calculus I—for Science and Engineering (Math. 20A)
- Calculus II—for Science and Engineering (Math. 20B)
- Calculus and Analytic Geometry (Math. 20C)
- Differential Equations (Math. 20D)
- Linear Algebra (Math. 20F)
- Complete calculus-based physics series with lab experience (Physics 2A-B-C)
- Chemistry 6A (except Computer Science and Computer Engineering majors) **Note:** A total of ten quarter-units of general chemistry (including laboratory) are strongly recommended for students applying to **all** majors offered by the **Department of Bioengineering.**
- Highest level of introductory computer programming language course offerings at the community college

Admission to Bioengineering or Bioengineering: Biotechnology

Because of heavy student interest in the *Bioengineering and Bioengineering: Biotechnology* majors, and the limited resources available to accommodate this demand, maintenance of a high quality program makes it necessary to limit enrollments to the most qualified students.

Students admitted into an impacted major who transfer out of the impacted major may transfer back into it **one time** without meeting the full requirements for continuing student admission, **provided they are in good academic standing.**

Freshman Students

Freshman students who have excelled in high school and have declared *Bioengineering or Bioengineering: Biotechnology* on their UCSD application are eligible for direct admission into those majors.

Effective fall 2010 the UCSD Office of Admissions and Relations with Schools will calculate an admissions target number and admit the appropriate number of incoming freshmen into each impacted major using the “UCSD Comprehensive Review” score as a ranking method. (Visit “[Undergraduate Admissions, Policies, and Procedures](http://gort.ucsd.edu/admissions/)” and <http://gort.ucsd.edu/admissions/> for detailed information concerning the “UCSD Comprehensive Review” score.) Students who meet the UCSD admission criteria will be admitted into their chosen impacted major, starting with the student having the highest “comprehensive review score,” until the admission

target number is reached. These students will be notified directly by the Office of Admissions and Relations with Schools whether they have been admitted into their chosen impacted major.

Freshman students who applied but were not admitted directly from high school into the impacted *Bioengineering or Bioengineering: Biotechnology* majors will be admitted into the major indicated as their “second choice” on the UC application (providing it is an “open” major).

Transfer Students

Effective fall 2010, the UCSD Office of Admissions and Relations with Schools will calculate an admissions target number and admit the appropriate number of incoming transfer students into each impacted major, based on the community college GPA. Additionally, transfer students should have completed courses equivalent to UCSD’s Math. 20A-B-C; Physics 2A-B; and Chem. 6A-B. Students who meet the UCSD admission criteria will be admitted into their chosen impacted major, starting with the student having the highest community college GPA, until the admission target number is reached. (At least a 3.2 GPA in the community college transfer courses, and a 3.4 GPA in math., physics, and computer science courses, are likely to be needed to gain admission.) These students will be notified directly by the Office of Admissions and Relations with Schools whether they have been admitted into their chosen impacted major.

Transfer students who applied but were not admitted directly from community college into the impacted *Bioengineering or Bioengineering: Biotechnology* majors will be admitted into the major indicated as their “second choice” on the UC application (providing it is an “open” major).

Continuing Students

For the 2010–11 academic year, ten “open” slots will be available in each of the impacted *Bioengineering and Bioengineering: Biotechnology* majors for UCSD continuing students interested in applying.

Interested continuing students must not be past sophomore standing, as time to graduation would be delayed since departmental upper-division courses are currently offered only once a year.

Continuing students will be required to complete the following nine courses **prior** to applying: BILD 1; Chem. 6AB; MAE 9; Math. 20A-C; Physics 2AB. Upon completion of these courses, students will obtain an application from the Bioengineering Student Affairs Office. **Applications must be submitted to the Bioengineering Student Affairs Office by Friday of the first week of instruction.** Continuing students’ applications will be ranked according to the GPA obtained in the nine required courses.

Applications to an impacted major will be approved, starting with the student having the highest GPA in the nine required courses, until the predetermined target number is reached. The Bioengineering Student Affairs Office will notify students who are successful in transitioning into an impacted major to “officially” declare the appropriate major online via the **Major/Minor** link under **Tools** at <http://tritonlink.ucsd.edu>.

Continuing students who apply and are unable to transition into an impacted major will also be notified of their status in a timely manner by the Bioengineering Student Affairs Office.

Academic Advising

Upon admission to a major, students are encouraged to seek advice from departmental staff in the Bioengineering Student Affairs Office, Room 141, Powell-Focht Bioengineering Hall, to plan a program of study. Students are expected to chart their progress within their major. As the department may make a small number of course and/or curricular changes every year, it is imperative that students check their e-mail for updates and consult a bioengineering undergraduate advisor on an annual basis.

To enroll in any courses required for a bioengineering major, a student must have satisfied prerequisite courses with a C- or better. (The department does not consider D or F grades as adequate preparation for subsequent material.) Also, the majority of bioengineering courses have enrollment restrictions and are open only to students who have been admitted to a bioengineering pre-major or major. Where these restrictions apply, the registrar will not enroll other students except by department approval. The department expects students to adhere to these policies and enroll in courses accordingly. Students are advised that they may be dropped from course rosters if prerequisites have not been met.

Bioengineering courses are typically offered only once a year and therefore should be taken in the recommended sequence. If courses are taken out of sequence, it may not always be possible to enroll in courses as desired or needed for timely graduation. If this occurs, students should seek immediate departmental advice.

Programmatic advice may be obtained from the Student Affairs Office. In addition, technical advice may be obtained from a specific bioengineering faculty advisor assigned to each student upon admission to the major.

Program Alterations, Exceptions to Requirements, and Special Programs

Exceptions to any program or course requirements are possible if approved by the Undergraduate Studies Committee before the courses in question are taken. Petitions may be obtained from the Bioengineering Student Affairs Office.

Capstone Design Course Sequence for Bioengineering and Bioengineering: Biotechnology

A capstone design course sequence is required for senior level students in the *Bioengineering* and *Bioengineering: Biotechnology* majors. The capstone design course sequence consists of a multi-quarter upper-division sequence of courses that totals ten quarter-units and includes (1) a series of four one-unit courses on selection (BENG 187A), design (BENG 187B), implementation (BENG 187C), and presentation (BENG 187D) of design projects, with consideration of professional issues, and (2) a sequence of two three-unit laboratory design projects, offered in many of the primary areas of bioengineering,

including biomechanics (BENG 119AB), systems bioengineering (BENG 127AB, 128AB, 129AB), nanoscale and molecular bioengineering (BENG 139AB), organ system bioengineering (BENG 147AB, 148AB, 149AB), tissue engineering and regenerative medicine (BENG 169AB), and bioinstrumentation (BENG 179AB). The design projects and presentations will be performed by student teams in the course sequence.

Independent Study for Undergraduates

Under the guidance of a bioengineering faculty member, lower- and upper-division level bioengineering students have opportunities to participate in independent study and research.

Upper-division bioengineering students may take BENG 199, Independent Study for Undergraduates. Lower-division bioengineering students may enroll in BENG 99, which is similar to BENG 199 except that less background in the curriculum is needed. These courses are taken as electives on a P/NP basis. Under certain conditions, a BENG 199 course may be used to satisfy upper-division technical elective course requirements for the major. Students interested in this alternative must identify a faculty member with whom they wish to work and propose a two-quarter research or study topic for *Bioengineering* and *Bioengineering: Biotechnology* majors, a one- or two-quarter research topic for *Bioengineering: Premedical* majors, and a one-quarter research topic for *Bioengineering: Bioinformatics* majors. Completion of two consecutive quarters of BENG 199 will satisfy both technical elective requirements in the *Bioengineering* and *Bioengineering: Biotechnology* majors. A *Bioengineering: Premedical* major may satisfy up to two of the three technical elective requirements in that major by completion of BENG 199 courses. Additionally, *Bioengineering: Bioinformatics* majors may also use a BENG 199 course to satisfy the major's one technical elective course requirement. After obtaining the faculty advisor's concurrence on the topic and scope of the study, the student must submit a *Special Studies Course Form* (each quarter) and a BENG 199 as *Technical Elective Contract* to the Undergraduate Studies Committee. These forms must be completed, approved, and processed prior to the beginning of the quarter in which the course is to be taken.

Teaching

Students interested in participating in the instructional activities of the department may take BENG 195, Undergraduate Teaching as an elective on a P/NP basis. Under certain conditions, it may be used to satisfy an upper-division technical elective in the *Bioengineering: Premedical* major. Policy in this regard may be obtained from the Student Affairs Office.

INDUSTRIAL INTERNSHIP PROGRAM AND GRADUATE INDUSTRIAL TRAINING PROGRAM

The Department of Bioengineering offers two industry-related programs: the **Industrial Internship Program** for undergraduates and the **Graduate Industrial Training Program** for graduate students. Both industrial programs are designed to complement the department's academic

curriculum with practical industry experience. The Bioengineering Industrial Internship Office is located in 125 Powell-Focht Bioengineering Hall. Students interested in these programs should contact the office at bioengineering@ucsd.edu well in advance of the quarter in which they would like to start their internship.

The Industrial Internship Program is available to undergraduate students who have completed all lower-division course requirements. Academic credit under BENG 196, Bioengineering Industrial Internship, can be earned by spending ten weeks or more as interns in an industrial setting. The intern may be involved in a range of activities, including design, analysis, manufacturing, testing, regulatory affairs, etc., under the direction of a mentor in the workplace. At the completion of the internship experience, students are required to submit a brief report to the mentor and faculty advisor describing their activities.

The Graduate Industrial Training Program is designed for students in the Master of Engineering Degree Program. This program serves to significantly enhance the professional development of M.Eng. students in preparation for leadership in the bioengineering industry. Students will complete an independent industrial bioengineering project in a company setting under the direction of an industrial and faculty advisor.

THE GRADUATE PROGRAM

Admission to the M.Eng., M.S., and Ph.D., as well as to the Ph.D. with a specialization in bioinformatics programs, is in accordance with the general requirements of the graduate division. Applicants are required to have completed a B.S. and/or M.S. degree by time of admission in a branch of engineering, natural sciences, mathematics, or quantitative life sciences. M.S. and Ph.D. applicants must have a GPA of 3.4 or better in technical courses. M.Eng. applicants should have competitive grades (greater than a 3.02 GPA). All applicants must submit GRE General Test scores, as well as three letters of recommendation from individuals who can attest to their academic or professional competence and to the depth of their interest in pursuing graduate study. Attention will be paid to the background and statement of purpose to ensure that they are consistent with the goals of the program. For example, whereas undergraduate research experience and the intention to pursue a research career or advanced studies are qualifications and interests typically well suited to the M.S. program, industrial experience and the intention to pursue a professional career are better suited to the M.Eng. program.

A minimum score of 550 (paper based), 213 (computer based), or 80 (Internet based) on the Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. Students who score below 600 on the TOEFL examination are strongly encouraged to enroll in an *English as a Second Language* program before beginning graduate work. (UC San Diego Extension offers an English language program during the summer as well as the academic year.) Admission to the M.S. or Ph.D. degree program is designated when

the applicants are judged to be appropriately qualified to pursue the degree requested at the time of application. Applicants are considered for admission for the fall quarter only.

A new graduate student who does not meet the prerequisites of required courses in the M.Eng., M.S., or Ph.D. curricula may have to take some basic courses to make up the deficiency. Thus, a student deficient in mathematics and mechanics may have to take Math. 110, CENG 101C or BENG 103B, and BENG 110, 122A in the first year and BENG 250A–B, 253 in the second year. A student deficient in biology and chemistry may have to take CHEM. 131 or BENG 130 and BIPN 100, 102 in the first year and BENG 230A–B–C in the second year.

Nonmatriculated students are welcome to seek enrollment in bioengineering courses via UC San Diego Extension's Concurrent Enrollment program. However, such enrollment in a bioengineering graduate course must be approved by the instructor.

INTEGRATED BACHELOR'S/MASTER'S DEGREE PROGRAM

An integrated program leading to a bachelor of science and a master of science degree in bioengineering is offered to undergraduate students who are enrolled in any of the major programs offered by the Department of Bioengineering. Students interested in obtaining the M.S. degree within one year following completion of the B.S. degree may apply to the department for admission to the program during the fourth quarter prior to the receipt of the B.S. degree. The program is open only to UCSD undergraduates.

To be eligible, students must have completed the first two quarters of their junior year in residence at UCSD and have an upper-division GPA of 3.5 or better and a 3.0 overall UC GPA. Twelve units of bioengineering graduate-level courses must be completed during the student's senior undergraduate year, *in addition* to the requirements for the bachelor's degree; these twelve units will count toward the requirements for the master's degree only and must be taken for a letter grade. It is the responsibility of the prospective B.S./M.S. student to select a bioengineering faculty member who is willing to serve as the student's advisor. The student will also arrange (with their faculty advisor's approval) a schedule of courses for the senior year that will fulfill the requirements for the B.S. degree while also serving the program planned for the M.S. degree. Students are expected to meet the requirements for the M.S. degree in one year (three consecutive academic quarters) from the date of the receipt of the B.S. degree.

MASTER OF SCIENCE DEGREE PROGRAMS

The **Master of Science (M.S.) Program** is intended to extend and broaden an undergraduate background and equip the graduates with fundamental knowledge in bioengineering. It is intended for those students wishing to gain experience in academic research, especially those considering continuing graduate studies at the doctoral level. The M.S. degree may be terminal or may be obtained while pursuing a doctorate. Doctoral degree students wishing to obtain the M.S. degree should refer

to "[Obtaining an M.S. Degree](#)" under the section, "[Doctoral Degree Program](#)."

An individualized program is agreed upon by the student and a faculty advisor. The plan of study must involve both course work and research, culminating in the preparation of a thesis.

A total of **forty-eight** units of credit is required:

- **Thirty-six units in course work.** Nine courses, of which six are core courses in *Engineering Physics* and *Life Science* and three are elective courses to be selected from course offerings in Bioengineering, other engineering/science departments, and the School of Medicine as described below. The faculty advisor must approve the three elective courses.
- **Twelve units in research (S/U grading only).** Bioengineering Research (BENG 299) under the direction of the chosen faculty research advisor.

A thesis based on the research is written and subsequently reviewed by the thesis advisor and two other faculty members appointed by the dean of Graduate Studies. The oral defense of the thesis constitutes the departmental master's exam.

Required Core Courses for M.S. Degree Program

CORE COURSES (six required)

Engineering Physics

- BENG 221. Mathematical Methods for Bioengineering
- BENG 222. Continuum Mechanics and Transport Phenomena in Living Systems
- BENG 223. Thermodynamics, Statistical Mechanics, Interfacial Phenomena in Living Systems
- Life Science
- BENG 230A. Biochemistry
- BENG 230B. Cell and Molecular Biology
- BENG 231. Foundations of Physiology for Bioengineering

ELECTIVE COURSES (three required from any of the four categories)

Systems Biology

- BENG 202/CSE 282. Bioinformatics II: Introduction to Bioinformatics Algorithms
- BENG 203/CSE 283. Genomics, Proteomics, and Network Biology BENG 211. Systems Biology & Bioengineering I: Biological Components
- BENG 212. Systems Biology & Bioengineering II: Network Reconstruction
- BENG 213. Systems Biology & Bioengineering III: Building & Simulating Large-Scale In Silico Models

Regenerative Medicine and Imaging

- BENG 230C. Cardiovascular Physiology
- BENG 230D. Respiratory and Renal Physiology
- BENG 241A. Foundations of Tissue Engineering
- BENG 280A. Principles of Biomedical Imaging
- BENG 280B. Comparative Biomedical Imaging

Multiscale Bioengineering

- BENG 209/MAE 209. Continuum Mechanics Applied to Medicine/Biology
- BENG 238/MED 238. Molecular Biology of the Cardiovascular System
- BENG 247A/ECE 247A. Advanced BioPhotonics
- BENG 247B/ECE 247B. BioElectronics
- BENG 247C/ECE 247C. BioNanotechnology
- BENG 250A. Biomechanics
- BENG 276/Chem. 276/Math. 276. Numerical Analysis in Multi-Scale Biology

Other Courses That Can Serve as Electives

BENG 207. Topics in Bioengineering

Course given at the discretion of the faculty on current topics of interest in bioengineering. (*The specific topics course must be approved by the Student Affairs Office.*) Graduate level courses must be approved by the assigned advisor (or thesis advisor if determined).

SEMINARS (required)

- BENG 281. Seminar in Bioengineering
- BENG 282. Seminar: Faculty Research

Restrictions to core course work requirements are as follows:

1. Units obtained in BENG 281, 299, or 501 may not be applied toward the course work requirement.
2. No more than a total of eight units of BENG 296 and 298 may be applied toward the course work requirement.
3. No more than twelve units of upper-division 100-level bioengineering courses may be applied toward the course work requirement.

Students must maintain at least a B average in the courses taken to fulfill the degree requirements.

Master's Time Limit Policy

Full-time M.S. students are permitted seven quarters in which to complete all requirements. While there are no written time limits for part-time students, the department has the right to set individual deadlines if necessary.

A strong effort is made to schedule M.S.-level course offerings so that students may obtain their M.S. degree in one year of full-time study or two years of part-time study (*see regulations on part-time study under "[Graduate Studies](#)"*). Entering students who do not meet the prerequisites of these core

courses may have to take some basic courses to make up the deficiency.

A candidate admitted for the M.S. degree who wishes to transfer to the Ph.D. program must consult the Student Affairs Office concerning the transfer before completion of the M.S. program.

Change of Degree Aim

Upon completion of the requirements for the M.S. degree, students are not automatically eligible for admission to the Ph.D. program.

M.S. candidates who wish to pursue a doctorate must submit an application for a change in status to the Graduate Studies Committee. The application must be approved and signed by a bioengineering faculty member who expects to serve as the student's Ph.D. advisor. Applications will be reviewed by an ad hoc faculty committee. If the committee recommends that the student has good potential for success in the doctoral program, the student will be given the opportunity to take an oral examination equivalent to the Ph.D. Departmental Qualifying Examination. At the time of that exam, an assessment will be made concerning admission to the Ph.D. program.

A change of status from a master's program to the doctoral program requires that the student meet the minimal grade-point average required by the department of doctoral candidates.

MASTER OF ENGINEERING DEGREE PROGRAM

The department offers a **master of engineering (M.Eng.) degree**. The purpose of this degree is to prepare design and project engineers for careers in the medical and biological engineering industries within the framework of the graduate program of the Department of Bioengineering. It is a terminal professional degree in engineering, which includes recognition of the importance of breadth in technical knowledge and sufficient electives to address job-specific interests and professional skills such as economics, management, and business. It is intended for students who are primarily interested in engineering design, development, manufacturing, and management within an industrial setting.

Students who may be interested in continuing to the Ph.D. program should apply to the M.S. program and not the terminal M.Eng. program.

The M.Eng. program is a flexible, course-intensive terminal professional degree, designed to be completed in one academic year of full-time study. It does not require a comprehensive exam. However, students must enroll for technical elective credit in BENG 295, *Bioengineering Design Project and Industrial Training*, under the direction of a faculty instructor. This is done by participating in the Graduate Industrial Training Program, which allows students to work in an industrial setting on bioengineering projects in order to gain practical experience. (See "[Industrial Internship Program](#)" and "[Graduate Industrial Training Program](#)" sections of this catalog.) BENG 295 course requirements include a written technical report.

In addition to enrolling in one to two quarters (four to eight units) of BENG 295, Bioengineering Design Project and Industrial Training, students must select six courses from the approved core areas, one

to two courses from the approved technical elective course list, and three courses from the approved general elective course list. Such core courses and technical and general electives are described below. In selecting breadth courses, students must be mindful of the prerequisite requirements for some of the courses listed. The lists below are based on the current graduate course offerings of the bioengineering and other engineering departments. The Graduate Studies Committee will review the M.Eng. course lists annually and update them as course offerings change. M.Eng. students are required to complete course requirements with a grade of B or better.

Students must also enroll in BENG 291, Senior Seminar I: Professional Issues in Bioengineering. This course instills skills for personal and organizational development during lifelong learning. Students prepare portfolios and a model NIH small business research grant.

Required Core Courses for M.Eng. Degree Program

CORE COURSES (six required)

Engineering Physics

- BENG 221. Mathematical Methods for Bioengineering
- BENG 222. Continuum Mechanics and Transport Phenomena in Living Systems
- BENG 223. Thermodynamics, Statistical Mechanics, and Interfacial Phenomena in Living Systems

Life Science

- BENG 230A. Biochemistry
- BENG 230B. Cell and Molecular Biology
- BENG 230C. Cardiovascular Physiology
- BENG 230D. Respiratory and Renal Physiology
- BENG 231. Foundations of Physiology for Bioengineering
- Tissue Engineering
- BENG 241A. Foundations of Tissue Engineering Science
- BENG 241B. Methods in Tissue Engineering Science
- BENG 242/MATS 257. Polymer Science and Engineering

Imaging

- BENG 247A. Advanced Biophotonics
- BENG 280A. Principles of Biomedical Imaging
- BENG 280B. Comparative Biomedical Imaging
- Other approved core graduate courses taught by bioengineering faculty that satisfy the depth requirement of the M.Eng. degree as approved by the Graduate Studies Committee.

TECHNICAL ELECTIVE COURSES FOR M.ENG. DEGREE (three required, one of which must be BENG 295)

- BENG 202/CSE 282. Bioinformatics II: Introduction to Bioinformatics Algorithms
- BENG 203/CSE 283. Genomics, Proteomics, and Network Biology
- BENG 207. Neuromuscular Physiology and Biomechanics
- BENG 208. Topics in Bioengineering with Lab
- BENG 209/MAE 209. Continuum Mechanics Applied to Medicine/Biology
- BENG 211. Systems Biology and Bioengineering I. Biological Components
- BENG 212. Systems Biology and Bioengineering II. Network Reconstruction
- BENG 213. Systems Biology and Bioengineering III. Building and Simulating Large-Scale in Silico Models
- BENG 238/MED 238. Molecular Biology of the Cardiovascular System
- BENG 247B/ECE 247B. Bioelectronics
- BENG 247C/ECE 247C. Bionanotechnology
- BENG 250A. Biomechanics
- BENG 250B. Advanced Biomechanics
- BENG 253. Biomedical and Transport Phenomena
- BENG 260/BGGN 260. Neurodynamics
- BENG 267. Microcirculation in Health and Disease
- BENG 276/Chem. 276/Math. 276. Numerical Analysis in Multiscale Biology
- BENG 295. Bioengineering Design Project - **required**
- MAE 210A/CENG 210A. Fluid Mechanics I
- MAE 210B. Fluid Mechanics II
- MAE 210C. Fluid Mechanics III
- MAE 221/CENG 221AB. Heat and Mass Transfer
- MAE 229A/MATS 211A. Mechanical Properties
- MAE 231A. Solid Mechanics
- MAE 231B. Elasticity
- MAE 231C. Anelasticity
- MAE 280A. Linear Systems Theory
- MAE 293. Advanced Computer Graphics for Engineers and Scientists
- MATS 252/MAE 266. Biomaterials and Medical Devices
- MATS 253/MAE 267. Nanomaterials and Properties
- CSE 202. Algorithm Design and Analysis
- CSE 210. Principles of Software Engineering
- CSE 250A. Artificial Intelligence: Search and Reasoning

- ECE 235. Nanometer-Scale VLSI Devices
- ECE 251A. Digital Signal Processing I
- ECE 251B. Digital Signal Processing II

Examples of General Electives for M.Eng. (three required)

- BENG 225. BioBusiness: Biotech Company
- ENG 201. Venture Mechanics
- ENG 202. Enterprise Dynamics
- ENG 203. Applied Innovations
- ECE 254. Detection Theory
- IR/PS Management: IRGN 420, 434, 438, 439, 444, IRCO 420, 421, 490G
- IR/PS International Issues: IRCO 401, IRGN 407, 411, 413
- MAE 290A. Efficient Numerical Methods for Simulation, Organization, and Control
- Technical Elective courses may be taken for general elective credit

For other courses that address job-specific interests and professional skills such as economics, management, and business, consult with the Student Affairs Office.

SEMINAR (required)

BENG 291. Professional Issues in Bioengineering

Sample M.Eng. Degree Schedule

FALL	WINTER	SPRING
Core	Core	Core
Core	Core	Core
BENG 225 (GE)	BENG 295 (TE)	BENG 295 (TE)
Tech. Elec.	Gen. Elec. BENG 291 (Seminar)	Gen. Elec.

DOCTORAL DEGREE PROGRAM

The **bioengineering Ph.D. program** is intended to prepare students for a variety of careers in research and teaching. Therefore, depending on the student's background and ability, research is initiated as soon as possible. Bioengineering students have specific course requirements and must maintain a minimum grade-point average of 3.4 in these courses. Students, in consultation with their advisors, develop course programs that will prepare them for the Departmental Qualifying Examination and for their dissertation research. These programs of study and research must be planned to meet the time limits established to advance to candidacy and to complete the requirements for the degree. Doctoral students who have passed the Departmental Qualifying Examination may take any course for an S/U grade with the exception of courses required by the Departmental or Senate Qualifying Examination Committee. It is recommended that all bioengineering graduate students take a minimum of two courses (other than research) per academic year after passing the Departmental Qualifying Examination. Details can be obtained from the Student Affairs Office.

Ph.D. in Bioengineering with Specialization in Multiscale Biology

As of winter 2009, the UCSD campus is offering a new Ph.D. specialization in Multiscale Biology that will be available to doctoral candidates in participating programs that span four divisions: Biological Sciences, Physical Sciences, Jacobs School of Engineering, and Health Sciences at UCSD. The Ph.D. specialization is designed to allow students to obtain standard basic training in their chosen field within the Biological Sciences, Physical Sciences, Engineering and Health Sciences with training in integrative and quantitative analysis across multiple scales of biological organization from molecule to organism in health and disease into their graduate studies. It trains a new cadre of Ph.D. scientists and provides a unique interdisciplinary education at the interfaces between the biological, medical, physical, and engineering sciences.

- The specific objectives of this program are
1. Focused collaboration across nine graduate degree programs train a new generation of cross-disciplinary scientist.
 2. State-of-the-art interdisciplinary training through a new technology-centered hands-on graduate laboratory course curriculum.
 3. Novel emphasis on research aimed at integrative and quantitative analysis across multiple scales of biological organization from molecule to organism in health and disease.

Prospective students must apply and be admitted into the Ph.D. program in bioengineering described previously. (For more information, see the Department of Bioengineering and/or the Graduate Interfaces Training Program administered within the Department of Chemistry and Biochemistry (4010 York Hall, Revelle College).

Doctoral Examinations

A bioengineering Ph.D. student is required to pass three examinations. The first is a Departmental Qualifying Examination, which must be taken during the spring quarter of the first year of study. The exam is designed to ensure that all successful candidates possess a firm command of the engineering and life science subjects that form the foundations of bioengineering research and their integration at a level appropriate for the doctorate. It is administered by a committee designated by the department, consisting of departmental faculty members and, in some cases, other faculty members from a related academic department (e.g., MAE, ECE, medicine). The scope of the oral examination includes the two broad areas that form the core first-year Ph.D. curriculum, namely *Engineering Physics* and *Life Science*. The purpose of the exam is not merely to recapitulate the content of first-year courses, but rather to establish that students are able to synthesize this knowledge and apply it to solve problems in contemporary bioengineering research.

Curriculum for First-Year Ph.D. Students

All bioengineering students are expected to enroll for letter grade credit in the core courses in *Engineering Physics* and *Life Sciences* tracks listed

below. In addition they are required to take three electives for a letter grade from among the courses listed based on advice from the graduate advisor. Each incoming student will be assigned a bioengineering faculty advisor who will serve as a graduate advisor until the student chooses a thesis advisor. First-year students are also required to enroll in two one-credit seminars.

CORE COURSES (all six required)

Engineering Physics

- BENG 221. Mathematical Methods for Bioengineering
- BENG 222. Continuum Mechanics and Transport Phenomena in Living Systems
- BENG 223. Thermodynamics, Statistical Mechanics, Interfacial Phenomena in Living Systems

Life Science

- BENG 230A. Biochemistry
- BENG 230B. Cell and Molecular Biology
- BENG 231. Foundations of Physiology for Bioengineering

ELECTIVE COURSES (three required, from any of the four categories)

Systems Biology

- BENG 202/CSE 282. Bioinformatics II: Introduction to Bioinformatics Algorithms
- BENG 203/CSE 283. Genomics, Proteomics, and Network Biology
- BENG 211. Systems Biology and Bioengineering I: Biological Components
- BENG 212. Systems Biology and Bioengineering II: Network Reconstruction
- BENG 213. Systems Biology and Bioengineering III: Building and Simulating Large-Scale In Silico Models

Regenerative Medicine and Imaging

- BENG 230C. Cardiovascular Physiology
- BENG 230D. Respiratory and Renal Physiology
- BENG 241A. Foundations of Tissue Engineering
- BENG 280A. Principles of Biomedical Imaging
- BENG 280B. Comparative Biomedical Imaging

Multiscale Bioengineering

- BENG 209/MAE 209. Continuum Mechanics Applied to Medicine/Biology
- BENG 238/MED 238. Molecular Biology of the Cardiovascular System
- BENG 247A/ECE 247A. Advanced Biophotonics
- BENG 247B/ECE 247B. Bioelectronics

- BENG 247C/ECE 247C. Bionanotechnology
- BENG 250A. Biomechanics
- BENG 276/Chem. 276/Math. 276. Numerical Analysis in Multiscale Biology

Other Courses That Can Serve as Electives

BENG 207. Topics in Bioengineering

Course is given at the discretion of the faculty on current topics of interest in bioengineering. (The specific topics course must be approved by the Student Affairs Office.)

Graduate level courses approved by the assigned advisor (or thesis advisor if determined).

SEMINARS (required)

- BENG 281. Seminar in Bioengineering
- BENG 282. Seminar: Faculty Research

In addition to the above mentioned breadth requirements, students must complete the following courses in their second and subsequent years of study:

- At least two four-unit courses from an approved list that includes the bioengineering graduate course sequences, other engineering/science course offerings, and School of Medicine courses. Students often take SOM courses to fulfill the second-year course requirements. The faculty advisor must approve the courses. Approved courses include BENG 203/CSE 283, BENG 207, BENG 230D, BENG 238/MED 238, BENG 247A-B-C, BENG 250B, MAE 207, MAE 210A-B-C, MAE 221A, MAE 231A-B-C, MAE 267/MATS 253, ECE 251A-B, and Chem. 211.
- One quarter of BENG 501. Teaching Experience

Courses comprising subject areas as well as subsequent requirements and composition of the examination committee, must be approved by the Graduate Studies Committee. Students are advised to seek such approval well in advance of their expected examination date, preferably while planning graduate studies.

Teaching experience is required of all bioengineering Ph.D. students prior to taking the Senate Qualifying Exam described below. Teaching experience is defined as service as a graduate student instructor in a course designated by the department. The total teaching requirement for new Ph.D. students is four quarters at 25 percent effort (ten hours per week). At least one quarter of teaching experience is required during the first year (prior to the departmental qualifying examination) and at least one quarter in the second year. Teaching experience can be fulfilled as a requirement for student support or taken as a course for academic credit (BENG 501). Students must contact the Student Affairs Office to plan for completion of this requirement.

The **Senate Qualifying Examination** is the second examination required of bioengineering Ph.D. students. In preparation for this examination, students must have completed the Departmental Qualifying Examination and the departmental teaching experience requirement, obtained a faculty research advisor, and identified a topic for their

dissertation research and made initial progress. At the time of application for advancement to candidacy, a doctoral committee responsible for the remainder of the student's graduate program is appointed by the Graduate Council. The committee conducts the Senate Qualifying Examination, during which students must demonstrate the ability to engage in thesis research. This involves the presentation and defense of a plan for the thesis research project. Upon successful completion of this examination, students are advanced to candidacy and are awarded the Candidate in Philosophy degree (see "[Graduate Studies](#)" section in this catalog).

The **Dissertation Defense** is the final Ph.D. examination. Upon completion of the dissertation research project, the student writes a dissertation that must be successfully defended in a public presentation and oral examination conducted by the doctoral committee. A complete copy of the student's dissertation must be submitted to each member of the doctoral committee approximately four weeks before the defense. It is understood that this copy of the dissertation given to committee members will not be the final copy, and that the committee members may suggest changes in the text at the time of the defense. This examination must be conducted after completion of at least three quarters from the date of advancement to doctoral candidacy. Acceptance of the dissertation by the Office of Graduate Studies and the university librarian represents the final step in completion of all requirements for the Ph.D.

There is no formal foreign language requirement for doctoral candidates. Students are expected to master whatever language is needed for the pursuit of their own research.

Obtaining an M.S. Degree

Ph.D. students may obtain the M.S. degree by completing the course work requirements and by passing the Ph.D. departmental qualifying examination. Course work requirements include successful completion of a total of forty-eight units of credit comprising *Engineering Physics* and *Life Science* and two four-unit courses from an approved list taken during the second year of the Ph.D. degree (see details on course work requirements in the section "[Doctoral Degree Program](#)"). Students should consult with the Student Affairs Office in advance of their second year of study concerning required paperwork and deadlines for conferral of the M.S. degree.

Ph.D. Time Limit Policy

Precandidacy status is limited to three years. Doctoral students are eligible for university support for six years. The defense and submission of the doctoral dissertation must be within seven years.

Evaluations

In the spring of each year, the faculty evaluate each doctoral student's overall performance in course work, research, and prospects for financial support for future years. A written assessment is given to the student after the evaluation. If a student's work is found to be inadequate, the faculty

may determine that the student cannot continue in the graduate program.

Industrial Internship Program and Graduate Industrial Training Program

The Department of Bioengineering offers two industry-related programs: the **Industrial Internship Program** for undergraduates and the **Graduate Industrial Training Program** for graduate students. Both industrial programs are designed to complement the department's academic curriculum with practical industry experience. The Bioengineering Industrial Internship Office is located in 125 Powell-Focht Bioengineering Hall. Students interested in these programs should contact the office at bioengineering@ucsd.edu well in advance of the quarter in which they would like to start their internship.

The **Industrial Internship Program** is available to undergraduate students who have completed all lower-division course requirements. Academic credit under BENG 196, Bioengineering Industrial Internship, can be earned by spending ten weeks or more as interns in an industrial setting. The intern may be involved in a range of activities, including design, analysis, manufacturing, testing, regulatory affairs, etc., under the direction of a mentor in the workplace. At the completion of the internship experience, students are required to submit a brief report to the mentor and faculty advisor describing their activities.

The **Graduate Industrial Training Program** is designed for students in the Master of Engineering Degree Program. This program serves to significantly enhance the professional development of M.Eng. students in preparation for leadership in the bioengineering industry. Students will complete an independent industrial bioengineering project in a company setting under the direction of an industrial and faculty advisor.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Note: The department will endeavor to offer the courses as outlined below; however, unforeseen circumstances sometimes mandate a change of scheduled offerings. Students are strongly advised to check with the department's Student Affairs Office. This is of particular importance in planning schedules to satisfy graduation requirements.

The following schedule is tentative for the academic year 2010–11 only. The quarter in which a course is scheduled may differ in subsequent academic years. Students should consult [TritonLink](#) and the Student Affairs Office to obtain current information.

Prerequisites are enforced when students register for courses. Students who have satisfied prerequisites at another institution or by AP credit need to be pre-authorized to register in these courses. If pre-authorization is necessary, students should contact the Student Affairs Office before the scheduled registration period.

Some courses require a course material fee.

LOWER-DIVISION

BENG 1. Introduction to Bioengineering (1)

An introduction to the central topics of bioengineering in a seminar format. The principles of problem definition, team design, engineering inventiveness, information access, communication, ethics, and social responsibility will be emphasized. P/NP grading only. **Prerequisite:** none. (W)

BENG 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen. (F,W,S)

BENG 97. Internship/Field Studies (1-4)

An enrichment program available to a limited number of lower-division undergraduate students, which provides work experience with industry, government offices, and hospitals. The internship is coordinated through UCSD's Academic Internship Program under the supervision of a faculty member and an industrial, government, or hospital employee. **Prerequisites:** lower-division standing, completion of thirty units of UCSD undergraduate study, a minimum UCSD GPA of 3.0, and a completed and approved Special Studies form. (F,W,S)

BENG 98. Directed Group Study (1-4)

Directed group study on a topic or in a field not included in the regular department curriculum. (P/NP grades only.) **Prerequisites:** lower-division standing, completion of thirty units of undergraduate study at UCSD with a UCSD GPA of at least 3.0 and consent of a Bioengineering faculty member; completed and approved Special Studies form.

BENG 99. Independent Study for Undergraduates (4)

Independent reading or research by arrangement with a Bioengineering faculty member. (P/NP grades only.) **Prerequisites:** lower-division standing, completion of thirty units of undergraduate study at UCSD with a UCSD GPA of at least 3.0 and consent of a Bioengineering faculty member; completed and approved Special Studies form.

BENG 99R. Independent Study (1)

Independent study or research under direction of a member of the faculty. **Prerequisites:** student must be of first-year standing and a Regent's Scholar; approved Special Studies form.

UPPER-DIVISION

BENG 100. Introduction to Bioengineering Design (4)

A general introduction to bioengineering design, including examples of engineering analysis and design applied to representative topics in biomechanics, bioinstrumentation, biomaterials, biotechnology, and related areas. A review of technological needs, design methodology, testing procedures, statistical analysis, governmental regulation, evaluation of costs and benefits, quality of life, and ethical issues. **Prerequisites:** BENG 1; grade of C- or better in Math. 21C or Math. 20C and Math. 21D or Math. 20D, and Phys. 2C; majors only. (S)

BENG 101. Foundations of Biomedical Imaging (4)

An introduction to the principles and applications of biomedical imaging, with emphasis on the acquisition, processing, display of imagery, and design of imaging systems. Filtering, convolution, and Fourier methods. Microscopy, radiography, computed tomography, magnetic resonance, ultrasound, and nuclear imaging. **Prerequisites:** Grade of C- or better in BENG 100; majors only or consent of department. (F)

BENG 103B. Bioengineering Mass Transfer (4)

Mass transfer in solids, liquids, and gases with application to biological systems. Free and facilitated diffusion. Convective mass transfer. Diffusion-reaction phenomena. Active transport. Biological mass transfer coefficients. Steady and unsteady state. Flux-force relationships.

(Credit not allowed for both CENG 101C and BENG 103B.)

Prerequisites: grade of C- or better in CENG 101A or BENG 112A; majors only or consent of instructor. (S)

BENG 109. Bioengineering Statics and Dynamics (4)

Newton's Laws. Static resultant forces and moments. Conservation laws of dynamics. Muscle and joint loads. Human body dynamics, locomotion, and clinical applications. Bodies in contact: friction, momentum, and impulse; impact and injury. Work, power, and energy relationships. Bioengineering design problems. **Prerequisites:** grade of C- or better in Math. 21D or Math. 20D and Phys. 2C; majors only or consent of instructor. (W)

BENG 110. Continuum Mechanics (4)

An introduction to continuum mechanics of both living and nonliving bodies. The laws of motion and free-body diagrams. Stresses. Deformation. Compatibility conditions. Constitutive equations. Properties of common fluids and solids. Derivation of field equations and boundary conditions. Applications to bioengineering design. **Prerequisites:** grades of C- or better in Physics 2A, 2B, 2C, and BENG 109; majors only or consent of instructor. (F)

BENG 112A. Biomechanics (4)

Introduction to physiological systems, with emphasis on structure and function of major tissues and organs. Application of mechanics to understand the behavior of these tissues and organs at gross and microscopic levels. Bioelastic solids. Rigid body biomechanics. Biofluids. Bioengineering and medical design. **Prerequisites:** grade of C- or better in BENG 110; majors only or consent of instructor. (W)

BENG 112B. Biomechanics (4)

Biomechanics of living tissues with emphasis on continuum analysis of problems in biofluid and cell mechanics. Engineering design and problem solving in the biomechanics of mammalian tissues, especially those of the cardiovascular system. **Prerequisites:** grade of C- or better in BENG 112A; majors only or consent of instructor. (S)

BENG 119A. Design Development in Biomechanics (3)

Development of design project in biomechanics. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 119B. Design Implementation in Biomechanics (3)

Implementation of design project in biomechanics. **Prerequisites:** grade of C- or above in BENG 119A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG 122A. Biosystems and Control (4)

Systems and control theory applied to bioengineering. Modeling, linearization, transfer functions, Laplace transforms, closed-loop systems, design and simulation of controllers. Dynamic behavior and controls of first and second order processes. PID controllers. Stability. Bode design. Features of biological controls systems. A simulation term project using MATLAB and an oral presentation are required. **Prerequisites:** grade of C- or better in MAE 140; majors only or consent of department. (W)

BENG 123. Systems Biology and Bioengineering (4)

Systems biology and bioengineering consists of (1) enumeration of biological components participating in a biological process, (2) reconstruction of interactions to form a network, (3) mathematical representation for analysis, interpretation, and prediction, (4) model validation and use in prospective design. **Prerequisites:** grade of C- or better in BIBC 100; majors only or consent of instructor. (W)

BENG 125. Modeling and Computation in Bioengineering (4)

Computational modeling of molecular bioengineering phenomena: excitable cells, regulatory networks, and transport. Application of ordinary, stochastic, and partial differential equations. Introduction to data analysis techniques: power spectra, wavelets, and nonlinear time series analysis. **Prerequisites:** grade of C- or better in BENG 122A or BENG 123; majors only or consent of instructor. (S)

BENG 126A. Design Development in Bioinformatics Bioengineering (3)

Development of design project in bioinformatics bioengineering. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 126B. Design Implementation in Bioinformatics Bioengineering (3)

Implementation of design project in bioinformatics bioengineering. **Prerequisites:** grade of C- or above in BENG 126A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG 127A. Design Development in Molecular Systems Bioengineering (3)

Development of design project in molecular systems bioengineering. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 127B. Design Implementation in Molecular Systems Bioengineering (3)

Implementation of design project in molecular systems bioengineering. **Prerequisites:** grade of C- or above in BENG 127A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG 128A. Design Development in Genetic Circuits Bioengineering (3)

Development of design project in genetic circuits bioengineering. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 128B. Design Implementation in Genetic Circuits Bioengineering (3)

Implementation of design project in genetic circuits bioengineering. **Prerequisites:** grade of C- or above in BENG 128A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG 129A. Design Development in Cell Systems Bioengineering (3)

Development of design project in cell systems bioengineering. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 129B. Design Implementation in Cell Systems Bioengineering (3)

Implementation of design project in cell systems bioengineering. **Prerequisites:** grade of C- or above in BENG 129A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG 130. Molecular Physical Chemistry (4)

An introduction to physical principles that govern biological matter and processes. Thermodynamic principles and their molecular origin, structural basis of life and physical and conceptual models to illustrate life phenomena. **Prerequisites:** grade of C- or better in Chem. 6B, Math. 20A, 20B, Physics 2A, 2B, 2C; majors only or consent of instructor. (W)

BENG 139A. Design Development in Molecular Bioengineering (3)

Development of design project in molecular bioengineering. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 139B. Design Implementation in Molecular Bioengineering (3)

Implementation of design project in molecular bioengineering. **Prerequisites:** grade of C- or above in BENG 139A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG 140A. Bioengineering Physiology (4)

Introductory mammalian physiology for bioengineering students, with emphasis on control mechanisms and

engineering principles. Basic cell functions; biological control systems; muscle; neural; endocrine, and circulatory systems. Not intended for premedical bioengineering students. (Credit not allowed for both BIPN 100 and BENG 140A.) **Prerequisites:** grade of C– or better in Chem. 6A, 6B, Physics 2A, 2B, 2C, BILD 1; majors only or consent of instructor. (W)

BENG 140B. Bioengineering Physiology (4)

Introductory mammalian physiology for bioengineering students, with emphasis on control mechanisms and engineering principles. Digestive, respiratory, renal, and reproductive systems; regulation of metabolism, and defense mechanisms. (Credit not allowed for both BIPN 102 and BENG 140B.) **Prerequisite:** grade of C– or better in BENG 140A; majors only or consent of instructor. (S)

BENG 147A. Design Development in Neural Engineering (3)

Development of design project in neural engineering. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 147B. Design Implementation in Neural Engineering (3)

Implementation of design project in neural engineering. **Prerequisites:** grade of C– or above in BENG 147A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG 148A. Design Development in Cardiac Bioengineering (3)

Development of design project in cardiac bioengineering. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 148B. Design Implementation in Cardiac Bioengineering (3)

Implementation of design project in cardiac bioengineering. **Prerequisites:** grade of C– or above in BENG 148A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG 149A. Design Development in Vascular Bioengineering (3)

Development of design project in vascular bioengineering. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 149B. Design Implementation in Vascular Bioengineering (3)

Implementation of design project in vascular bioengineering. **Prerequisites:** grade of C– or above in BENG 149A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG 160. Chemical and Molecular Bioengineering Techniques (4)

Introductory laboratory course in current principles and techniques of chemistry and molecular biology applicable to bioengineering. Quantitation of proteins and nucleic acids by spectrophotometric, immunological, and enzymatic methods. Separations and purification by centrifugation, chromatographic, and electrophoretic methods. Course material fee may apply. **Prerequisites:** grade of C– or better in BIBC 102, BICD 100, BENG 100, MAE 170; majors only or consent of instructor. (S)

BENG 161A. Bioreactor Engineering (4)

Engineering, biochemical, and physiological considerations in the design of bioreactor processes: enzyme kinetics, mass transfer limitations, microbial growth, and product formation kinetics. Fermentation reactor selection, design, scale-up, control. Quantitative bioengineering analysis and design of biochemical processes and experiments on biomolecules. **Prerequisites:** grade of C– or better in Chem. 114B or BIBC 102 (may be taken concurrently), BENG 122A or BENG 123, and BIBC 103 or BENG 160; majors only or consent of instructor. (F)

BENG 161B. Biochemical Engineering (4)

Commercial production of biochemical commodity products. Application of genetic control systems and mutant populations. Recombinant DNA and eucaryotic proteins in *E. coli* and other host organisms. Product recovery operations, including the design of bioseparation processes of filtration, adsorption, chromatography, and crystallization. Bioprocess economics. Human recombinant erythropoietin as an example, from genomic cloning to CHO cell expression, to bioreactor manufacturing and purification of medical products for clinical application. **Prerequisites:** grade of C– or better in BENG 161A; majors only or consent of instructor. (W)

BENG 161C. Metabolic Engineering (4)

Engineering systems analysis of metabolic and regulatory processes. Use of high-throughput data for network reconstruction. Formulation of the stoichiometric matrix and its uses to determine steady state flux distributions. Kinetics of individual enzymatic reactions. Computer simulations of metabolic networks, systemic sensitivity coefficients, bifurcations to study dynamic network functions. Temporal decomposition of metabolic processes into multiple time scales and the physiological roles of metabolic events in each scale. **Prerequisites:** grade of C– or better in BENG 160B or BENG 161B; majors only or consent of instructor. (S)

BENG 162. Biotechnology Laboratory (4)

Laboratory practices and design principles for biotechnology. Culture of microorganisms and mammalian cells, recombinant DNA bioreactor design and operation. Design and implementation of biosensors. A team design-based term project and oral presentation required. Course material fee(s) may apply. **Prerequisites:** grade of C– or above in MAE 170; BIBC 102; BIBC 103 or BENG 160; majors only or consent of instructor. (F)

BENG 166A. Cell and Tissue Engineering (4)

Engineering analysis of physico-chemical rate processes that affect, limit, and govern the function of cells and tissues. Cell migration, mitosis, apoptosis, and differentiation. Dynamic and structural interactions between mesenchyme and parenchyme. The role of the tissue microenvironment including cell-cell interactions, extracellular matrix, and growth factor communication. The design of functional tissue substitutes including cell and material sourcing, scale-up and manufacturability, efficacy and safety, regulatory, and ethical topics. Clinical Applications. **Prerequisites:** grade of C– or better in BENG 103B or BENG 112B; senior standing; majors only or consent of department. (F)

BENG 167. Cell and Tissue Engineering Laboratory (4)

An introduction to contemporary methods and applications. Students will formulate and test hypotheses related to the design and production of functional tissue substitutes. Topics to be explored include tissue characterization, biomaterial scaffolds, cell migration, adhesion, and growth. **Prerequisite:** BENG 166A; majors only or consent of instructor. (S)

BENG 168. Biomolecular Engineering (4)

Basic molecular biology; recombinant DNA technologies; design and manufacture of recombinant proteins and genetically engineered cells; architecture and mechanism of molecular nano-machineries that perform gene regulation, energy conversion, enzymatic catalysis, and active transport. **Prerequisites:** grade of C– or better in BILD 1 and BENG 100; majors only or consent of instructor. (S)

BENG 169A. Design Development in Tissue Engineering (3)

Development of design project in tissue bioengineering. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 169B. Design Implementation in Tissue Engineering (3)

Implementation of design project in tissue engineering. **Prerequisites:** grade of C– or above in BENG 169A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG 172. Bioengineering Laboratory (4)

A laboratory course demonstrating basic concepts of biomechanics, bioengineering design, and experimental procedures involving animal tissue. Sources of error and experimental limitations. Computer data acquisition, modeling, statistical analysis. Experiments on artery, muscle and heart mechanics, action potentials, viscoelasticity, electrocardiography, hemorrheology. Course material fee may apply. **Prerequisites:** grade of C– or better in MAE 170; junior or senior standing in the major or consent of instructor. (S)

BENG 173. Bioengineering Project Laboratory (4)

Applications of bioengineering concepts to the solution of practical and research problems. Planning, design, and testing of prototype devices. Term project and oral presentation are required. **Prerequisites:** majors only; consent of instructor; BENG 112B, BENG 172. (Not offered in 2010–11.) (S)

BENG 179A. Design Development in Bioinstrumentation (3)

Development of design project in bioinstrumentation. **Prerequisites:** concurrent enrollment in BENG 187B; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (F)

BENG 179B. Design Implementation in Bioinstrumentation (3)

Implementation of design project in bioinstrumentation. **Prerequisites:** grade of C– or above in BENG 179A; concurrent enrollment in BENG 187C; Bioengineering or Bioengineering: Biotechnology majors only or consent of instructor. (W)

BENG/BIMM/CSE 181. Molecular Sequence Analysis (4)

(Cross-listed as BIMM 181 and CSE 181.) This course covers the analysis of nucleic acid and protein sequences, with an emphasis on the application of algorithms to biological problems. Topics include sequence alignments, database searching, comparative genomics, and phylogenetic and clustering analyses. Pairwise alignment, multiple alignment, DNA sequencing, scoring functions, fast database search, comparative genomics, clustering, phylogenetic trees, gene finding/DNA statistics. **Prerequisites:** CSE 100 or Math. 176, CSE 101 or Math. 188, BIMM 100 or Chem. 114C; Bioinformatics majors only. (S)

BENG/BIMM/CSE/Chem. 182. Biological Databases (4)

(Cross-listed as BIMM 182, CSE 182, and Chem. 182.) This course provides an introduction to the features of biological data, how those data are organized efficiently in databases, and how existing data resources can be utilized to solve a variety of biological problems. Object oriented databases, data modeling and description. Survey of current biological database with respect to above, implementation of database focused on a biological topic. **Prerequisites:** CSE 100 or Math. 176; Bioinformatics majors only. (F)

BENG 183. Applied Genomic Technologies (4)

Principles and technologies for using genomic information for biomedical applications. Technologies will be introduced progressively, from DNA to RNA to protein to whole cell systems. The integration of biology, chemistry, engineering, and computation will be stressed. Topics include: Technology for the Genome, DNA Chips, RNA Technologies, Proteomic Technologies, Physiomic and Phenomic Technologies, Analysis of Cell Function. **Prerequisites:** grade of C– or better in BIMM 100 or Chem. 114C; BICD 110; Bioinformatics majors only. (F)

BENG/BIMM/CSE/Chem. 184. Computational Molecular Biology (4)

(Cross-listed as BIMM 184, CSE 184, and Chem. 184.) This advanced course covers the application of machine learning and modeling techniques to biological systems. Topics include gene structure, recognition of DNA and protein sequence patterns, classification, and protein structure prediction. Pattern discovery, hidden Markov models/support vector machines/neural network/profiles, protein structure prediction, functional characterization of proteins, functional genomics/proteomics, metabolic pathways/gene networks. **Prerequisites:** BENG 181 or

BIMM 181 or CSE 181; BENG 182 or BIMM 182 or CSE 182 or Chem. 182; Bioinformatics majors only. (W)

BENG 186A. Principles of Biomaterials Design (4)

Fundamentals of materials science as applied to bioengineering design. Natural and synthetic polymeric materials. Materials characterization and design. Wound repair, blood clotting, foreign body response, transplantation biology, biocompatibility of materials, tissue engineering. Artificial organs and medical devices. Government regulations. Patenting. Economic impact. Ethical issues. A term project and oral presentation are required. **Prerequisites:** grade of C– or better in BENG 112B or senior standing in Bioengineering; Biotechnology major; majors only or consent of department. (S)

BENG 186B. Principles of Bioinstrumentation Design (4)

Biophysical phenomena, transducers, and electronics as related to the design of biomedical instrumentation. Potentiometric and amperometric signals and amplifiers. Biopotentials, membrane potentials, chemical sensors. Electrical safety. Mechanical transducers for displacement, force, and pressure. Temperature sensors. Flow sensors. Light-based instrumentation. **Prerequisites:** grade of C– or better in MAE 140 and MAE 170; majors only or consent of instructor. (W)

BENG 186C. Bioengineering Design (4)

Development of a bioengineering design described in a formal engineering report. Engineering analysis and application of methodology from applied sciences, biology, physiology, and biochemistry. Analysis of economic, environmental, manufacture, ethical, health and safety, social issues, and application of governmental regulations. **Prerequisites:** grade of C– or better in BENG 103B, BENG 106B, BENG 112B, BENG 186B, and MAE 130A; majors only or consent of instructor. (Not offered in 2010–11.) (W)

BENG 187A. Bioengineering Design Project: Planning (1)

General engineering design topics, including project planning and design objectives, background research, engineering needs assessment, and technical design specifications and requirements. Introduction to biomedical and biotechnology design projects. Majors must enroll in the course for a letter grade in order to count the sequence toward the major. No exceptions will be approved. **Prerequisites:** grade of C– or better in BENG 101 or BICD 100; BENG 112A or CENG 101A; BENG 140A or BIBC 102; BENG 186B or BENG 123; Bioengineering or Bioengineering; Biotechnology majors only or consent of instructor. (S)

BENG 187B. Bioengineering Design Project: Development (1)

Development of original bioengineering design to solution of problem in biology or medicine. Analysis of economic issues, manufacturing and quality assurance, ethics, safety, government regulations and patent requirements. Oral presentation and formal engineering reports. Majors must enroll in the course for a letter grade in order to count the sequence towards the major. No exceptions will be approved. **Prerequisites:** grade of C– or better in BENG 187A, MAE 170, and BENG 112B or BENG 123; concurrent enrollment in one of BENG 119A, BENG 126A, BENG 127A, BENG 128A, BENG 129A, BENG 139A, BENG 147A, BENG 148A, BENG 149A, BENG 169A, or BENG 179A; Bioengineering or Bioengineering; Biotechnology majors only or consent of instructor. (F)

BENG 187C. Bio engineering Design Project: Implementation (1)

Approaches to implementation of senior design project, including final report. Teams will report on construction of prototypes, conduct of testing, collection of data, and assessment of reliability and failure. Majors must enroll in the course for a letter grade in order to count the sequence toward the major. No exceptions will be approved. **Prerequisites:** grade of C– or better in BENG 187B; concurrent enrollment in one of the following lab sections: BENG 119B, BENG 126B, BENG 127B, BENG 128B, BENG 129B, BENG 139B, BENG 147B, BENG 148B, BENG 149B, BENG 169B, or BENG 179B; Bioengineering or Bioengineering; Biotechnology majors only or consent of instructor. (W)

BENG 187D. Bioengineering Design

Project: Presentation (1)

Oral presentations of design projects, including design, development, and implementation strategies and results of prototype testing. Majors must enroll in the course for a letter grade in order to count the sequence toward the major. No exceptions will be approved. **Prerequisites:** grade of C– or better in BENG 187C; Bioengineering or Bioengineering; Biotechnology majors only or consent of instructor. (S)

BENG 191/291. Senior Seminar I: Professional Issues in Bioengineering (2)

(Conjoined with BENG 291.) Instills skills for personal and organizational development during lifelong learning. Student prepares portfolio of personal attributes and experiences, prepares for career interviews plus oral report of interviewing organizational CEO. Graduate students will prepare a NIH small business research grant. **Prerequisite:** consent of instructor. (W)

BENG 192. Senior Seminar in Bioengineering (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in bioengineering (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times with a change in topic and permission of the department. Enrollment is limited to twenty students, with preference given to seniors.

BENG 195. Teaching (2–4)

Teaching and tutorial assistance in a bioengineering course under supervision of instructor. Not more than four units may be used to satisfy graduation requirements. (P/NP grades only.) **Prerequisites:** B average in the major and departmental approval. (F,W,S)

BENG 196. Bioengineering Industrial Internship (1–4)

Under the joint supervision of a faculty advisor and industry mentor, the student will work at a bioengineering industrial site to gain practical bioengineering experience. No more than twelve units may be used to satisfy graduation unit requirements. (P/NP grades only.) **Prerequisites:** consent of department and completion of all lower-division course requirements, including general-science requirements; some laboratory experience; completion of ninety units with a 2.5 GPA; and consent of a bioengineering faculty coordinator. (F,W,S,Su)

BENG 197. Engineering Internship (1–4)

An enrichment program, available to a limited number of undergraduate students, which provides work experience with industry, government offices, hospitals, and their practices. Subject to the availability of positions, students will work in a local industry or hospital (on a salaried or unsalaried basis) under the supervision of a faculty member and industrial, government, or hospital employee. Coordination of the Engineering Internship is conducted through UCSD's Academic Internship Program. Time and effort to be arranged. Units may not be applied towards major graduation requirements unless prior approval of a faculty advisor is obtained and internship is an unsalaried position. **Prerequisites:** completion of ninety units with a 2.5 GPA and consent of a bioengineering faculty coordinator. (F,W,S,Su)

BENG 198. Directed Group Study (1–4)

Directed group study, on a topic or in a field not included in the regular department curriculum, by arrangement with a bioengineering faculty member. (P/NP grades only.) **Prerequisites:** upper-division standing, completion of ninety units of UCSD undergraduate study, a minimum UCSD GPA of 2.5, consent of instructor, and a completed and approved Special Studies form. (F,W,S)

BENG 199. Independent Study for Undergraduates (4)

Independent reading or research by arrangement with a bioengineering faculty member. May be taken for credit three times. (P/NP grades only.) **Prerequisites:** upper-division standing, completion of ninety units of UCSD undergraduate study, a minimum UCSD GPA of 2.5, consent of instructor, and a completed and approved Special Studies form. (F,W,S,Su)

GRADUATE

BENG 202/CSE 282. Bioinformatics II: Introduction to Bioinformatics Algorithms (4)

(Formerly BENG 202/CSE 257A.) Introduction to methods for sequence analysis. Applications to genome and proteome sequences. Protein structure, sequence-structure analysis. **Prerequisite:** Pharm. 201 or consent of instructor. (W)

BENG 203/CSE 283. Genomics, Proteomics, and Network Biology (4)

Annotating genomes, characterizing functional genes, profiling, reconstructing pathways. **Prerequisites:** Pharm. 201, BENG 202/CSE 282 or consent of instructor. (S)

BENG 207. Topics in Bioengineering (4)

Course given at the discretion of the faculty on current topics of interest in bioengineering. (F,W,S)

BENG 208. Topics in Bioengineering with Lab (4)

Course given at the discretion of the faculty on topics of current interest in engineering science. This course is intended to be a lecture and lab companion topics course. **Prerequisite:** consent of instructor. (S)

BENG 209/MAE 209. Continuum Mechanics Applied to Medicine/Biology (4)

Introduction to the basic definitions of Continuum Mechanics and their mathematical formulation at the graduate level with applications to problems in medicine and biology. This course is intended for students with little or no background in mechanics; it is an introduction to the Biomechanics courses BENG 250 A–B in the Department of Bioengineering and to Solid and Fluid Mechanics courses MAE 210A and MAE 231A in the Department of Mechanical and Aerospace Engineering. This course should not be taken concurrently with MAE 210A or MAE 231A. **Prerequisite:** consent of instructor. (F)

BENG 211. Systems Biology and Bioengineering I: Biological Components (4)

Components of biological systems, their biochemical properties and function. The technology used for obtaining component lists. Relationship within and integration of component lists. Structured vocabularies and component ontologies. Algorithms for comparative approaches in deciphering and mining component lists. **Prerequisite:** BENG 230A or BIMM 100 or consent of instructor. (F)

BENG 212. Systems Biology and Bioengineering II: Network Reconstruction (4)

This course will cover the process of reconstructing complex biological reaction networks. Reconstruction of metabolic networks, regulatory networks and signaling networks. Bottom-up and top-down approaches. The use of collections of historical data. The principles underlying high-throughput experimental technologies and examples given on how this data is used for network reconstruction, consistency checking, and validation. **Prerequisite:** BENG 211 or consent of instructor. (W)

BENG 213. Systems Biology and Bioengineering III: Building and Simulating Large-Scale In Silico Models (4)

Mathematical models of reconstructed reaction networks and simulation of their emergent properties. Classical kinetic theory, stochastic simulation methods and constraints-based models. Methods that are scalable and integrate multiple cellular processes will be emphasized. Existing genome-scale models will be described and computations performed. Emphasis will be on studying the genotype-phenotype relationship in an in silico model driven fashion. Comparisons with phenotypic data will be emphasized. **Prerequisite:** BENG 212 or consent of instructor. (S)

BENG 221. Mathematical Methods for Bioengineering (4)

Introduction of the foundations of engineering by teaching the mathematical methods that describe the engineering principles. Analytical and numerical approaches to solving the equations. **Prerequisite:** graduate standing in bioengineering or consent of instructor. (F)

BENG 222. Continuum Mechanics and Transport Phenomena in Living Systems (4)

Introduction to engineering problems from a physics and a problem-solving perspective. Important bioengineering problems in mechanics and transport will be discussed with case studies. **Prerequisite:** graduate standing in bioengineering or consent of instructor. (S)

BENG 223. Thermodynamics, Statistical Mechanics, Interfacial Phenomena in Living Systems (4)

Thermodynamics, statistical mechanics, and interfacial phenomena that emphasize the chemical natures of living systems. Topics include intermolecular and surface forces, calculation of energetic processes, computation of electrical forces and fields, and principles of physics in multiscale engineering and design. **Prerequisite:** graduate standing in bioengineering or consent of instructor. (W)

BENG 225. BioBusiness: Starting, Growing, and Harvesting a Biotech Company (4)

Biotech is a special breed of business, especially in the start-up and early phases. Whether you are considering joining a biotech start-up or want to be successful in a life science organization, it pays to understand this unique business model. In this course, you will study and analyze (1) start-up proposals (2) the genesis of the biotech industry (3) biotech categories and growth strategies (4) the process of spinning out viable product concepts from academia (5) financing techniques (6) business development (7) acquisition/IPO valuation methods and (8) potentially disruptive technologies. The format is highly interactive and learning is enhanced by means of exercises, team presentations, and case studies. **Prerequisite:** bioengineering M.Eng. degree student or consent of instructor. (S)

BENG 230A. Biochemistry (4)

A graduate course in biochemistry especially tailored to the requirements and background of bioengineering graduate students. It will cover the important macro- and small molecules in cells that are the major constituents, or that function as signaling molecules or molecular machineries. The structures, pathways, interactions, methodologies, and molecular designs using recombinant DNA technology will be covered. **Prerequisites:** BIPN 100 and 102 or consent of instructor. (F)

BENG 230B. Cell and Molecular Biology (4)

A general survey of structure-function relationships at the molecular and cellular levels. Emphasis on basic genetic mechanisms; control of gene expression; membrane structure, transport and traffic; cell signaling; cell adhesion; mechanics of cell division; and cytoskeleton. **Prerequisites:** BIPN 100, 102, and BENG 230A or consent of instructor. (W)

BENG 230C. Cardiovascular Physiology (4)

Physical concepts of behavior of heart, large blood vessels, vascular beds in major organs and the microcirculation. Physical and physiological principles of blood flow, blood pressure, cardiac work, electrophysiology of the heart. Special vascular beds, including their biological and hemodynamic importance. Integration through nervous and humoral controls. **Prerequisites:** BIPN 100, 102, and BENG 230B or consent of instructor. (S)

BENG 230D. Respiratory and Renal Physiology (4)

Mechanics of breathing. Gas diffusion. Pulmonary blood flow. Stress distribution. Gas transport by blood. Kinetics of oxygen and carbon dioxide exchange. VA/Q relations. Control of ventilation. Glomerular and proximal tubule functions. Water metabolism. Control of sodium and potassium in the kidney. **Prerequisites:** BIPN 100, 102, and BENG 230C or consent of instructor. (F,W,S)

BENG 231. Foundations of Physiology for Bioengineering (4)

Introduction to human physiology emphasizing quantitative physiological principles and engineering applications to the study and understanding of physiological systems. The study of principal organ systems will be integrated with cell and molecular biology, biological control systems, and the physical sciences. **Prerequisite:** graduate standing in bioengineering or consent of instructor. (S)

BENG 238/MED 238. Molecular Biology of the Cardiovascular System (4)

An overview of heart, vascular development and associated diseases from a molecular biological perspective. Current approaches for generating mouse models of cardiovascular disease and recently developed technologies for physiological assessment in small animal models will be presented. (S)

BENG 241A. Foundations of Tissue Engineering Science (4)

Molecular and cell biological basis of tissue engineering science. Paracrine control of tissue growth and differentiation. Biomechanics and the molecular basis of cell-cell and cell-matrix interactions. Cell motility, mechanics of tissue growth and assembly, tissue repair. Mass transfer in tissues. Microcirculation of blood and lymph. **Prerequisite:** BENG 230A or consent of instructor. (F)

BENG 241B. Methods in Tissue Engineering Science (4)

Isolation of cells, cell and tissue culture systems. Fluorescence and confocal microscopy. Intracellular imaging. Mechanical testing of tissues. Micromechanical measurement and analysis of cell deformability and cell interaction. Methods in microcirculation and angiogenesis. **Prerequisite:** BENG 241A or consent of instructor. (S)

BENG 242/MATS 257. Polymer Science and Engineering (4)

Quantitative basic understanding of different branches of polymer science varying from polymer chemistry, characterization, thermodynamics, rheological properties, smart materials, self-assembly in biopolymers (natural) and synthetic polymers, and applications of polymers ranging from medicine to structure. **Prerequisite:** graduate standing in bioengineering or materials science or consent of instructor. (W)

BENG 247A/ECE 247A. Advanced Biophotonics (4)

Basic physics and chemistry for the interaction of photons with matter, including both biological and synthetic materials; use of photonic radiation pressure for manipulation of objects and materials; advanced optoelectronic detection systems, devices and methods, including time resolved fluorescent and chemiluminescent methods, fluorescent energy transfer (FRET) techniques, quantum dots, and near-field optical techniques; underlying mechanisms of the light sensitive biological systems, including chloroplasts for photosynthetic energy conversion and the basis of vision processes. **Prerequisite:** graduate standing. (F)

BENG 247B/ECE 247B. Bioelectronics (4)

Topics to be covered will include photolithographic techniques for high-density DNA microarray production, incorporation of CMOS control into electronic DNA microarrays, direct electronic detection technology used in microarrays and biosensor devices, and focus on problems related to making highly integrated devices (lab-on-a-chip, in vivo biosensors, etc.) form heterogeneous materials and components. **Prerequisite:** graduate standing. (W)

BENG 247C/ECE 247C. Bionanotechnology (4)

Topics include: nanosensors and nanodevices for both clinical diagnostics and biowarfare (bioterror) agent detection; nanostructures for drug delivery; nanoarrays and nanodevices; use of nanoanalytical devices and systems; methods and techniques for modification or functionalization of nanoparticles and nanostructures with biological molecules; nanostructural aspects of fuel cells and biofuel cells; potential use of DNA and other biomolecules for computing and ultra high-density data storage. **Prerequisite:** graduate standing. (S)

BENG 250A. Biomechanics (4)

An introduction to biomechanics and transport phenomena in biological systems at the graduate level. Biorheology, biosolid mechanics, muscle mechanics, mass transfer, momentum transfer, energy transfer. **Prerequisites:** CENG 101C, BENG 112B, and BENG 222 or consent of instructor. (W)

BENG 250B. Advanced Biomechanics (4)

Modern development of biomechanics at an advanced mathematical level. Selected topics in the dynamics of heart, pulsatile, blood flow, microcirculation, and muscle

mechanics. **Prerequisite:** BENG 253 or consent of instructor. (S)

BENG 253. Biomedical Transport Phenomena (4)

Nonequilibrium thermodynamic analysis of transport phenomena. The osmotic effect. Diffusion and exchange in biological systems. **Prerequisite:** BENG 222 or consent of instructor. (W)

BENG 260/BGGN 260. Neurodynamics (4)

Introduction to the nonlinear dynamics of neurons and neural systems using bifurcation theory and chaotic motions, at different levels of abstraction, e.g., biophysical and "reduced" models for analysis of regularly spiking and bursting cells. Laboratory exercises will accompany the lectures. **Prerequisite:** graduate standing or consent of instructor.

BENG 267. Microcirculation in Health and Disease (4)

Structural and functional aspects of transport and blood-tissue exchange in key organs during circulatory shock, bacterial toxemia, hypertension. Physical and ultrastructural techniques used to analyze small-vessel dynamics. **Prerequisite:** consent of instructor. (S)

BENG 276/Chem. 276/Math. 276. Numerical Analysis in Multi-scale Biology (4)

Introduces mathematical tools to simulate biological processes at multiple scales. Numerical methods for ordinary and partial differential equations (deterministic and stochastic), and methods for parallel computing and visualization. Hands-on use of computers emphasized; students will apply numerical methods in individual projects. **Prerequisite:** consent of instructor. (F,W,S)

BENG 277/BIOM 287. Tissue Engineering Laboratory (4)

Students will learn to conduct tissue engineering and developmental biology experiments, microfabricate cell culture systems, engineer biopolymer materials, and develop and analyze quantitative models of transport, cell fate, and growth mechanics. The understanding and manipulation of multicellular processes that comprise development and growth involves specialized areas of biomechanics, developmental biology, biomaterials, and the tools of molecular biology, as well as the integration of theory and experiment. To fabricate functional tissues, it is important to establish underlying molecular and physical mechanisms and then control and integrate these. **Prerequisite:** consent of instructor. (S)

BENG 280A. Principles of Biomedical Imaging (4)

Fundamentals of Fourier transform and linear systems theory including convolution, sampling, noise, filtering, image reconstruction and visualization with an emphasis on applications to biomedical imaging. Examples from optical imaging, CT, MR, ultrasound, nuclear, PET, and radiography. **Prerequisite:** graduate standing. (F)

BENG 280B. Comparative Biomedical Imaging (4)

Application of biomedical imaging to the measurement of structure, function, and dynamics of organ systems from the microscopic to the organ level. Emphasis on detailed evaluation and comparison of specific imaging modalities. **Prerequisite:** consent of instructor. (W,S)

BENG 281. Seminar in Bioengineering (1)

Weekly seminars by faculty, visitors, postdoctoral research fellows, and graduate students concerning research topics in bioengineering and related subjects. May be repeated for credit. Course does not apply toward M.S. graduation requirements. (S/U grades only.) (F,W,S)

BENG 282. Seminar: Faculty Research (1)

Weekly seminars by bioengineering faculty presenting their research. May be repeated for credit. (S/U grades only.) (F,W,S)

BENG 283/Chem. 283/BIOM 283. Supramolecular Structure Determination Laboratory (4)

A laboratory course combining hands-on mass spectrometry and bioinformatics tools to explore the relationship between structure and function in macromolecules. Tools for peptide sequencing, analysis of post-translational modification, and fragmentation analysis by mass spectrometry are examples of experiments students will run. **Prerequisite:** consent of instructor.

BENG 290. Bioengineering Special Graduate Seminar (1-2)

Seminars by faculty, visitors, postdoctoral research fellows, and/or graduate students in selected topic(s) in bioengineering and/or related subjects. This course does not apply toward M.S. graduation requirements.

BENG 291/191. Senior Seminar I: Professional Issues in Bioengineering (2)

(Conjoined with BENG 191.) Instills skills for personal and organizational development during lifelong learning. Student prepares portfolio of personal attributes and experiences, prepares for career interviews plus oral report of interviewing organizational CEO. Graduate students will prepare a NIH small business research grant. **Prerequisites:** none. (W)

BENG 295. Bioengineering Design Project and Industrial Training (4)

Independent work by graduate students focused on design, applied research, and professional experience. **Prerequisites:** consent of instructor and departmental approval. (F,W,S)

BENG 296. Independent Study (4)

Prerequisite: consent of instructor. (F,W,S)

BENG 298. Directed Group Study (1-4)

Directed group study on a topic or in a field not included in regular department curriculum, by special arrangement with a faculty member. (S/U grades only.) **Prerequisite:** consent of instructor. (F,W,S)

BENG 299. Graduate Research (1-12)

Independent work by graduate students engaged in research and writing theses. (S/U grades only.) **Prerequisite:** consent of instructor. (F,W,S)

BENG 501. Teaching Experience (2 or 4)

Teaching experience in an appropriate bioengineering undergraduate course under direction of the faculty member in charge of the course. Lecturing one to two hours per week in either a problem-solving section or regular lecture. (S/U grades only.) **Prerequisites:** consent of instructor and departmental approval. (F,W,S)

Computer Science and Engineering (CSE)

PROFESSORS

Donald W. Anderson, Ph.D., *Emeritus*
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Vineet Bafna, Ph.D.
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Alexander Vardy, Ph.D.
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Stefan Savage, Ph.D.
Alex Snoeren, Ph.D.

ASSISTANT PROFESSORS

Ranjit Jhala, Ph.D.
Sorin Lerner, Ph.D.
Tajana S. Rosing, Ph.D.
Hovav Shacham, Ph.D.
Steven J. Swanson, Ph.D.
Michael Taylor, Ph.D.

ADJUNCT FACULTY

Samuel R. Buss, Ph.D., *Mathematics*
Bradley G. Calder, Ph.D., *Computer Science and Engineering*
Andrew Chien, Ph.D., *Computer Science and Engineering*
Kimberly Claffy, Ph.D., *San Diego Supercomputer Center*
Jim Hollan, Ph.D., *Cognitive Science*
Falko Kuester, Ph.D., *Structural Engineering*
Jeffrey B. Remmel, Ph.D., *Mathematics*
J. Benjamin Rosen, Ph.D., *Computer Science and Engineering*
Terrence Sejnowski, Ph.D., *Biology*
Allan Snaveley, Ph.D., *San Diego Supercomputer Center*
Matthias Zwicker, Ph.D., *Computer Science and Engineering*

AFFILIATED FACULTY

Barry Brown, Ph.D., *Communication*
Trey Ideker, Ph.D., *Bioengineering*
Glenn Tesler, Ph.D., *Mathematics*

RESEARCH FACULTY

Philip Papadopoulos, Ph.D., *Associate Research Professor*

LECTURERS WITH SECURITY OF EMPLOYMENT

Paul Kube, Ph.D.
Elizabeth Simon, Ph.D.

CONTINUING LECTURERS

Gary Gillespie, Ph.D.
Susan Marx, Ph.D.
Richard Ord, M.S.

ACADEMIC COORDINATOR

Paul Kube, Ph.D., Lecturer with Security of Employment

OFFICES:

Undergraduate Affairs Room 1200D
Graduate Affairs Room 1200D
Engineering Building Unit 3B, Warren College
<http://www.cse.ucsd.edu>

THE UNDERGRADUATE PROGRAM

Degree and Program Options

The Department of Computer Science and Engineering (CSE) offers four degree programs: the B.S. degree in computer science, the B.A. degree in computer science, the B.S. degree in computer engineering, and the B.S. degree in computer science with a specialization in bioinformatics.

The B.A. degree in computer science is a flexible program that allows comprehensive studies beyond computer science and engineering.

All CSE programs of study provide a broad and rigorous curriculum and are designed to provide students with the strong technical education necessary for placement in the competitive high-tech job market as well as for advanced studies in graduate school.

CSE offers courses in the following areas:

- Theory
- Artificial intelligence
- Software
- Hardware
- Computer security and cryptography
- Computer vision and graphics
- Databases and XML
- Systems and networking
- Bioinformatics
- Software engineering

In addition, CSE seniors can participate in challenging project-courses in: software systems, where teams create multiplayer games; Internet systems, where students create sophisticated Web transaction systems; and mobile wireless computing, where teams create applications for handheld devices.

The CSE department supports and encourages students to explore opportunities outside the classroom. Students assist in many CSE courses as paid lab tutors and readers, getting an excellent opportunity to interact more closely with faculty and other students. In addition, CSE students participate in research projects with graduate students and faculty in CSE, the San Diego Supercomputer Center, and the California Institute for Telecommunications and Information Technology (Calit2). Under the direction of our faculty, CSE students may also earn credit by participating in independent research projects. The CSE department has strong ties with local and national high-tech industry, where students can earn course credit while applying their academic knowledge toward exciting commercial technologies in paid internships.

B.S. COMPUTER SCIENCE PROGRAM

The lower-division B.S. computer science program is designed to provide a strong foundation in mathematics, physics, electrical engineering, programming methodology and skills, and computer organization. Upper-division core courses deal with the theory and design of algorithms, hardware, and software. Students can gain additional breadth and/or depth in computer science and engineering by an appropriate selection of upper-division technical electives.

Students should have sufficient background in high school mathematics so that they can take freshman calculus in their first quarter. Courses in high school physics and computer programming, although helpful, are not required for the program.

The department requires a total of 128 units for the B.S. computer science program (not including the general-education requirements). There are

three varieties of requirements: lower-division, upper-division, and technical electives.

Advisory placement exam for CSE 3, CSE 8A/8AL and CSE 11: An advisory placement test is encouraged of all CSE majors to help accurately place students into the right starting point in the CSE undergraduate curriculum. This information is found at the following Web site: <http://www-cse.ucsd.edu/undergraduate-education.html>. Contact the CSE student affairs advising office at ugradinfo@cs.ucsd.edu if further assistance is needed.

1. Lower-Division Requirements

Students are expected to complete the following fifty-two units by the end of their sophomore year.

Computer Science and Engineering

CSE 8B or CSE 11, CSE 12, CSE 15L, CSE 20 or Math. 15A, CSE 21 or Math. 15B, CSE 30, , and CSE 91; twenty-four units.

Note: Students with little computer experience are encouraged to take CSE 3. Students without prior programming experience are advised to take CSE 8A, CSE 8AL, and then CSE 8B, instead of CSE 11. CSE 11 is a faster paced version of CSE 8A, CSE 8AL, and CSE 8B, and requires experience in programming with a compiled language.

Mathematics

Math. 20A, Math. 20B, Math. 20C, and Math. 20F; sixteen units.

General Science

Phys 2A. and Phys. 2B, or Chem. 6A and Chem. 6B, or Chem. 6AH and Chem. BH, or BILD 1 and BILD 2, or BILD 3 and BICD 100; eight units.

Students who received high grades in both calculus and physics in high school may substitute the major's sequence, Phys. 4A-B-C for Phys. 2A-B-C.

Probability and Statistics

Math. 183 or CSE 103; four units.

2. Upper-Division Requirements

All B.S. computer science students are required to take CSE 100 or Math. 176, CSE 101 or Math. 188, CSE 105 or Math. 166, CSE 110, CSE 120, 130, 131, 140, 140L, 141 and 141L; forty units.

Students are expected to complete almost all of these courses by the end of their junior year. If students want to accelerate their program, they should consider taking CSE 100 or Math. 176, CSE 105, and/or CSE 140 and 140L in the sophomore year.

3. Technical Electives

B.S. computer science students are required to complete one upper-division cluster of three to five CSE courses. The three to five CSE courses are part of the nine technical electives required for a total of thirty-six units. The purpose of the clusters is to help students identify groups of complementary courses, thus improving their education. Clusters are designed by the CSE faculty by grouping existing courses. Students who wish can also design their own clusters, with approval by the CSE Undergraduate Committee. For a complete list of clusters, visit www.ucsd.edu or see an advisor in the CSE advising offices.

1. Choose one upper-division cluster consisting of three to five CSE courses. A three-course cluster is permitted when the cluster is a natural extension of one of the core upper-division requirements.
2. A five-course cluster will be permitted when an additional foundational course may be required by other courses in the cluster.
3. Within a cluster there can be choices, such as "take four of the five" or a choice between two course alternatives.
4. May use up to eight units of CSE 198, CSE 199, or CSE 199H to meet the CSE upper-division technical requirement.
5. Twelve credits of non-198, CSE 199, or CSE 199H must be completed.

Two technical electives (of the required nine technical electives) can be chosen from the wider set of courses that includes computer science and engineering upper-division courses, graduate courses, and other electives as listed under the section titled "[Electives](#)." Other restrictions in the selection of technical electives are also given in the section "[Electives](#)."

4. B.S. Computer Science, Sample Program starting with CSE 3

FALL	WINTER	SPRING
FRESHMAN YEAR		
CSE 3	CSE 8A and 8AL	CSE 8B
Math. 20A	CSE 91 (2 units)	CSE 20 or Math. 15A
GE	Math. 20B	Math. 20C
	GE	GE
SOPHOMORE YEAR		
CSE 12	CSE 30	CSE 110
CSE 15L (2 units)	CSE 100 or Math. 176	CSE 140
CSE 21 or Math. 15B	Major General Science	CSE 140L (2 units)
Major General Science	GE	GE
JUNIOR YEAR		
CSE 101 or Math. 188	CSE 105 or Math. 166	CSE 103 or Math. 183
CSE 141	CSE 120	CSE Tech. Elec.
CSE 141L (2 units)	Math. 20F	CSE Tech. Elec.
GE	GE	GE
SENIOR YEAR		
CSE 130	CSE 131	CSE Tech. Elec.
CSE Tech. Elec.	CSE Tech. Elec.	CSE Tech. Elec.
CSE Tech. Elec.	CSE Tech. Elec.	CSE Tech. Elec.
GE	GE	GE

B.S. Computer Science, Sample Program starting with CSE 8A/8AL

FALL	WINTER	SPRING
FRESHMAN YEAR		
CSE 8A and CSE 8AL	CSE 8B	CSE 12
CSE 91 (2 units)	CSE 20 or Math. 15A	CSE 15L (2 units)
Math. 20A	Math. 20B	Math. 20C
GE	GE	GE
SOPHOMORE YEAR		

CSE 30	CSE 100 or Math. 176	CSE 101 or Math. 188
CSE 21 or Math. 15B	CSE 110	Math. 20F
Major General Science	Major General Science	CSE Tech. Elec.
GE	GE	GE
JUNIOR YEAR		
CSE 105 or Math. 166	CSE 120	CSE 103 or Math. 183
CSE 140	CSE 141	CSE Tech. Elec.
CSE 140L (2 units)	CSE 141L (2 units)	CSE Tech. Elec.
GE	GE	GE
SENIOR YEAR		
CSE 130	CSE 131	CSE Tech. Elec.
CSE Tech. Elec.	CSE Tech. Elec.	CSE Tech. Elec.
CSE Tech. Elec.	CSE Tech. Elec.	GE
GE	GE	GE

B.S. Computer Science, Sample Program starting with CSE 11

FALL	WINTER	SPRING
FRESHMAN YEAR		
CSE 11	CSE 12	CSE 30
CSE 91	CSE 15L (2 units)	CSE 20 or Math. 15A
Math. 20A	Math. 20B	Math. 20C
GE	GE	GE
SOPHOMORE YEAR		
CSE 21 or Math. 15B	CSE 100 or Math. 176	CSE 101 or Math. 188
CSE 140	CSE 110	CSE 141
CSE 140L	CSE Tech. Elec.	CSE 141L (2 units)
GE	Major General Science	Major General Science
JUNIOR YEAR		
CSE 105 or Math. 166	CSE 130	CSE 131
CSE 120	CSE Tech. Elec.	CSE 103 or Math. 183
CSE Tech. Elec.	CSE Tech. Elec.	GE
GE	GE	GE
SENIOR YEAR		
CSE Tech. Elec.	CSE Tech. Elec.	CSE Tech. Elec.
CSE Tech. Elec.	CSE Tech. Elec.	GE
GE	GE	GE
GE	GE	GE

Notes for Selecting and Scheduling Classes for B.S. Computer Science

(All courses must be taken for a letter grade.)

1. Advisory placement exam: Students may self-select which course they wish to take and are encouraged to take the advisory placement exam to help decide. Students with little computer experience are encouraged to take CSE 3. Students without experience in programming in a compiled language are advised to take CSE 8A and CSE 8AL, and then CSE 8B, instead of CSE 11. CSE 11 is a faster paced version of CSE 8A, CSE 8AL, and CSE 8B. CSE 8B or CSE 11 must be taken before CSE 12.
2. Computer Science Advanced Placement Credit: A Exam (Java Programming) two units
 - Score of 4 exempts CSE 8A and CSE 8AL. Student should take CSE 11.

- Score of 5 exempts CSE 11. Student should take CSE 12.
3. CSE 8A/8AL, or CSE 8B, or CSE 11 may be taken concurrently with CSE 20/Math. 15A. Please obtain department approval for enrollment permission for CSE 20/Math. 15A at ugradinfo@cs.ucsd.edu.
 4. CSE 15L and CSE 70 are new courses starting fall 2007.
 5. Effective fall 2010, CSE 70 is renumbered to CSE 110.
 6. CSE 15L must be taken prior to or concurrently with CSE 12.
 7. The CSE Undergraduate Committee would like students to start taking technical electives as soon as possible after completing CSE 30. Effective fall 2010, students must complete nine technical electives. Students must complete one cluster consisting of three to five courses. Students may use a CSE graduate course for technical elective credit with approval. Once a graduate course is used for an undergraduate degree, that course may not be reused for a graduate degree. In addition, only four units of CSE 197 may be used toward technical elective credit.
 8. Students may take up to eight units of CSE 198, CSE 199, or CSE 199H to meet the CSE upper-division technical requirement.
 9. 12 credits of non-198, CSE 199, or CSE 199H must be completed. Two of the technical electives may be chosen from a list of approved electives. This list is at <http://www.cse.ucsd.edu/undergrad/degreeprograms/electives.html>. If you want to deviate from this list of approved electives, you must petition the CSE student advisor at ugradinfo@cs.ucsd.edu.

B.S. COMPUTER ENGINEERING PROGRAM

(Curriculum is the same in both the CSE and ECE departments.)

The B.S. computer engineering program is jointly administered by the Departments of Computer Science and Engineering and Electrical and Computer Engineering. Students wishing to take the computer engineering program must be admitted to one of the departments.

The lower-division computer engineering program is designed to provide a strong foundation in mathematics, physics, electrical engineering, programming methodology and skills, and computer organization. Upper-division core courses deal with the theory and design of algorithms, hardware and software, as well as electronic systems. Students can gain additional breadth and/or depth in computer science and engineering by an appropriate selection of technical electives.

Students should have sufficient background in high school mathematics so that they can take freshman calculus in their first quarter. Courses in high school physics and computer programming, although helpful, are not required for the program.

B.S. computer engineering program requires a total of 152 units (not including the general-education requirements). There are three varieties

of requirements: lower-division, upper-division, and technical electives.

Advisory placement exam for CSE 3, CSE 8A/8AL, and CSE 11: An advisory placement test is encouraged of all CSE majors to help accurately place students into the right starting point in the CSE undergraduate curriculum. This information is found at the following Web site: <http://www-cse.ucsd.edu/undergraduate-education.html>. Contact the CSE student affairs advising office at ugradinfo@cs.ucsd.edu if further assistance is needed.

1. Lower-Division Requirements

Students are expected to complete the following seventy-six units by the end of their sophomore year.

Computer Science and Engineering

CSE 8B or CSE 11, CSE 12, CSE 15L, CSE 20 or Math. 15A, CSE 21 or Math. 15B, CSE 30, , and CSE 91; twenty-four units.

Note: Students with little computer experience are encouraged to take CSE 3. Students without prior programming experience are advised to take CSE 8A, CSE 8AL, and then CSE 8B, CSE 8AL, instead of CSE 11. CSE 11 is a faster paced version of CSE 8A and CSE 8B, and requires experience in programming with a compiled language.

Mathematics

Math. 20A, Math. 20B, Math. 20C, Math. 20D, and Math. 20F; twenty units.

Physics

Phys. 2A, Phys. 2B, Phys. 2C, Phys. 2D; sixteen units. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the Department of Mathematics placement test permits them to start with Math. 20B or a higher course may take Phys. 2A in the fall quarter of the freshman year; all others will take Phys. 2A in the winter quarter of the freshman year. Students who received high grades in both calculus and physics in high school may substitute the major's sequence, Phys. 4A-B-C-D for Phys. 2A-B-C-D.

Introduction to Electrical Engineering

ECE 35, 45, 65; twelve units. These courses give a comprehensive introduction to electrical engineering.

Probability and Statistics

ECE 109; four units. This course can be taken in the sophomore year.

2. Upper-Division Requirements

All B.S. Computer engineering students are required to take CSE 100 or Math. 176, CSE 101 or Math. 188, CSE 105 or Math. 166, CSE 110, CSE 120, 130, 131, 140, 140L, 141, and 141L; forty units.

In addition, all B.S. Computer engineering students have to fulfill the following upper-division ECE requirements.

Linear Systems

ECE 101; four units. The department recommends that this course be taken in the junior year.

Electronic Circuits and Systems

ECE 102, ECE 108; eight units. The department recommends that these courses be taken in the junior year.

If students want to accelerate their program, they should consider taking CSE 100 or Math. 176, CSE 105 or Math. 166, and/or CSE 140 and 140L in the sophomore year.

3. Technical Electives

All B.S. Computer engineering students are required to take six technical electives for a total of twenty-four units. One of these courses must be either ECE 111 or ECE 118. Of the remaining five courses, four must be computer science and engineering or electrical and computer engineering upper-division or graduate courses.

The remaining course can be any computer science and engineering or electrical and computer engineering upper-division or graduate course, or any other course listed under the section titled Electives. Other restrictions in the selection of technical electives are also given in the section Electives.

4. B.S. Computer Engineering, Sample Program

FALL	WINTER	SPRING
FRESHMAN YEAR		
CSE 8A, CSE 8AL, or CSE 11	CSE 15L	CSE 21 or Math. 15B
Math. 20A	CSE 12	Math. 20C
GE	Math. 20B	GE
CSE 91	CSE 20 or Math. 15A	GE
SOPHOMORE YEAR		
CSE 30	CSE 110	CSE 140
Math. 20D	CSE 100 or Math. 176	CSE 140L
Phys. 2A	ECE 45	ECE 65
ECE 35	Phys. 2B	Phys. 2C
JUNIOR YEAR		
CSE 101 or Math. 188	CSE 120	CSE 105 or Math. 166
CSE 141	Phys. 2D	(Req. Tech. Elec.-ECE 111 or ECE 118)
CSE 141L	ECE 102	ECE 108
ECE 101	Math. 20F	CSE/ECE Tech. Elec.
SENIOR YEAR		
CSE 130	CSE 131	CSE/ECE Tech. Elec.
CSE/ECE Tech. Elec.	CSE/ECE Tech. Elec.	ECE 109
GE.	CSE/ECE Tech. Elec	GE
	GE	

Notes for Selecting and Scheduling Classes for B.S. Computer Engineering

(All courses must be taken for a letter grade.)

1. Advisory placement exam: Students may self-select which course they wish to take and are encouraged to take the advisory placement exam to help decide. Students with little computer experience are encouraged to take CSE 3.
3. Students without experience in programming

in a compiled language are advised to take CSE 8A and CSE 8AL, and then CSE 8B, instead of CSE 11. CSE 11 is faster paced version of CSE 8A, CSE 8AL, and CSE 8B. CSE 8B or CSE 11 must be taken before CSE 12.

- Computer Science Advanced Placement Credit: A Exam (Java Programming) two units:
 - Score of 4 exempts CSE 8A and CSE 8AL. Student should take CSE 11.
 - Score of 5 exempts CSE 11. Students should take CSE 12, CSE 8A/8AL, or CSE 8B, or CSE 11 may be taken concurrently with and CSE 20/ Math. 15A. Please obtain department approval for enrollment permission in CSE 20/Math. 15A at ugradinfo@cs.ucsd.edu. CSE 15L and CSE 70 are new courses starting fall 2007.
- CSE 15L must be taken prior to or concurrently with CSE 12.
- Effective fall 2006, ECE 35 and ECE 45 are new courses in computer engineering. These courses replace ECE 35A and 35B, respectively.
- Students must complete six technical electives. Four of the six technical electives must be CSE or ECE upper-division courses.
- Students must complete ECE 111 or ECE 118 to meet the design requirement.
- Students must obtain approval to use a CSE graduate course for technical elective credit. Once a graduate course is used for an undergraduate degree that course may not be reused for a graduate degree. In addition, only four units of either a CSE 197, 198, or 199 may be used toward technical elective credit.
- One of the technical electives may be chosen from a list of approved electives. This list is at <http://www.cse.ucsd.edu/undergrad/degreeprograms/electives.html>. If you want to deviate from this list of approved electives, you must petition the CSE student advisor at: ugradinfo@cs.ucsd.edu.

B.S. COMPUTER SCIENCE WITH A SPECIALIZATION IN BIOINFORMATICS

The explosion in biological knowledge spawned by the various genome projects has created entirely new fields and industries, and a need for trained computational biologists who are familiar with biology, mathematics, and computer sciences. The computer science and engineering department offers rigorous, interdisciplinary training in the new and rapidly evolving field of bioinformatics.

Bioinformatics refers to advanced computational and experimental methods that model the flow of information (genetic, metabolic, and regulatory) in living systems to provide an integrated understanding of the system properties of organisms.

This interdisciplinary major is offered by three other programs (Division of Biological Sciences, Department of Chemistry and Biochemistry, and Department of Bioengineering). The computer science and engineering requirements comprise of 152 units to be taken from the divisions of physical sciences, biology, and engineering.

1. Lower-Division Requirements

Lower-division requirements, sixty-four units: Students are expected to complete all lower-division requirements by the end of their sophomore year.

- Math. 20A, Math. 20B, Math. 20C, and Math. 20F, (16 units)
- Chem. 6A, Chem. 6B, Chem. 6C, and one Chem. lab (15 units)
- BILD 1, BILD 2, and BILD 94 (9 units)
- CSE 11, CSE 12, and CSE 21 or Math. 15B (12 units)
- Phys. 2A, Phys. 2B, and Phys. 2C (12 units)

2. Upper-Division Requirements

Upper-division requirements, eighty-eight units (includes five CSE technical electives)

- CSE 100 or Math. 176 (Data Structures), (4 units)
- CSE 101 or Math. 188 (Algorithms), (4 units)
- Chem. 140A–140B (Organic Chemistry), (8 units)
- Chem. 114B (Biochemical Energetics and Metabolism) or BIBC 102 (Structural and Metabolic Biochemistry), (4 units)
- BIBC 103 (Biochemical Techniques), (4 units)
- BICD 100 (Genetics), (4 units)
- BIMM 100 (Molecular Biology) or Chem. 114D (Molecular and Cellular Biochemistry), (4 units)
- BIMM 101 (Recombinant DNA Lab), (4 units)
- BICD 110 (Cell Biology), (4 units)
- BIBC 110 (Physical Biochemistry) or Chem. 127 (Physical Chemistry), (4 units)
- Five additional CSE upper-division electives (electives 1, 2, 3, 4, and 5).

At least one course from each of the three groups for a total of five electives:

- Group I: CSE 30, 111, 131A, 131B, 134A
- Group II: CSE 105, 150, 151, Math. 184A
- Group III: CSE 132A, 132B, 133

The bioinformatics series comprises the following six courses, twenty-four units:

- CSE 181 or BIMM 181 or BENG 181 (Molecular Sequence Analysis), (4 units)
- CSE 182 or BIMM 182 or BENG 182 or Chem. 182 (Biological Databases), (4 units)
- BENG 183 (Applied Genomic Technologies), (4 units)
- CSE 184 or BIMM 184 or BENG 184 (Computational Molecular Biology), (4 units)
- BIMM 185 (Bioinformatics lab), (4 units)
- Math. 186 (Probability and Statistics), (4 units)

3. B.S. Computer science with a specialization in bioinformatics, sample program

FALL	WINTER	SPRING
FRESHMAN YEAR		

CSE 8A/8AL + 8B or 111	CSE 12	BILD 942
Math. 20A	Math. 20B	Math. 20C
Chem. 6A	Chem. 6B	Chem. 6C
GE 1	BILD 1	Chem. 6BL
	GE 2	GE 3

SOPHOMORE YEAR

CSE 21 or Math. 15B	Math. 20F	Chem. 140B
BILD 2	Phys. 2B	BIBC 103
Phys. 2A	Chem. 140A	Phys. 2C
GE 4	GE 5	GE 6

JUNIOR YEAR

CSE 100 or Math. 1763	CSE 101 or Math. 188	CSE 1814
BICD 100	Math. 186	BIMM 101 or Chem. 112B
GE 7	BIBC 102 or Chem. 114B	BICD 110
GE 8	BIMM 100 or Chem. 114D	Chem. 127

SENIOR YEAR

CSE 182	CSE 184	BIMM 185
BENG 183	Elec. 2	Elec. 4
Elec. 15	Elec. 3	Elec. 5
GE 9	GE 10	GE 11

1 Students may take the slower paced version, CSE 8A + CSE 8AL + CSE 8B, instead of CSE 11.

2 BILD 94 (1 unit seminar) is recommended in students first spring quarter of study at UCSD. This course gives an overview of issues and topics in bioinformatics.

3 CSE 30 prerequisite will be waived.

4 New courses for the bioinformatics program: CSE 181 is cross-listed with BIMM 181 and BENG 181; CSE 182 is cross-listed with BIMM 182, Chem. 182, and BENG 182; CSE 184 is cross-listed with BIMM 184 and BENG 184; and (BENG 183, BIMM 185, and Math. 186 are not cross-listed with any other courses).

5 Students must complete five CSE technical electives from the approved list.

B.A. COMPUTER SCIENCE PROGRAM

The B.A. computer science program gives students more latitude in designing their course of study. The lower-division program is designed to provide a strong foundation in mathematics, physics, programming methodology and skills, and computer organization. Upper-division core courses deal with the theory and design of algorithms, hardware, and software. Students can gain additional breadth and/or depth in computer science and engineering by an appropriate selection of technical electives. By requiring fewer technical electives, the B.A. computer science program serves those students desiring more time for undergraduate studies outside their major subject.

The department requires a total of 116 units for the B.A. computer science program (not including the general-education requirements). There are three varieties of requirements: lower-division, upper-division, and technical electives.

Advisory placement exam for CSE 3, CSE 8A/8AL, and CSE 11: An advisory placement test is encouraged of all CSE majors to help accurately place students into the right starting point in the CSE undergraduate curriculum. This information is found at the following Web site: <http://www-cse.ucsd.edu/undergraduate-education.html>. Contact the CSE student affairs advising office at ugradinfo@cs.ucsd.edu if further assistance is needed.

1. Lower-Division Requirements

Students are expected to complete the following forty-eight units by the end of their sophomore year.

Computer Science and Engineering

CSE 8B or CSE 11, CSE 12, CSE 15L, CSE 20 or Math. 15A, CSE 21 or Math. 15B, CSE 30, and CSE 91; twenty-four units.

Note: Students with little computer experience are encouraged to take CSE 3. Students without prior programming experience are advised to take CSE 8A, CSE 8AL, and then CSE 8B, instead of CSE 11. CSE 11 is a faster paced version of CSE 8A, CSE 8AL, and CSE 8B, and requires experience in programming with a compiled language.

Mathematics

Math. 20A, Math. 20B, Math. 20C, and Math. 20F; sixteen units.

General Science

Phys. 2A and Phys. 2B, or Chem. 6A and Chem. 6B, or Chem. 6AH and Chem. BH, or BILD 1 and BILD 2, or BILD 3 and BICD 100; eight units.

Students who received high grades in both calculus and physics in high school may substitute the major's sequence, Phys. 4A-B-C for Phys. 2A-B-C.

2. Upper-Division Requirements

All B.A. computer science students are required to take CSE 100 or Math. 176, CSE 101 or Math. 188, CSE 105 or Math. 166, CSE 110, CSE 120, 131, 140, 140L, 141, and 141L; forty units.

Students are expected to complete almost all of these courses by the end of their junior year. If students want to accelerate their program, they should consider taking CSE 100 or Math. 176, CSE 105 or Math. 166, and/or CSE 140 and 140L in the sophomore year.

3. Technical Electives

B.A. computer science students are required to take seven technical electives for a total of twenty-eight units. Five technical electives must be computer science and engineering upper-division or graduate courses.

Two technical electives (of the required seven technical electives) can be chosen from a wider set of courses that includes computer science and engineering upper-division courses, graduate courses, and other electives as listed under the section titled "Electives." Other restrictions in the selection of technical electives are also given in the section "Electives."

4. B.A. Computer Science, Sample Program starting with CSE 3

FALL	WINTER	SPRING
FRESHMAN YEAR		
CSE 3 Math. 20A	CSE 8A and 8AL CSE 91 (2 units)	CSE 8B CSE 20 or Math. 15A
GE	Math. 20B GE	Math. 20C GE
SOPHOMORE YEAR		
CSE 12	CSE 30	CSE 110

CSE 15L (2 units)	CSE 100 or Math. 176	CSE 140
CSE 21 or Math. 15B	Major General Science GE	CSE 140L (2 units) GE
Major General Science JUNIOR YEAR	CSE 105 or Math. 166	CSE 120
CSE 101 or Math. 188	CSE Tech. Elec. Math. 20F	CSE Tech. Elec. CSE Tech. Elec.
CSE 141 CSE 141L (2 units) GE	GE	GE
SENIOR YEAR		
CSE 130 CSE Tech. Elec. GE	CSE 131 CSE Tech. Elec. GE	CSE Tech. Elec. CSE Tech. Elec. GE

B.A. Computer Science, Sample Program starting with CSE 8A/8AL

FALL	WINTER	SPRING
FRESHMAN YEAR		
CSE 8A and 8AL CSE 91 (2 units)	CSE 8B CSE 20 or Math. 15A	CSE 12 CSE 15L (2 units) Math. 20C GE
Math. 20A GE	Math. 20B GE	
SOPHOMORE YEAR		
CSE 21 or Math. 15B	CSE 100 or Math. 176	CSE 101 or Math. 188
CSE 30 Major General Science GE	CSE 110 Major General Science GE	CSE 140 CSE 140L (2 units) GE
JUNIOR YEAR		
CSE 105 or Math. 166	CSE 120	CSE Tech. Elec.
CSE 141 CSE 141L (2 units) GE	CSE Tech. Elec. Math. 20F GE	CSE Tech. Elec. GE
SENIOR YEAR		
CSE 130 CSE Tech. Elec. GE	CSE 131 CSE Tech. Elec. GE	CSE Tech. Elec. CSE Tech. Elec. GE

B.A. Computer Science, Sample Program starting with CSE 11

FALL	WINTER	SPRING
FRESHMAN YEAR		
CSE 11	CSE 12	CSE 20 or Math. 15A
CSE 91 Math. 20A GE	CSE 15L (2 units) Math. 20B GE	CSE 30 Math. 20C GE
SOPHOMORE YEAR		
CSE 21 or Math. 15B	CSE 100 or Math. 176	CSE 141
Math. 20F	CSE 140	CSE 141L (2 units) CSE Tech. Elec.
Major General Science GE	CSE 140L (2 units) Major General Science	GE
JUNIOR YEAR		
CSE 105 CSE 120 CSE Tech. Elec. GE	CSE 130 CSE Tech. Elec. GE	CSE 131 CSE Tech. Elec. GE

SENIOR YEAR

CSE Tech. Elec GE	CSE Tech. Elec. GE	CSE Tech. Elec. GE
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Notes for Selecting and Scheduling Classes for B.A. Computer Science

(All courses must be taken for a letter grade.)

- Advisory placement exam: Students may self-select which course they wish to take and are encouraged to take the advisory placement exam to help decide. Students with little computer experience are encouraged to take CSE 3. Students without experience in programming in a compiled language are advised to take CSE 8A and CSE 8AL, and then CSE 8B, instead of CSE 11. CSE 11 is a faster paced version of CSE 8A, CSE 8AL, and CSE 8B. CSE 8B or CSE 11 must be taken before CSE 12.
- Computer Science Advanced Placement Credit: A Exam (Java Programming) two units
 - Score of 4 exempts CSE 8A and CSE 8AL. Student should take CSE 11.
 - Score of 5 exempts CSE 11. Student should take CSE 12.
- CSE 8A/8AL, or CSE 8B, or CSE 11 may be taken concurrently with CSE 20/Math. 15A, Please obtain department approval for enrollment permission in CSE 20/Math. 15A at ugradinfo@cs.ucsd.edu.
- CSE 15L and CSE 70 are new courses starting fall 2007.
- CSE 15L must taken prior to or concurrently with CSE 12.
- Effective fall 2010, CSE 70 is renumbered to CSE 110.
- Effective fall 2010, students must complete seven technical electives. Four of the seven technical electives must be CSE upper-division courses. Students can use a CSE graduate course for technical elective credit with approval. Once a graduate course is used for an undergraduate degree that course may not be reused for a graduate degree. In addition, only four units of CSE 197 may be used toward technical elective credit.
- Students may take use up to eight units of CSE 198, CSE 199, or CSE 199H to meet the CSE upper-division technical requirement.
- Two of the technical electives may be chosen from a list of approved electives. This list is at <http://www.cse.ucsd.edu/undergrad/degreeprograms/electives.html>. If you want to deviate from this list of approved electives, you must petition the CSE student advisor at ugradinfo@cs.ucsd.edu.

ELECTIVES

The discipline of computer science and engineering interacts with a number of other disciplines in a mutually beneficial way. These disciplines include mathematics, electrical engineering, and cognitive science. The following is a list of upper-division courses from these and other disciplines that can be counted as technical electives.

Restrictions

- 1. At most four units of CSE 197 may be used towards technical elective requirements.
- 2. CSE 195 cannot be used towards course requirements.
- 3. Undergraduate students must get instructor's permission and departmental stamp to enroll in a graduate course.
- 4. Students may not get duplicate credit for equivalent courses.
- 5. The UC San Diego General Catalog should be consulted for equivalency information and any restrictions placed on the courses.
- 6. Additional restrictions are noted below. Any deviation from this list must be petitioned.

Computer Science with a Specialization in Bioinformatics

Students must petition department for technical elective credit not on approved list.

Mathematics

All upper-division courses except Math. 168A (Math. 183—Computer Engineering majors only), 184A, and 195–199.

If a student has completed CSE 167, then he or she cannot get elective credit for Math. 155A. Students may receive elective credit for only one of the following courses: CSE 164A, Math. 174, Math. 173, Phys. 105A-B, CENG 100, MAE 107. No credit for any of these courses will be given if Math. 170A-B-C is taken. Students may receive credit for either one of the following: Math. 166 or CSE 105 (but not both), Math. 188 or CSE 101 (but not both), Math. 176 or CSE 100 (but not both).

Credit will be given for only one of the following: ECE 109 or Math. 183 or Econ. 120A.

Electrical and Computer Engineering

All ECE upper-division courses except 195–199. Students may not get credit for both CSE 123A and ECE 158A or CSE 143 and ECE 165. Credit will be given for only one of the following: ECE 109 or Math. 183 or Econ. 120A.

Cognitive Science

Sensation and Perception 101A; Learning, Memory, and Attention 101B, Language 101C, Distributed Cognition 102A, Cognitive Ethnography 102B, Cognitive Engineering 102C, Neuroanatomy and Physiology 107A, Systems Neuroscience 107B, Cognitive Neuroscience 107C, Programming Methods for Cognitive Science 108D, Neural Network Models of Cognitive I 108E, Advanced Programming Methods for Cognitive Science 108F, Human Computer Interaction 120, Human Computer Interaction Programming 121, Natural and Artificial Symbolic Representational Systems 170, Neural Network Models of Cognition II 181, Representation, Search, and the Web 188.

Students may not get credit for both CSE 150 and Advanced Programming Methods for Cognitive Science 108F.

Mechanical and Aerospace Engineering

All upper-division MAE courses except MAE 140 (ONLY Computer Science majors may take MAE 140) and 195–199.

Students may receive elective credit for only one of the following courses: CSE 164A, Math. 174, Math. 173, Phys. 105A-B, CENG 100, MAE 107. Students may only get credit for one of the two courses, CSE 167 or MAE 152.

Economics

Microeconomics 100A-B-C, Game Theory 109, Macroeconomics 110A-B-C, Mathematical Economics 113, Econometrics 120A-B-C, Applied Econometrics 121, Decisions Under Uncertainty 171, Introduction to Operations Research 172A-B-C, Economic and Business Forecasting 178.

Credit will be given for only one of the following: ECE 109 or Math. 183 or Econ. 120A.

Linguistics

Phonetics 110, Phonology I 111, Phonology II 115, Morphology 120, Syntax I 121, Syntax II 125, Semantics 130, Mathematical Analysis of Language 160, Computers and Language 163, Computational Linguistics 165, Principles of Discourse and Dialog 169, Psycholinguistics 170, Language and the Brain 172, and Sociolinguistics 175.

Engineering

Principles of Team Engineering 100, Team Engineering Laboratory 100L, Team Engineering 101.

Computer Science and Computer Engineering

Students are eligible to receive six units of technical elective credit for completing a combination of ENG 100 (two units) and ENG 100L (two units). Students must complete one quarter of ENG 100 for two units, and two quarters of ENG 100L for a total of four units. With this combination, students will get credit for one technical elective. To receive credit for two technical electives, students must complete one more quarter of ENG 100L. This credit can be applied to fulfill the technical elective requirements.

Music

Computer Music II 172, Audio Production: Mixing and Editing 173.

Psychology

Introduction to Engineering Psychology 161.

CSE HONORS PROGRAM

The CSE Honors Program encourages eligible undergraduate students to perform advanced study in their major. Students in the honors program work closely with faculty on an undergraduate research project, typically completed over two quarters. As a result, the honors program is excellent preparation for further study in a graduate program. Students who complete the honors program also have an honors distinction officially bestowed upon them upon graduation.

Eligibility for Admission

In accordance with university Honors Program guidelines, to apply for the CSE honors program students must meet the following prerequisites:

- Junior-level standing in a CSE major

- 3.5 GPA in CSE major courses, 3.25 GPA overall
- Completion of CSE 101, CSE 105, and CSE 110
- Completion of at least twelve units of upper-division CSE courses at UCSD

Application Procedure

To apply for admission to the CSE Honors Program, students must submit a formal application that includes the following information:

- Name of CSE faculty advisor sponsoring the project
- Project proposal (one page)
- Signature from the faculty advisor acknowledging that the faculty member has agreed to advise the student in the honors program, and corroborates the specifics of the project
- Submit the application no later than the end of fall quarter of senior year. Submission during spring quarter of the junior year is strongly encouraged.

The application form is available online from the CSE department Web site and from the CSE undergraduate advising office. Admission to the honors program will be formally approved by the CSE honors committee based upon the materials provided in the application.

Completion Requirements

In accordance with university Honors Program guidelines, to complete the CSE Honors Program students must meet the following requirements upon graduation:

- 3.25 GPA in a CSE major
- Eight units of CSE 199H with a GPA of 3.0 (letter grade of B) or higher
- Written honors thesis
- Presentation of honors project
- Signature from faculty advisor on an honors completion form
- Completion of requirements by the end of the spring quarter of graduation

Depending on students' performance on their honors project, students are eligible to receive the following honors designations on their diploma:

- "With distinction": Complete the eight units of CSE 199H with a GPA of 3.0 or higher
- "With high distinction": Complete the eight units of CSE 199H with a GPA of 3.5 or higher
- "With highest distinction": Complete the eight units of CSE 199H with a GPA of 3.8 or higher

Students must write a thesis describing their honors research project. The thesis must have the content, rigor, and format of scholarly publications in computer science and engineering. The faculty advisor must have reviewed and approved the honors thesis prior to submission by the student.

Students must orally present their project as a requirement for the honors program. Students have many opportunities for fulfilling this requirement:

- UCSD Annual Undergraduate Research Conference
- JSOE Engineering Undergraduate Research Konference & Assembly (EUREKA)
- An ORU research review or workshop (e.g., Calit2, CNS, CWC, CCMS, ITA Center)
- A conference or workshop presentation
- A graduate research seminar

The faculty advisor can also provide an alternative presentation opportunity.

Unit Considerations

The CSE HonorsP does not increase the units required for graduation in a CSE major. Students participating in the Honors Program may apply eight units in CSE 199H for the equivalent of two technical elective courses for their major. Students may also apply unit credit in CSE 199H towards the cluster requirement in the undergraduate program.

MINOR AND PROGRAM OF CONCENTRATION

The CSE minor requires successful completion of a total of nine CSE courses. Lower-division courses are CSE 8B or CSE 11, CSE 12, CSE 20, CSE 21, and CSE 30. The remaining four CSE courses are CSE 100, CSE 101, and two additional CSE upper-division courses subject to enforcement of prerequisites.

CS Minor

Three-year plan for students starting with CSE 8A

FALL	WINTER	SPRING
1st Year CSE 8A and CSE 8AL	CSE 8B	CSE 12
2nd Year CSE 20	CSE 21	CSE 30
3rd Year CSE 100 CSE Elective	CSE 101	CSE Elective

CS Minor

Three-year plan for students starting with CSE 11

FALL	WINTER	SPRING
1st Year CSE 11	CSE 20	CSE 12
2nd Year CSE 21	CSE 30	CSE 100
3rd Year CSE 101	CSE Elective	CSE Elective

Scheduling Notes

Students without any programming experience are advised to take CSE 3 and CSE 5A before taking CSE 8A and CSE 8AL. Concurrent enrollment is required in CSE 8A and CSE 8AL. Students may also start with CSE 11, but they should be aware that CSE 11 is a faster paced version of CSE 8A, CSE 8AL, and CSE 8B, and requires experience in programming with a compiled language.

Students should consult their college provost's office concerning the rules for the minor or program of concentration.

Restriction

Effective fall 2000, mathematics/computer science majors will not be allowed the minor in computer science.

COMPUTING COURSES FOR NON-MAJORS

The department offers a slow-pace course providing a practical introduction to computers, computation, and programming: CSE 5A—an introduction to structured programming using the C/Java programming language. We also offer an introduction in fluency in information technology: CSE 3—an introduction to basic information students need to deal with information technology. It is more of a concepts course than a programming course, but some simple programming will be done as part of the teaching of concepts.

ADMISSION TO MAJOR

Freshmen Students

Freshmen students are invited to declare the CSE computer science, computer engineering, or computer science with a specialization in bioinformatics major. Starting fall 2008 the Department of CSE removed the "Impacted/Closed Status" and admission restrictions for freshmen applicants. This means the Department of CSE will accept all students that apply to the Department of CSE and are admitted by the UC San Diego Admissions Office.

Furthermore, freshmen students that start at UC San Diego as undeclared or in another major may also switch into a computer science or computer engineering major. Students may use the Major/Minor link under Tools at <http://tritonlink.ucsd.edu> to make this change.

Major choices for your selection

B.A. Computer Science (CS28)

B.S. Computer Science (CS26)

B.S. Computer Science with a Specialization in Bioinformatics (CS27)

B.S. Computer Engineering (CS25)

Admission to the department as a major, transfer, or minor is in accordance with the general requirements established by the Jacobs School of Engineering.

Transfer Students

Transfer students are invited to declare the CSE computer science, computer engineering, or computer science with a specialization in bioinformatics majors. Starting fall 2008 the Department of CSE removed the "Impacted/Closed Status" and admission restrictions for transfer applicants. This means the Department of CSE will accept all students that apply to the Department of CSE and are admitted by the UC San Diego Admissions Office.

Furthermore, transfer students that start at UC San Diego as undeclared or in another major may also switch into a computer science or computer engineering major. Students may use the Major/Minor link under Tools at <http://tritonlink.ucsd.edu> to make this change.

Major choices for your selection

B.A. Computer Science (CS28)

B.S. Computer Science (CS26)

B.S. Computer Science with a Specialization in Bioinformatics (CS27)

B.S. Computer Engineering (CS25)

Preparation for Success

To reduce the amount of time needed to complete degree requirements, transfer students should try to complete as many prerequisite courses they can take at a community college before starting at UC San Diego.

Recommended courses and recommended 3.0 GPA

- Calculus I—for Science and Engineering (Math. 20A)
- Calculus II—for Science and Engineering (Math. 20B)
- Calculus and Analytic Geometry (Math. 20C)
- Differential Equations (Math. 20D)
- Linear Algebra (Math. 20F)
- Complete calculus-based physics series (Phys. 2A-B-C) [For computer engineering majors]
- Highest level of introductory computer programming language (i.e. Java, C or C++) course offerings at the community college

B.S. in Computer Science with a Specialization in Bioinformatics

Freshmen and transfer students are invited to declare the CSE bioinformatics major. Starting fall 2008 the Department of CSE has removed the "Impacted/Closed Status" and admission restrictions for freshman and transfer applicants. This means the Department of CSE will accept all students that apply to the Department of CSE and are admitted by the UC San Diego Admissions Office.

Furthermore, freshmen and transfer students that start at UC San Diego as undeclared or in another major may also switch into the B.S. in Computer Science with a Specialization in Bioinformatics major (major code CS27). Students may use the Major/Minor link under Tools at <http://tritonlink.ucsd.edu> to make this change.

It is strongly recommended that students meet with an advisor in the Department of CSE to discuss requirements for the bioinformatics program.

Advanced Placement Credit: Application to Major Requirements

Effective January 14, 2005, the following CSE advanced placement equivalencies have been approved (a four-unit maximum for both tests).

- Computer Science A Exam (Java Programming), two units:
 - Score of 4 = exempt CSE 8A and 8AL; student should take CSE 11
 - Score of 5 = exempt CSE 11
- Computer Science AB Exam (Java Programming, and Data Structures and Object-Oriented Programming), four units:
 - Score of 4 or 5 = exempt CSE 11
 - Score of 5 = exempt CSE 12 with department approval

ENROLLMENT IN CSE COURSES

All CSE and non-CSE majors may enroll in lower- and upper-division CSE courses. Students must meet course prerequisites.

Please note: Student demands exceed capacity in many CSE graduate courses. Accordingly, many CSE graduate courses may have enrollment restrictions, which give priority to students in the following order:

1. CSE M.S. and CSE Ph.D. students.
2. All others, with permission of the Department of Computer Science and Engineering.

Enrolling in Upper-Division Courses

The Department of Computer Science and Engineering will attempt to provide sufficient sections of all lower-division courses. Students will, however, be screened to ensure that they meet all course enrollment restrictions.

Admission to upper-division courses will be restricted to students having completed all prerequisites with a C– or better (or consent of the instructor.) You may also contact ugradinfo@cs.ucsd.edu for more information.

UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP)

CSE majors are encouraged to participate in the UC Education Abroad Program (EAP) or UCSD's Opportunities Abroad Program (OAP). Subject to approval by the faculty director of the major, courses taken through EAP/OAP will be accepted for credit toward the major. Students interested in studying abroad should see a CSE undergraduate program advisor to discuss appropriate courses and programs for their plan of study. The advising office is located in Engineering Building Unit #3 (EBU 3B), Room 1231.

Information on EAP/OAP is given in the "Education Abroad Program" section of the *UC San Diego General Catalog*. Interested students should contact the Programs Abroad Office in the International Center and visit its Web site at <http://programsabroad.ucsd.edu>. Financial aid can be used for EAP/OAP study, and special study-abroad scholarships are also available.

GRADUATION REQUIREMENTS

All major requirements and technical electives except CSE 197, 198, or 199 must be taken for a letter grade. To graduate, a grade-point average of 2.0 will be required in upper-division courses in the major, including technical electives. In addition, each student must satisfy general-education course requirements determined by the student's college, as well as major requirements determined by the department. The five colleges at UCSD require widely different numbers of general-education courses. Each student should choose his or her college carefully, considering the special nature of the college and breadth of education, realizing that some colleges require considerably more courses than others.

THE GRADUATE PROGRAM

The graduate program offers master of science and doctor of philosophy degrees in computer science and computer engineering. To be accepted into either course of study, a student should have a B.A./B.S. degree in computer science, computer engineering, or a related area, or be able to demonstrate an equivalent competency.

The graduate program is concerned with fundamental aspects of computation. The computer science specialization is divided among the following areas:

- Algorithms and complexity
- Artificial intelligence
- Bioinformatics
- Computer architecture and compilers
- Computer graphics and computer vision
- Databases and information management
- Embedded systems and software
- High-performance computing
- Programming systems
- Security and cryptography
- Software engineering
- Systems and networking
- Ubiquitous Computing
- VLSI/CAD (computer-aided design)

The computer engineering specialization places a greater emphasis on hardware and the design of computer systems.

Admission to the graduate program is done through the Office of Graduate Admissions, Department of CSE. The application deadline is in December. Admissions are always effective the following fall quarter. For admission deadline and requirements, please refer to the departmental Web page: <http://www.cse.ucsd.edu/gradedu/admissions/graduateadmissions.html>.

Admission decisions for the M.S. and Ph.D. programs are made separately. A current M.S. student who wishes to enter the Ph.D. program must submit a petition, including a new statement of purpose and three new letters of recommendation, to the CSE Admissions Committee.

FIVE-YEAR BACHELOR'S-MASTER'S PROGRAM

Undergraduate students in the Department of Computer Science and Engineering who are enrolled in the B.S. or B.A. Computer Science or B.S. Computer Engineering degree programs, and who have a cumulative GPA of a 3.4 and also a GPA of 3.4 in at least seven core courses, are eligible to apply for the Five-Year Bachelor's-Master's Degree Program. Students must apply four quarters before graduation. Acceptance into this program is an honor that carries with it practical benefits—the graduate application process is simplified (no GREs required), and students accepted into this program can be admitted fall, winter, and spring quarter, based upon availability of openings in the program. Advanced

students are given access to graduate level courses and have the opportunity to do graduate level research earlier under the direct supervision of UC San Diego's faculty, and students are able to complete the B.A., B.S., and M.S. degree within a five-year time period. Courses taken can be used toward either the B.A., B.S., or M.S. degree, but not counted toward both degrees. Additional information and applications can be obtained by contacting the CSE Student Affairs Office, EBU 3B, Room 1234. For an application, visit <http://www.cse.ucsd.edu/gradedu/degreeprograms/bachelormasterscombined.html>.

COMPUTER SCIENCE PROGRAM

MASTER OF SCIENCE PROGRAM

Thesis or Comprehensive Exam

The department offers the master of science degree in computer science. The degree can be pursued under either the Thesis Plan I or the Comprehensive Examination Plan II. There are two options for the Comprehensive Exam Plan II: the Standard Comprehensive Option or Interdisciplinary Comprehensive Option. Each plan requires forty-nine units of work. For full-time students, all the requirements can be completed within two years.

Required Courses

Students entering the M.S. Program in Computer Science will choose an area of concentration. Each concentration is an area in which the faculty has significant research expertise. A typical concentration is a collection of three courses that are designed to give the student in-depth training in the chosen field. Additionally, to ensure breadth, all students are required to take four core courses.

Core courses must be completed with an average grade of B. The four core courses required of all students are as follows:

CSE 202. Algorithms Design and Analysis

CSE 221. Operating Systems

CSE 240A. Principles of Computer Architecture

CSE 292. Faculty Research Seminar

The department expects to offer concentrations in the following areas:

Artificial Intelligence

Bioinformatics

Communication Networks

Computer Architecture and Compilers

Computer Graphics and Vision

Cryptography and Security

Databases

Design Automation for Microelectronic Designs

Distributed and Fault-Tolerant Computing

Embedded Systems and Software

Human-Computer Interaction

Parallel and Scientific Computing

Software Engineering

Storage Systems

Ph.D. Preparation

The specific courses involved in each of the concentrations are detailed in a separate bulletin which is available in the Graduate Student Affairs Office, EBU 3B 1234 or on the Web at <http://www.cse.ucsd.edu/gradedu/advising/newstudentinfo/mastersconcentration.html>.

Electives

In addition to completing the required core courses and fulfilling either the thesis or comprehensive examination requirements described above, the student must also complete additional approved courses to bring the total number of units to forty-nine. The number of units of electives depends upon whether the student chooses Plan I or Plan II. The electives consist of other CSE graduate courses or courses from a list of approved electives. Units obtained in the courses CSE 293, 298, 299, 500, 501, 599, and any of the seminar courses CSE 209, 229, 259, 269, 290, and 294 do not count toward the elective requirement.

Plan I: Thesis Option

This plan involves both course work and research, culminating in the preparation of a thesis. The student must take twelve units of CSE 298 (Independent Study) to fulfill the research requirement, and a thesis based on research must be written and subsequently reviewed by the thesis committee. This committee, which is appointed by the dean of Graduate Studies, consists of three faculty members, with at least two members from within the CSE department.

Computer Science—Thesis, Plan I Forty-nine units

Core: CSE 202, CSE 221, CSE 240A, CSE 292

Concentration: twelve units in one of the concentration areas designated by the department. Concentration courses must be taken for a letter grade

Technical electives: twelve units (minimum of two courses in CSE, minimum of two courses graduate)

Research: twelve units of CSE 298

Capstone: thesis

Plan II: Comprehensive Examination

Under this plan, the student must pass the comprehensive examination designed to test the student's knowledge in basic computer science material. The examination can normally be passed with a thorough knowledge of topics covered in the undergraduate and first-year graduate computer science programs. Each student is allowed three attempts to pass the examination. The student must secure at least a master's-level pass in the comprehensive examination. More information regarding the comprehensive examination can be found in a separate document provided by the CSE graduate office. In particular, the comprehensive examination is structured around the three CSE core areas: algorithms and data structures; operating systems; and computer architecture and digital logic design.

Project

Students electing Plan II are required to execute a project with an advisor while enrolled in four units of CSE 293.

Computer Science, Comprehensive Exam, Plan II Forty-nine units

Standard option:

Core: CSE 202, CSE 221, CSE 240A, CSE 292

Primary concentration: twelve units in one of the concentration areas designated by the department (current list is appended to this document). Concentration courses must be taken for a letter grade.

Technical electives: twenty units (minimum of three courses in CSE, minimum of three graduate level courses)

Project: four units of CSE 293

Capstone: comprehensive exam

Interdisciplinary option:

Core: CSE 202, CSE 221, CSE 240A, CSE 292

Primary concentration: twelve units in one of the concentration areas designated by the department (current list is appended to this document). Concentration courses must be taken for a letter grade.

Secondary concentration: twelve units in one of the approved areas outside of CSE. The twelve units of the secondary concentration must be taken from only one area and approved by the M.S. Committee: the Departments of Cognitive Science, Electrical and Computer Engineering, Mechanical and Aerospace Engineering, Structural Engineering, or the Rady School of Management. Technical electives: eight units (within CSE, graduate level)

Project: four units of CSE 293

Capstone: comprehensive exam

COMPUTER ENGINEERING PROGRAM

The CSE computer engineering program offers master of science and doctoral degrees with the degree title computer science and engineering (computer engineering). Computer engineering explores the engineering analysis and design aspects of algorithms and technology. Specific research areas include computer systems, signal processing systems, architecture, networks, computer-aided design, fault tolerance, and data storage systems.

MASTER OF SCIENCE PROGRAM

The degree can be pursued under either the Thesis Plan I or the Comprehensive Examination Plan II. There are two options for the Comprehensive Exam Plan II: the Standard Comprehensive Option or Interdisciplinary Comprehensive Option. Each plan requires forty-nine units of work. For full-time students, all the requirements must be completed within two years. Students with an adequate background in computer engineering can complete the M.S. program within four to five quarters of full-time study.

Plan I: Thesis Option

This plan of study involves both course work and research, culminating in the preparation of a thesis. A thesis based on research must be written and subsequently reviewed by a committee consisting of three faculty members, with at least two members from within the CSE department. The committee is appointed by the dean of Graduate Studies. Twelve units of CSE 298 must be taken with a faculty member in CSE who agrees to act as advisor for the thesis to fulfill the research requirement. A total of forty-nine units of credit is required, as follows:

Computer Engineering—Thesis, Plan I Forty-nine units

Core: Core courses must be completed with an average grade of B. The four core courses required of all students are as follows:

CSE 292

Three of the following courses: CSE 202, CSE 221, CSE237A, CSE 240A, CSE 241A

Concentration courses: twelve units from a list of computer engineering courses maintained by the department

Electives: twelve units (minimum of eight units taken within CSE, minimum of eight units graduate level)

Research: twelve units of CSE 298

Capstone: thesis

Plan II: Comprehensive Examination

There are two options for the Computer Engineering, Comprehensive Exam Plan II: the Standard Comprehensive Option or Interdisciplinary Comprehensive Option.

In order to receive the M.S. degree in computer engineering under this plan, a student must complete the course requirements listed below and pass the comprehensive examination.

The comprehensive examination is designed to test the student's knowledge in basic computer science and engineering material. The examination can normally be passed with a thorough knowledge of topics covered in the undergraduate and the first-year graduate computer science or computer engineering programs. Each student is allowed three attempts to pass the examination. The student must secure at least a master's-level pass in the comprehensive examination. This examination is the same for both the computer science and the computer engineering graduate programs. More information about the comprehensive examination can be obtained in a separate document from the CSE graduate office.

Computer Engineering—Comprehensive, Plan II Forty-nine units

Core: core courses must be completed with an average grade of B. The four core courses required of all students are as follows:

CSE 292

Three of the following courses: CSE 202, CSE 221, CSE237A, CSE 240A, CSE 241A

Standard option:

- Primary concentration: twelve units from a list of computer engineering courses maintained by the department. Concentration courses must be taken for a letter grade.
- Technical electives: twenty units (minimum of twelve units in CSE, minimum of twelve units at graduate level)
- Project: four units of CSE 293
- Capstone: comprehensive exam
- Interdisciplinary option:
- Primary concentration: twelve units from a list of computer engineering courses maintained by the department. Concentration courses must be

taken for a letter grade.

- Secondary concentration: twelve units within one of the approved areas outside of CSE. The twelve units of the secondary concentration must all be taken from only one area and approved by the M.S. Committee: the Departments of Cognitive Science, Electrical and Computer Engineering, Mechanical and Aerospace Engineering, Structural Engineering, and the Rady School of Management.
- Technical electives: eight units (within CSE, graduate level)
- Project: four units of CSE 293
- Capstone: comprehensive exam

DOCTORAL PROGRAMS

PH.D. DEGREE PROGRAMS IN COMPUTER SCIENCE AND COMPUTER ENGINEERING

CSE offers doctor of philosophy degrees in computer science and in computer engineering, providing a research-oriented education in preparation for a research, industrial, or entrepreneurial career. These programs explore both the fundamental aspects and application of computation, spanning theory, software, hardware, and applications. Our particular areas of research expertise include

- algorithms
- artificial intelligence
- bioinformatics
- complexity theory
- computer architecture/compiler
- VLSI/CAD and embedded systems
- databases and information management
- distributed systems and networking
- graphics and vision
- high performance computing
- mobile computing
- security and cryptography
- software engineering

Competency Requirement

The competency requirement ensures that Ph.D. students already have or will acquire the necessary undergraduate background for Ph.D. studies. Competency at the advanced undergraduate level may be demonstrated by any of the following methods:

1. providing evidence of previous undergraduate or graduate course work; or
2. taking an undergraduate course at UCSD; or
3. taking the corresponding graduate course with consent of instructor; or
4. passing the final exam of an undergraduate course at UCSD.

Ph.D. students must demonstrate competency with respect to the following six undergraduate courses at UCSD. The corresponding graduate courses are listed in parentheses.

- CSE 101. Design and Analysis of Algorithms (CSE 202 Algorithm Design and Analysis)**
- CSE 105. Theory of Computability (no corresponding graduate course)**
- CSE 120. Principles of Computer Operating Systems (CSE 221 Operating Systems)**
- CSE 130. Programming Languages: Principles and Paradigms (CSE 230. Principles of Programming Languages)**
- CSE 131. Compiler Construction (CSE 231. Advanced Compiler Design)**
- CSE 141. Introduction to Computer Architecture (CSE 240A. Principles of Computer Architecture)**

A graduate course taken to satisfy the competency requirement may also be used to satisfy the breadth, depth, or elective course requirement.

Course Requirements

The course requirement is intended to ensure that students are exposed to (1) fundamental concepts and tools, (2) advanced, up-to-date views in topics outside their area (the *breadth requirement*), and (3) a deep, up-to-date view of their research area (the *depth requirement*). Ph.D. students are expected to complete the breadth and depth requirements within the first three years of the program. All required course work must be taken for a letter grade, with the exception of CSE 291 (Topics in CSE), CSE 292 (Faculty Research Seminar), CSE 299 (Research), and CSE 500 (Teaching Assistantship), for which only S/U grades are allowed.

Units obtained from a single course cannot count more than once towards satisfying the requirement in each of the breadth, depth, or elective areas. Ph.D. students who have taken similar courses elsewhere may petition for a waiver of the required courses or for substitution by alternative courses.

Breadth Requirement

The breadth requirement ensures that Ph.D. students share knowledge of fundamental concepts and tools from across broad areas of computer science and computer engineering. Each Ph.D. student must take each of these courses for a letter grade and maintain an overall breadth course GPA of 3.3 (except for CSE 292, for which a letter grade is not assigned). A student will typically complete all breadth courses within the first two years of graduate study.

Breadth courses are categorized into three areas: Theory, Systems, and Applications.

Students in **Computer Science** must take six (courses in the areas of Theory, Systems, and Applications: two in Theory, two in Systems, and two in Applications)

Students in **Computer Engineering** must take six courses in the areas of Theory, Systems, and Applications following one of two plans:

- Plan A: one in Theory, three in Systems, and two in Applications
- or
- Plan B: two in Theory, three in Systems, and one in Applications

Please refer to the department Web site for a complete list of all eligible courses by breadth area.

Depth Requirements

The depth requirement ensures that a Ph.D. student acquires some depth of knowledge in a general research area early in his or her career. Each Ph.D. student must select one of the following areas as his or her depth area. The student must take three courses (twelve units) from this depth area. The student must take each of these courses for a letter grade and maintain an overall depth course GPA of 3.4. However, one of these three courses can be a CSE Topics course (CSE 291) or an Independent Study (CSE 299), which are not taken for a letter grade.

The department will maintain a list of appropriate courses for each depth area.

The depth areas are

- Theoretical Computer Science
- Programming Languages, Compilers, and Software Engineering
- Computer Systems
- Database Systems
- Computer Engineering
- Artificial Intelligence
- Graphics and Vision
- Bioinformatics

Electives

In addition to the above, each student must take three additional courses (twelve units) including at most eight units of 299, with no grade lower than C-. Upper-division undergraduate courses satisfying the competency requirement may be used as electives. Undergraduate upper-division courses CSE 291 and CSE 299 may also be used to fulfill this requirement. Units obtained in the CSE 209 series, 229 series, 239 series, 249 series, 259 series, 269 series, 279 series, 289 series, 290, 292, 293, 294, 298, and 500, and 599 do not count toward the elective requirement.

Research Exam Requirement

The research exam is intended to verify three components of the student's preparation for Ph.D. research: (1) breadth of comprehension sufficient to enable computer science research in areas beyond the topic(s) of the research exam and thesis; (2) ability to perform critical study, analysis, and writing in a focused area; and (3) research experience.

The research exam has both an oral part and a written part. The oral part of the research exam is distinct from, and cannot be combined with the University Qualifying Exam. Grading criteria for each part, and standards for passing, are available from the CSE department graduate office.

The research exam is conducted by a committee of three faculty members approved by the Graduate Committee and the chair of the department. At least two committee members must be CSE senate faculty. The student's advisor is not a member of the committee, but is free to attend the research examination. The normative time for passing the research exam is by the end of the second year of study. A petition to the CSE Graduate Committee is required

to take the research examination after the student's seventh quarter of study. The research exam must be passed by the end of the third year if the student is to continue in the Ph.D. Program. Passing the research exam may enable Ph.D. students to receive the M.S. degree if they have otherwise met their M.S. degree requirements concurrently. Ph.D. students who do not pass the exam after two attempts will be given the opportunity to write a thesis in order to receive a terminal M.S. degree. The M.S. degree is only granted to those students who do not already hold an M.S. degree prior to entering the CSE department at UCSD.

Teaching Assistant Requirement

All students enrolled in the Ph.D. Program must have one quarter of training as a teaching assistant. This is a formal degree requirement and must be completed before the student is permitted to graduate. The requirement is met by serving as a 50 percent teaching assistant and taking CSE 500 (Teaching Assistantship).

Qualifying Examination and Advancement to Candidacy

The qualifying examination is a requirement for advancement to candidacy. Prior to taking the qualifying examination a student must have satisfied the departmental competency, course, and research exam requirements and must have been accepted by a CSE faculty member as a Ph.D. thesis candidate. All doctoral students are expected to advance to candidacy by the end of their third year, and advancement is mandatory by the end of the fourth year. The examination is administered by a doctoral committee appointed by the dean of Graduate Studies and Research and consists of faculty from CSE and other departments. More information on the composition of the committee can be obtained from the CSE graduate office. The examination is taken after the student and his or her advisor have identified a topic for the dissertation and an initial demonstration of feasible progress has been made. The candidate is expected to describe his or her accomplishments to date as well as future work.

Dissertation

The dissertation defense is the final Ph.D. examination. A candidate for the Ph.D. is expected to write a dissertation and defend it in an oral examination conducted by the doctoral committee.

Departmental Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

Financial Aid

Financial support is available to qualified graduate students in the form of fellowships, loans, and assistantships. Anticipated stipends for half-time research assistantships are \$2,100 per month, with the possibility of full-time employment during the summer months. For a half-time teaching assistantship, the anticipated stipend will be \$1,840 per

month. Requests for application forms for admission and financial support should be directed to the Department of Computer Science and Engineering.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

A tentative schedule of course offerings is available from the Department of CSE each spring for the following academic year. The tentative schedule for 2010–11 is also found at <http://www.cse.ucsd.edu/undergrad/courses/ugradnextyearcourses.html>.

LOWER-DIVISION

CSE 3. Fluency in Information Technology (4)

Introduces the concepts and skills necessary to effectively use information technology. Includes basic concepts and some practical skills with computer and networks. **Prerequisite:** none.

CSE 4GS. Mathematical Beauty in Rome (4)

Exploration of topics in mathematics and engineering as they relate to classical architecture in Rome, Italy. In depth geometrical analysis and computer modeling of basic structures (arches, vaults, domes), and on-site studies of the Colosseum, Pantheon, Roman Forum, and St. Peter's Basilica. **Prerequisites:** Math. 10A or Math. 20A; departmental approval, and co-requisite of CSE 6GS.

CSE 6GS. Mathematical Beauty in Rome Lab (4)

Companion course to CSE 4GS where theory is applied and lab experiments are carried out "in the field" in Rome, Italy. For final projects, students will select a complex structure (e.g., the Colosseum, the Pantheon, St. Peter's, etc.) to analyze and model, in detail, using computer-based tools. **Prerequisites:** Math. 10A or Math. 20B; departmental approval, and co-requisite of CSE 4GS.

CSE 5A. Introduction to Programming I (4)

(Formerly CSE 62A) Introduction to algorithms and top-down problem solving. Introduction to the C language including functions, arrays, and standard libraries. Basic skills for using a PC graphical user interface operating system environment. File maintenance utilities are covered. (A student may not receive credit for CSE 5A after receiving credit for CSE 10 or CSE 11 or CSE 8B or CSE 9B or CSE 62B or CSE 65.) **Prerequisite:** A familiarity with high-school level algebra is expected, but this course assumes no prior programming knowledge.

CSE 8A. Introduction to Computer Science: JAVA (3)

Introductory computer science course designed for students interested in computing. No prior programming experience is assumed. Learn fundamental concepts of applied computer science using media computation. Must be taken concurrently with CSE 8AL. CSE 8A is part of a three-track course (CSE 8A, CSE 8AL, and CSE 8B) that is equivalent to CSE 11. Students should take CSE 8B to complete this track. Students who have taken CSE 8B or CSE 11 may not take CSE 8A. Recommended prep: High school algebra and familiarity with computing concepts. **Prerequisite:** co-requisite of CSE 8AL.

CSE 8AL. Introduction to Computer Science: JAVA Lab (1)

Exercises in the theory and practice of computer science under the supervision of an instructor. Hands-on experience with designing, editing, compiling, and executing programming constructs and applications. Must be taken concurrently with CSE 8A. CSE 8AL is part of a three-track course (CSE 8A, CSE 8AL, and CSE 8B) that is equivalent to CSE 11. Students should take CSE 8B to complete this track. Students who have taken CSE 8B or CSE 11 may not take CSE 8AL. Recommended prep: High school algebra and familiarity with computing concepts. **Prerequisite:** co-requisite of CSE 8A.

CSE 8B. Introduction to Computer Science: Java B (4)

Continuation of the Java language. Continuation of programming techniques. More on inheritance. Exception handling. CSE 8A is part of a three-track course (CSE 8A, CSE 8AL, and CSE 8B) that is equivalent to CSE 11. Students who have taken CSE 11 may not take CSE 8B. Recommended prep: High school algebra and familiarity with computing concepts or CSE 8A and CSE 8AL.

CSE 11. Introduction to Computer Science and Object-Oriented Programming: Java (4)

Introduction to computer science and programming using the Java language. Basic UNIX. Modularity and abstraction. Documentation, testing and verification techniques. Basic object-oriented programming including inheritance and dynamic bind. Exception handling. Event-driven programming. Experience with AWT library or other similar library. **Prerequisites:** high-school algebra and a course in programming in a compiled language. Majors only.

CSE 12. Basic Data Structures and Object-Oriented Design (4)

Basic data structures including stacks, queues, lists, binary trees, hash tables. Basic object-oriented design including encapsulation, polymorphism, classes as the implementation of abstract data types. Memory management, pointers, recursion, and big-o notation. Uses the C/C++ and Java programming language. **Prerequisites:** CSE 8B or CSE 11, and CSE 15L.

CSE 15L. Tools and Technique Laboratory (2)

Hands-on exploration of software development tools and techniques. Investigation of the scientific process as applied to software development and debugging. Emphasis is on weekly hands-on laboratory experiences, development of laboratory notebooking techniques as applied to software design. **Prerequisites:** CSE 8B, or CSE 11. Concurrent enrollment with CSE 12.

CSE 20. Introduction to Discrete Mathematics (4)

Basic discrete mathematical structure: sets, relations, functions, sequences, equivalence relations, partial orders, and number systems. Methods of reasoning and proofs: propositional logic, predicate logic, induction, recursion, and pigeonhole principle. Infinite sets and diagonalization. Basic counting techniques; permutation and combinations. Applications will be given to digital logic design, elementary number theory, design of programs, and proofs of program correctness. Credit not offered for both Math. 15A and CSE 20. Equivalent to Math 15A. **Prerequisites:** CSE 8A or CSE 8B or CSE 11. CSE 8B or CSE 11 may be taken concurrently with CSE 20/ Math. 15A.

CSE 21. Mathematics for Algorithms and Systems (4)

This course will provide an introduction to the discrete mathematical tools needed to analyze algorithms and systems. Enumerative combinatorics: basic counting principles, inclusion-exclusion, and generating functions. Matrix notation. Applied discrete probability. Finite automata. Credit not offered for both Math. 15B and CSE 21. Equivalent to Math 15B. **Prerequisite:** CSE 20 or Math. 15A.

CSE 30. Computer Organization and Systems Programming (4)

Introduction to organization of modern digital computers—understanding the various components of a computer and their interrelationships. Study of a specific architecture/machine with emphasis on systems programming in C and Assembly languages in a UNIX environment. **Prerequisite:** CSE 12, CSE 15L, or consent of instructor.

CSE 70. Software Engineering (4)

Introduction to software development and engineering methods, including specification, design, implementation, testing, and process. An emphasis on team development, agile methods, and use of tools such as IDE's, version control, and test harnesses. **Prerequisite:** CSE 12.

CSE 80. UNIX Lab (2)

The objective of the course is to help the programmer create a productive UNIX environment. Topics include customizing the shell, file system, shell programming, process management, and UNIX tools. **Prerequisite:** CSE 8B or CSE 11. Majors only.

CSE 86. C++ for Java Programmers (2)

Helps the Java programmer to be productive in the C++ programming environment. Topics include the similarities and differences between Java and C++ with special attention to pointers, operator overloading, templates, the STL, the preprocessor, and the C++ Runtime Environment. **Prerequisite:** CSE 12 or consent of instructor.

CSE 91. Perspectives in Computer Science and Engineering (2)

A seminar format discussion led by CSE faculty on topics in central areas of computer science, concentrating on the relation among them, recent developments, and future directions. **Prerequisites:** majors only.

CSE 92. Reading and Writing in Computer Science (2)

This course helps students to read and write technical English better, and to read and write software better. They write short papers responding to a CSE-related book, learn the basics of functional programming, and do a project using a functional language. **Prerequisites:** CSE 12. Majors only.

CSE 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to 15 to 20 students, with preference given to entering freshmen. **Prerequisite:** none.

CSE 99. Independent Study in Computer Science and Engineering (4)

Independent reading or research by special arrangement with a faculty member. **Prerequisites:** lower-division standing. Completion of 30 units at UCSD with a UCSD GPA of 3.0. Special Studies form required. Department stamp required. Consent of instructor and approval of the department. Majors only.

UPPER-DIVISION**CSE 100. Advanced Data Structures (4)**

High-performance data structures and supporting algorithms. Use and implementation of data structures like (un) balanced trees, graphs, priority queues, and hash tables. Also memory management, pointers, recursion. Theoretical and practical performance analysis, both average case and amortized. Uses C++ and STL. Credit not offered for both Math. 176 and CSE 100. Equivalent to Math. 176. **Prerequisite:** CSE 21 or Math. 15B or consent of instructor.

CSE 101. Design and Analysis of Algorithms (4)

Design and analysis of efficient algorithms with emphasis of non-numerical algorithms such as sorting, searching, pattern matching, and graph and network algorithms. Measuring complexity of algorithms, time and storage. NP-complete problems. Credit not offered for both Math. 188 and CSE 101. Equivalent to Math 188. **Prerequisites:** CSE 12, CSE 21 or Math. 15B or Math. 100A or Math. 103A and CSE 100 or Math. 176. Majors only.

CSE 102. Storage System Architectures (4)

Descriptive and analytic introduction to storage system architectures. Disk drive storage media organization and run-time performance; external indexing data structures B+trees and linear hashing algorithms. Disk arrays, RAID data organization, reliability, sparing, data declustering, and video servers. **Prerequisites:** CSE 100 or Math. 176, CSE 120, CSE 123A, or consent of the instructor. Majors only.

CSE 103. A Practical Introduction to Probability and Statistics (4)

Distributions over the real line. Independence, expectation, conditional expectation, mean, variance. Hypothesis testing. Learning classifiers. Distributions over R^n , covariance matrix. Binomial, Poisson distributions. Chernoff bound. Entropy. Compression. Arithmetic coding. Maximal likelihood estimation. Bayesian estimation. CSE 103 is not duplicate credit for ECE 109, ECON 120A, or Math. 183. **Prerequisites:** Math. 20A and Math 20B.

CSE 105. Theory of Computability (4)

An introduction to the mathematical theory of computability. Formal languages. Finite automata and regular

expression. Push-down automata and context-free languages. Computable or recursive functions: Turing machines, the halting problem. Undecidability. Credit not offered for both Math. 166 and CSE 105. Equivalent to Math 166. **Prerequisites:** CSE 12, CSE 21 or Math. 15B or Math. 100A or Math. 103A. Majors only.

CSE 107. Introduction to Modern Cryptography (4)

Topics include private and public-key cryptography, block ciphers, data encryption, authentication, key distribution and certification, pseudorandom number generators, design and analysis of protocols, zero-knowledge proofs, and advanced protocols. Emphasizes rigorous mathematical approach including formal definitions of security goals and proofs of protocol security. **Prerequisites:** CSE 21 or Math. 15B, CSE 101 or Math. 188, CSE 105 or Math. 166. Majors only.

CSE 110. Software Engineering (4)

Introduction to software development and engineering methods, including specification, design, implementation, testing, and process. An emphasis on team development, agile methods, and use of tools such as IDE's, version control, and test harnesses. CSE 70 is renumbered to CSE 110: students may not receive credit for both CSE 70 and CSE 110. **Prerequisite:** CSE 12, CSE 21, or Math. 15B.

CSE 111. Object Oriented Software Design (4)

Introduction to object-oriented analysis and design. Object-oriented modeling methods for analysis and design, object-oriented general design paradigms, object-oriented design techniques. Cyclic development of object-oriented systems. **Prerequisites:** CSE 8B or CSE 9B or CSE 10 or CSE 11, CSE 12, and CSE 100 or Math. 176. Majors only.

CSE 112. Advanced Software Engineering (4)

This course will cover software engineering topics associated with large systems development such as requirements and specifications, testing and maintenance, and design. Specific attention will be given to development tools and automated support environments. **Prerequisite:** CSE 111.

CSE 118. Ubiquitous Computing (4)

Explores emerging opportunities enabled by cheap sensors and networked computing devices. Small research projects will be conducted in teams, culminating in project presentations at the end of the term. Section will cover material relevant to the project, such as research methods, software engineering, teamwork, and project management. **Prerequisite:** any course from the following: CSE 131, CSE 132B, Cog Sci 102C, Cog Sci 121, Cog Sci 184, ECE 111, ECE 118, ECE 191, ECE 192, COMT 111B, COMT 115, or ICAM.; or consent of instructor.

CSE 120. Principles of Computer Operating Systems (4)

Basic functions of operating systems; basic kernel structure, concurrency, memory management, virtual memory, file systems, process scheduling, security and protection. **Prerequisites:** CSE 100 or Math. 176 and CSE 101 or Math. 188. Majors only.

CSE 121. Operating Systems: Architecture and Implementation (4)

(Formerly CSE 171B.) Case study of architecture and implementation of a selected modern operating system. In-depth analysis through a detailed study of source code. Topics include process creation, context-switching, memory allocation, synchronization mechanisms, interprocess communication, I/O buffering, device drivers, and file systems. **Prerequisite:** CSE 120.

CSE 123. Computer Networks (4)

(Renumbered from CSE 123A.) Introduction to concepts, principles, and practice of computer communication networks with examples from existing architectures, protocols, and standards with special emphasis on the Internet protocols. Layering and the OSI model; physical and data link layers; local and wide area networks; datagrams and virtual circuits; routing and congestion control; internetworking. Transport protocols. Credit may not be received for both CSE 123A and 158A or CSE 123B and 158B. **Prerequisites:** CSE 120 or consent of instructor. Majors only.

CSE 124. Networked Services (4)

(Renumbered from CSE 123B.) The architecture of modern networked services, including data center design,

enterprise storage, fault tolerance, and load balancing. Protocol software structuring, the Transmission Control Protocol (TCP), remote procedure calls, protocols for digital audio and video communication, overlay and peer-to-peer systems, secure communication. Credit may not be received for both CSE 124 and ECE 158B. Students may not receive credit for both CSE 123B and CSE 124. **Prerequisites:** CSE 120 or consent of instructor. Majors only.

CSE 125. Software System Design and Implementation (4)

Design and implementation of large, complex software systems involving multiple aspects of CSE curriculum. Emphasis is on software system design applied to a single, large group project with close interaction with instructor. **Prerequisites:** senior standing with substantial programming experience, and consent of instructor. Department stamp required. Majors only.

CSE 127. Introduction to Computer Security (4)

Topics include basic cryptography, security/threat analysis, access control, auditing, security models, distributed systems security, and theory behind common attack and defense techniques. The class will go over formal models as well as the bits and bytes of security exploits. **Prerequisites:** CSE 21 or Math. 15B, and CSE 120. Majors only.

CSE 128. Concurrency (4)

Specification of concurrent programs safety, liveness, and fairness: producer-consumer; mutual exclusion; atomic read/writes; semaphores; monitors; distributed algorithms and memory coherency; programming with threads; concurrency in popular programming languages and operating systems. **Prerequisites:** CSE 120. Majors only.

CSE 130. Programming Languages: Principles and Paradigms (4)

(Formerly CSE 173.) Introduction to programming languages and paradigms, the components that comprise them, and the principles of language design, all through the analysis and comparison of a variety of languages (e.g., Pascal, Ada, C++, PROLOG, ML.) Will involve programming in most languages studied. **Prerequisites:** CSE 12 and CSE 100 or Math. 176. Majors only.

CSE 131. Compiler Construction (4)

(Formerly CSE 131B.) Introduction to the compilation of programming languages, practice of lexical and syntactic analysis, symbol tables, syntax-directed translation, type checking, code generation, optimization, interpretation, and compiler structure. (Students may receive repeat credit for CSE 131A and CSE 131B by completing CSE 131.) **Prerequisites:** CSE 100 or Math. 176, CSE 105 or Math. 166, CSE 110, and CSE 130.

CSE 132A. Database System Principles (4)

Basic concepts of databases, including data modeling, relational databases, query languages, optimization, dependencies, schema design, and concurrency control. Exposure to one or several commercial database systems. Advanced topics such as deductive and object-oriented databases, time allowing. **Prerequisites:** CSE 100 or Math. 176. Majors only.

CSE 132B. Database Systems Applications (4)

Design of databases, transactions, use of trigger facilities and datablades. Performance measuring, organization of index structures. **Prerequisite:** CSE 132 or CSE 132A or equivalent.

CSE 134A. Web Server Languages (4)

Design and implementation of interactive World Wide Web documentation using server-side programs. Languages covered include HTML, Perl, and JavaScript. Other languages as time allows. **Prerequisites:** CSE 100 or Math. 176. Majors only.

CSE 134B. Web Client Languages (4)

Design and implementation of interactive World Wide Web clients using helper applications and plug-ins. The main language covered will be Java. **Prerequisites:** CSE 100 or Math. 176. Majors only.

CSE 135. Server-side Web Applications (4)

Design and implementation of dynamic Web-based applications. Multi-tier architecture, scripting languages, SQL, XML, session handling, non-browser clients, Web services,

and scalability, security, and usability in the Web context. **Prerequisites:** CSE 100 or Math. 176. Majors only.

CSE 136. Enterprise-class Web Applications (4)
Design and implementation of large scale Web-based applications. Modeling organizational needs, design and revision management, J2EE or similar software platforms, Web and application server functionality, reuse of object-oriented components, model-view-controller and other design patterns, clustering, load-balancing, fault-tolerance, authentication, usage accounting. **Prerequisites:** CSE 135. Majors only.

CSE 140. Components and Design Techniques for Digital Systems (4)
(Formerly CSE 170A) Design of Boolean logic and finite state machines; two-level, multi-level combinational logic design, combinational modules and modular networks, Mealy and Moore machines, analysis and synthesis of canonical forms, sequential modules. **Prerequisites:** CSE 20 or Math. 15A, CSE 30. CSE 140L must be taken concurrently. Majors only.

CSE 140L. Digital Systems Laboratory (2)
(Formerly CSE 175B) Implementation with computer-aided design tools for combinational logic minimization and state machine synthesis. Hardware construction of a small digital system. **Prerequisites:** CSE 20, CSE 30. CSE 140 must be taken concurrently.

CSE 141. Introduction to Computer Architecture (4)
Introduction to computer architecture. Computer system design. Processor design. Control design. Memory systems. **Prerequisites:** CSE 140, CSE 140L, or consent of the instructor. CSE 141L should be taken concurrently. Majors only.

CSE 141L. Project in Computer Architecture (2)
Hands-on computer architecture project aiming to familiarize students with instruction set architecture, and design of process. Control and memory systems. **Prerequisites:** CSE 140, CSE 140L, or consent of the instructor. CSE 141 should be taken concurrently. Majors only.

CSE 142. Advanced Digital Logic Design (4)
(Formerly CSE 170C) Digital logic optimization; functional decomposition and symmetric functions; reliable design and fault diagnosis; structure of sequential machines; asynchronous circuit design. Assignments using logic synthesis tools. **Prerequisites:** CSE 140, CSE 140L.

CSE 143. Microelectronic System Design (4)
VLSI process technologies; circuit characterization; logic design styles; clocking strategies; computer-aided design tools; subsystem design; design case studies. System design project from hardware description, logic synthesis, physical layout to design verification. Students may not receive credit for both CSE 143 and ECE 161B. **Prerequisites:** CSE 140 and CSE 141. Majors only.

CSE 145. Embedded System Design Project (4)
Project class building an embedded computing system. Learn fundamental knowledge of microcontrollers, sensors, and actuators. Introduction to the hardware and software tools to build project in a team environment and end-to-end system building. **Prerequisite:** CSE 30.

CSE 146. Introduction to Reliable Hardware (4)
Fault models and tests, combinational circuit test generation, fault collapsing, fault simulation, synchronous sequential circuit testing, functional testing, memory testing. **Prerequisites:** CSE 140 and CSE 140L, or consent of instructor. Majors only.

CSE 148. Advanced Processor Architecture Design Project (4)
Students will use hardware description language tools to add advanced architectural features to a basic processor design. These features may include pipelining, superscalar execution, branch prediction, and advanced cache features. Designs will be implemented in programmable logic devices. **Prerequisites:** CSE 141, CSE 141L, or consent of instructor. Majors only.

CSE 150. Introduction to Artificial Intelligence: Search and Reasoning (4)
Search algorithms including BFS, DFS, iterative deepening and A*, randomized search algorithms including Walksat,

syntax and semantics of first-order logic (FOL), knowledge representation in FOL including reasoning, basic reasoning with probabilities, basic Bayesian learning. **Prerequisites:** CSE 100 or Math. 176 or consent of instructors. Majors only.

CSE 151. Introduction to Artificial Intelligence: Statistical Approaches (4)
Reasoning with probabilities, reasoning and learning with Bayesian networks, decision-making under uncertainty, sequential decision-making, statistical learning methods, and reinforcement learning. **Prerequisites:** CSE 100 or Math. 176 or consent of instructor. Majors only.

CSE 152. Introduction to Computer Vision (4)
The goal of computer vision is to compute scene and object properties from images and video. This introductory course includes feature detection, image segmentation, motion estimation, object recognition, and 3-D shape reconstruction through stereo, photometric stereo, and structure from motion. **Prerequisites:** Math. 20F, CSE 100 or Math. 176, CSE 101 or Math. 188. Knowledge of C, C++ or Matlab programming. Majors only.

CSE 160. Introduction to Parallel Computing (4)
Introduction to high performance parallel computing: parallel architecture, algorithms, software, and problem-solving techniques. Areas covered: Flynn's taxonomy, processor-memory organizations, shared and non-shared memory models: message passing and multithreading, data parallelism; speedup, efficiency and Amdahl's law, communication and synchronization, isoeficiency and scalability. Assignments given to provide practical experience. **Prerequisites:** CSE 100 or Math. 176. Majors only.

CSE 166. Image Processing (4)
Principles of image formation, analysis, and representation. Image enhancement, restoration, and segmentation; stochastic image models. Filter design, sampling, Fourier and wavelet transforms. Selected applications in computer graphics and machine vision. **Prerequisites:** Math. 20F, CSE 100 or Math. 176. Majors only.

CSE 167. Computer Graphics (4)
(Formerly CSE 177) Representation and manipulation of pictorial data. Two-dimensional and three-dimensional transformations, curves, surfaces. Projection, illumination, and shading models. Raster and vector graphic I/O devices; retained-mode and immediate-mode graphics software systems and applications. **Prerequisites:** Math. 2EA/20F and CSE 100 or Math. 176. Majors only.

CSE 168. Computer Graphics II: Rendering (4)
Weekly programming assignments that will cover graphics rendering algorithms. During the course the students will learn about ray tracing, geometry, tessellation, acceleration structures, sampling, filtering, shading models, and advanced topics such as global illumination and programmable graphics hardware. **Prerequisites:** CSE 167 or concurrent enrollment. Majors only.

CSE 169. Computer Animation (4)
Advanced graphics focusing on the programming techniques involved in computer animation. Algorithms and approaches for both character animation and physically based animation. Particular subjects may include skeletons, skinning, key framing, facial animation, inverse kinematics, locomotion, motion capture, video game animation, particle systems, rigid bodies, clothing, and hair. **Prerequisites:** a good understanding of linear algebra. CSE 167 or consent of instructor. Majors only.

CSE 171. User Interface Design (4)
Explores usability, representation and coordination issues in user interface design with some focus on distributed cooperative work, semiotics, and the interplay between socio-cognitive and technical issues. Most examples and homework involve the Web. **Prerequisites:** CSE 8B or 11, CSE 20 or Math. 15A, and CSE 100 or Math. 176. Majors only.

CSE 175. Social and Ethical Issues in Information Technology (4)
Social aspects of information technology, with an emphasis on ethical issues. Topics include ethical theories, privacy and security, spam, e-commerce, the digital divide, open source software, medical informatics, actor-network theory, and some neo-classical economics. **Prerequisites:** CSE 100 or Math. 176. Majors only.

CSE 181. Molecular Sequence Analysis (4)
This course covers the analysis of nucleic acid and protein sequences, with an emphasis on the application of algorithms to biological problems. Topics include sequence alignments, database searching, comparative genomics, and phylogenetic and clustering analyses. Pairwise alignment, multiple alignment, DNS sequencing, scoring functions, fast database search, comparative genomics, clustering, phylogenetic trees, gene finding/DNA statistics. **Prerequisites:** CSE 100 or Math. 176, CSE 101 or Math. 188, BIBM 100 or Chem. 114D. Bioinformatics majors only. CSE 181 is crosslisted with BIBM 181 and BENG 181.

CSE 182. Biological Databases (4)
This course provides an introduction to the features of biological data, how that data are organized efficiently in databases, and how existing data resources can be utilized to solve a variety of biological problems. Relational databases, object oriented databases, ontologies, data modeling and description, survey of current biological database with respect to above, implementation of a database focused on a biological topic. **Prerequisites:** CSE 100 or Math. 176. Bioinformatics majors only. CSE 182 is crosslisted with BIBM 182, Chem. 182, and BENG 182.

CSE 184. Computational Molecular Biology (4)
This advanced course covers the application of machine learning and modeling techniques to biological systems. Topics include gene structure, recognition of DNA and protein sequence patterns, classification, and protein structure prediction. Pattern discovery, Hidden Markov models/support vector machines/neural network/profiles. Protein structure prediction, functional characterization or proteins, functional genomics/proteomics, metabolic pathways/gene networks. **Prerequisites:** BIBM 181 or BENG 181 or CSE 181, BIBM 182 or CSE 182 or CHEM 182. Bioinformatics majors only. CSE 184 is crosslisted with BIBM 184, BENG 184, and Chem. 184.

CSE 190. Topics in Computer Science and Engineering (4)
Topics of special interest in computer science and engineering. Topics may vary from quarter to quarter. May be repeated for credit with the consent of instructor. **Prerequisites:** consent of instructor. Department stamp required. Majors only.

CSE 191. Seminar in CSE (1-4)
A seminar course on topics of current interest. Students, as well as, the instructor will be actively involved in running the course/class. This course cannot be counted toward a technical elective. **Prerequisites:** consent of instructor. Department stamp required. Majors only.

CSE 195. Teaching (4)
Teaching and tutorial assistance in a CSE course under the supervision of the instructor. (P/NP grades only.) **Prerequisites:** consent of the department chair. Department stamp required.

CSE 197. Field Study in Computer Science and Engineering (4, 8, 12, or 16)
Directed study and research at laboratories away from the campus. (P/NP grades only.) **Prerequisite:** consent of the instructor and approval of the department. Department stamp required.

CSE 198. Directed Group Study (2 or 4)
Computer science and engineering topics whose study involves reading and discussion by a small group of students under the supervision of a faculty member. (P/NP grades only.) **Prerequisites:** consent of the instructor. Department stamp required.

CSE 199. Independent Study for Undergraduates (2 or 4)
Independent reading or research by special arrangement with a faculty member. (P/NP grades only.) **Prerequisites:** consent of the instructor. Department stamp required.

GRADUATE

CSE 200. Computability and Complexity (4)
Computability review, including halting problem, decidable sets, r.e. sets, many-one reductions; TIME($t(n)$), SPACE($s(n)$) and general relations between these classes;

L, P, PSPACE, NP; NP—completeness; hierarchy theorems; RP, BPP. **Prerequisite:** CSE 105 or equivalent.

CSE 201A. Advanced Complexity (4)

Polynomial-time hierarchy (PH); BPP in second level of PH; Savitch's theorem; NL=coNL; non-uniform and circuit complexity; some circuit lower bounds; IP=PSPACE; probabilistic proof checking (PCP); Application of PCP to approximation hardness; Complexity of proof systems; Parallel complexity classes NC and AC; P-completeness. **Prerequisite:** CSE 200.

CSE 202. Algorithm Design and Analysis (4)

The basic techniques for the design and analysis of algorithms. Divide-and-conquer, dynamic programming, data structures, graph search, algebraic problems, randomized algorithms, lower bounds, probabilistic analysis, parallel algorithms. **Prerequisite:** CSE 101 or equivalent.

CSE 203A. Advanced Algorithms (4)

Modern advances in design and analysis of algorithms. Exact syllabus varies. Topics include approximation, randomized algorithms, probabilistic analysis, heuristics, online algorithms, competitive analysis, models of memory hierarchy, parallel algorithms, number-theoretic algorithms, cryptanalysis, computational geometry, computational biology, network algorithms, VLSI CAD algorithms. **Prerequisite:** CSE 202.

CSE 204A. Combinatorial Optimization (4)

Linear programming, simplex method, duality, and column generating technique. Integer programming introduced via the Knapsack problem. The periodic nature of all integer programs. Why the round-off technique cannot work in general. The solution of the Knapsack problem in polynomial time since nonbasic columns form a group. **Prerequisite:** CSE 202 or linear algebra or consent of instructor.

CSE 205A. Logic in Computer Science (4)

(Formerly CSE 208D) Mathematical logic as a tool in computer science. Propositional logic, resolution, first-order logic, completeness and incompleteness theorems with computational viewpoint, finite model theory, descriptive complexity, logic programming, non-monotonic reasoning, temporal logic. Applications to databases, automatic theorem proving, program verification, and distributed systems. **Prerequisite:** CSE 200 or consent of instructor.

CSE 206A. Lattice Algorithms and Applications (4)

(Formerly CSE 207C) Introduction to the algorithmic theory of point lattices (A.K.A. algorithmic geometry of numbers), and some of its most important applications in cryptography and cryptanalysis. Topics usually include: LLL basis reduction algorithm, cryptanalysis of broadcast RSA, hardness of approximating lattice problems. **Prerequisites:** CSE 202, CSE 200, or concurrent.

CSE 207. Modern Cryptography (4)

Private and public key cryptography, introduction to reduction based proofs of security, concrete security, block ciphers, pseudorandom functions and generators, symmetric encryption, asymmetric encryption, computational number theory, RSA and discrete log systems, message authentication, digital signatures, key distribution and key management. **Prerequisite:** CSE 202 or consent of instructor.

CSE 207C. Lattices and Cryptology (4)

Renumbered to CSE 206A (see above).

CSE 208. Advanced Cryptography (4)

Zero-knowledge, secure computation, session-key distribution, protocols, electronic payment, one-way functions, trapdoor permutations, pseudorandom bit generators, hardcore bits. **Prerequisites:** CSE 202, CSE 200, and CSE 207 or consent of instructor.

CSE 208D. Logic in Computer Science (4)

Renumbered to CSE 205A (see above).

CSE 209A. Topics/Seminar in Algorithms, Complexity, and Logic (1–4)

Topics of special interest in algorithms, complexity, and logic to be presented by faculty and students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. **Prerequisite:** consent of instructor.

CSE 209B. Topics/Seminar in Cryptography (1–4)

Topics of special interest in cryptography to be presented by faculty and students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. **Prerequisite:** consent of instructor.

CSE 210. Principles of Software Engineering (4)

(Formerly CSE 264A.) General principles in modern software engineering. Both theoretical and practical topics are covered. Theoretical topics include proofs of correctness, programming language semantics, and theory of testing. Practical topics include structured programming, modularization techniques, design of languages for reliable programming, and software tools. **Prerequisites:** CSE 100, 131A, 120, or consent of instructor.

CSE 211. Software Testing and Analysis (4)

Survey of testing and analysis methods. Introduction to advanced topics in area as well as traditional production methods. Topics include inspections and reviews, formal analysis, verification and validation standards, non-statistical testing, statistical-testing and reliability models, coverage methods, testing and analysis tools, and organization management and planning. Methods special to special development approaches such as object-oriented testing will also be described. **Prerequisite:** undergraduate major in computer science or extensive industrial experience.

CSE 218. Advanced Topics in Software Engineering (4)

This course will cover a current topic in software engineering in depth. Topics in the past have included software tools, impacts of programming language design, and software system structure. (S/U grades permitted.) **Prerequisite:** none.

CSE 221. Operating Systems (4)

Operating system structures, concurrent computation models, scheduling, synchronization mechanisms, address spaces, memory management protection and security, buffering, streams, data-copying reduction techniques, file systems, naming, caching, disk organization, mapped files, remote file systems, case studies of major operating systems. **Prerequisites:** CSE 120 and 121, or consent of instructor.

CSE 222. Communication Networks (4)

Renumbered to CSE 222A (see below).

CSE 222A. Computer Communication Networks (4)

(Formerly CSE 222.) Computer communication network concepts, protocols, and architectures, with an emphasis on an analysis of algorithms, protocols, and design methodologies. Topics will include layering, error control, flow control, congestion control, switching and routing, quality of service management, mobility, naming, security, and selected contemporary topics. **Prerequisite:** CSE 123A or consent of instructor.

CSE 222B. Internet Algorithmics (4)

(Formerly CSE 228H.) Techniques for speeding up Internet implementations including system restructuring, new algorithms, and hardware innovations. Topics include: models for protocols, systems and hardware; efficiency principles; applying these principles to deriving techniques for efficient implementation of common endnode and router functions. **Prerequisite:** CSE 123A or CSE 222A or consent of instructor.

CSE 223. Distributed Systems (4)

Renumbered to CSE 223A (see below).

CSE 223A. Principles of Distributed Computing (4)

(Formerly CSE 223.) Logical and physical time, snapshot protocols, failure models, replication strategies, consensus and reliable broadcast, self-stabilization, atomic commit. **Prerequisite:** CSE 221 or consent of instructor.

CSE 223B. Distributed Computing and Systems (4)

Efficient primitives for distributed operating systems and high-performance network servers, including concurrent and event-driven server architectures, remote procedure calls, and load shedding. Distributed naming, directory, and storage services, replication for fault tolerance, and security in distributed systems. **Prerequisites:** CSE 221, CSE 222A, or consent of instructor.

CSE 225. High Performance Distributed Computing (and Computational Grids) (4)

Architecture of high performance distributed systems (e.g., frameworks and middleware). High performance distributed objects (DCOM, Corba, Java Beans) and networking with crosscut issues for performance, availability, and performance predictability. Scalable servers, metacomputing, and scientific computing. **Prerequisites:** CSE 121 and CSE 123A or consent of instructor.

CSE 226. Storage Systems (4)

(Formerly CSE 228B.) Secondary and tertiary storage systems, optical and magnetic media, performance analysis, modeling, reliability, redundant arrays of inexpensive disks, striping, log and maximum distance separable data organizations, sparing. **Prerequisite:** CSE 221 or consent of instructor.

CSE 227. Computer Security (4)

Security and threat models, risk analysis, authentication and authorization, auditing, operating systems security, access control mechanisms, protection mechanisms, distributed systems/network security, security architecture, electronic commerce security mechanisms, security evaluation. **Prerequisite:** CSE 221 or consent of instructor.

CSE 228B. Storage Systems (4)

Renumbered to CSE 226 (see above).

CSE 228H. Internet Algorithmics (4)

Renumbered to CSE 222B (see above).

CSE 229A. Topics/Seminar in Computer Systems (1–4)

Discussion on problems of current research interest in computer systems. Possible areas of focus include: distributed computing, computational grid, operating systems, fault-tolerant computing, storage systems, system services for the World Wide Web. Topics to be presented by faculty and students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. **Prerequisite:** consent of instructor.

CSE 229B. Topics/Seminar in Networks and Communication (1–4)

Discussion on problems of current research interest in computer networks and communication. Possible areas of focus include: wide-area networking, wireless networks, the Internet, computational grid, operating systems, fault-tolerant computing, storage systems. Topics to be presented by faculty and students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. **Prerequisite:** consent of instructor.

CSE 229C. Topics/Seminar in Computer Security (1–4)

Discussion on problems of current research interest in computer security. Topics to be presented by faculty and students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. **Prerequisite:** consent of instructor.

CSE 230. Principles of Programming Languages (4)

(Formerly CSE 273.) Functional versus imperative programming. Type systems and polymorphism; the ML language. Higher order functions, lazy evaluation. Abstract versus concrete syntax, structural and well-founded induction. The lambda calculus, reduction strategies, combinators. Denotational semantics, elementary domain theory. **Prerequisite:** CSE 130 or equivalent, or consent of instructor.

CSE 231. Advanced Compiler Design (4)

(Formerly CSE 264C.) Advanced material in programming languages and translator systems. Topics include compilers, code optimization, and debugging interpreters. **Prerequisites:** CSE 100, 131A–B, or consent of instructor.

CSE 232. Principles of Database Systems (4)

(Formerly CSE 264D.) Database models including relational, hierarchic, and network approaches. Implementation of databases including query languages and system architectures. **Prerequisite:** CSE 100 or consent of instructor.

CSE 232B. Database System Implementation (4)

A hands-on approach to the principles of databases implementation. Algebraic rewriters/optimizers, query processors, triggers. Beyond centralized relational databases. **Prerequisite:** CSE 232.

CSE 233. Database Theory (4)

Theory of databases. Theory of query languages, dependency theory, deductive databases, incomplete information, complex objects, object-oriented databases, and more. Connections to logic and complexity theory including finite model theory and descriptive complexity. **Prerequisite:** CSE 200.

CSE 237A. Introduction to Embedded Computing (4)

Embedded system technologies including processors, DSP, memory, and software. System interfacing basics, communication strategies, sensors, and actuators. Mobile and wireless technology in embedded systems. Using pre-designed hardware and software components. Design case studies in wireless, multimedia, and/or networking domains. **Prerequisites:** basic courses in digital hardware, algorithms and data structures, elementary calculus, and probability; or consent of instructor.

CSE 237B. Software for Embedded Systems (4)

Embedded computing elements, device interfaces, time-critical IO handling. Embedded software design under size, performance, and reliability constraints. Software timing and functional validation. Programming methods and compilation for embeddable software. Embedded runtime systems. Case studies of real-time software systems. **Prerequisites:** CSE 237A; or basic courses in programming, algorithms and data structures, elementary calculus, discrete math, computer architecture; or consent of instructor.

CSE 237C. Validation and Testing of Embedded Systems (4)

Embedded system building blocks including IP cores. Co-simulation. Formal verification using model checking. Verification environments. Test challenges in core integration: compliance, feature, random, and collision testing. Core access and test integration. Interface-based verification and standards. **Prerequisites:** CSE 237A; or basic courses in algorithms and data structures, elementary calculus, discrete math, symbolic logic, computer architecture; or consent of instructor.

CSE 237D. Design Automation and Prototyping for Embedded Systems (4)

System representation and modeling. Abstract and language models. Simulation as a modeling activity. Computational and hw/sw system prototypes. System analysis using models. Constraint and interface modeling. Behavioral compilation and synthesis. **Prerequisites:** CSE 237A; or basic courses in digital logic design, algorithms and data structures, elementary calculus, discrete math, symbolic logic, computer architecture; or consent of instructor.

CSE 239A. Topics/Seminar in Databases (1-4)

Discussion on problems of current research interest in databases. Possible areas of focus include: core database issues, data management on the Web, data integration, new database models and applications, formal methods in databases. Topics to be presented by faculty and students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. **Prerequisite:** consent of instructor.

CSE 240. Principles in Computer Architecture I (4)

Renumbered to CSE 240A (see below).

CSE 240A. Principles of Computer Architecture (4)

(Formerly CSE 240.) This course will cover fundamental concepts in computer architecture. Topics include instruction set architecture, pipelining, pipeline hazards, bypassing, dynamic scheduling, branch prediction, superscalar issue, memory-hierarchy design, advanced cache architectures, and multiprocessor architecture issues. **Prerequisite:** CSE 141 or consent of instructor.

CSE 240B. Parallel Computer Architecture (4)

This course covers advanced topics in parallel computer architecture, including on-chip and off-chip interconnection networks, cache coherence, cache consistency, hardware multithreading, multi-core and tiled architectures. It incorporates the latest research and development on parallel architectures and compilation techniques for those architectures. CSE 240A recommended. **Prerequisite:** graduate standing.

CSE 240C. Advanced Microarchitecture (4)

This course covers advanced topics in computer architecture. It incorporates the latest research and development on topics such as branch prediction, instruction-level parallelism, cache hierarchy design, speculative multithreading, reliable architectures, and power-management techniques. CSE 240A recommended. **Prerequisite:** graduate standing.

CSE 240D. Application Specific Processors (4)

This course covers advanced topics in design concepts and implementation principles of application specific processors, including embedded system design principles and application specific processors, application specific instruction set processors, domain specific processor architectures, embedded memories and dynamically customizable processors. CSE 240A recommended. **Prerequisite:** graduate standing.

CSE 241A/ECE 260B. VLSI Integration of Computing Circuitry (4)

VLSI integrated-circuit building blocks of computing systems, and their implementation. Computer-aided design and performance simulations, design exercises and projects. Devices, standard cells and interconnects, clocking, power/ground distribution, arithmetic modules, memories. Methodologies and tradeoffs in system implementation. **Prerequisites:** layout (CSE 165 or ECE 260A) and logic design (CSE 140 or ECE 111), or consent of instructor.

CSE 242A. Integrated Circuit Layout Automation (4)

Couplings among timing, circuits and spatial embedding in nanometer-scale CMOS design. The role, and key problems, of physical layout in IC implementation. Example topics: RTL-to-GDSII methodologies, analyses and estimations, partitioning, floor planning, placement, routing, special net routing, cell generation, compaction. **Prerequisite:** CSE 241A or consent of instructor.

CSE 243A. Introduction to Synthesis Methodologies in VLSI CAD (4)

Hardware software co-design, architectural level synthesis, control synthesis and optimization, scheduling, binding, register and bus sharing, interconnect design, module selection, combinational logic optimization, state minimization, state encoding, and retiming. **Prerequisite:** CSE 241A or consent of instructor.

CSE 244A. VLSI Test (4)

Design for test, testing economics, defects, failures and faults, fault models, fault simulation, automatic test pattern generation, functional testing, memory, PLA, FPGA, microprocessor test, and fault diagnosis. **Prerequisite:** CSE 241A or consent of instructor.

CSE 244B. Testable and Fault Tolerant Hardware Design (4)

Scan path design, BIST architectures, test point insertion, self-checking circuits, test and fault tolerance in architectural synthesis, reconfigurable fault tolerant hardware, and SOC test design. **Prerequisite:** CSE 244A or consent of instructor.

CSE 245. Computer Aided Circuit Simulation and Verification (4)

This course is about the computer algorithms, techniques, and theory used in the simulation and verification of electrical circuits. **Prerequisite:** CSE 241A or consent of instructor.

CSE 246. Computer Arithmetic Algorithms and Hardware Design (4)

Number representation, fixed point adders, subtractors, and multipliers; modified booth's recoding, high-radix multiplication, (non)restoring dividers, SRT division, high-radix dividers, division by convergence, square-rooting, floating point arithmetic, rounding schemes, errors and error control, and floating point adders, subtractors, multipliers, dividers. **Prerequisite:** CSE 241A or consent of instructor.

CSE 247. Application Specific and Reconfigurable Computer Architecture (4)

This course covers architecture concepts used to tailor processors to a specific application or sets of applications. It covers Field-Programmable Gate Arrays (FPGAs), various forms of Application Specific Integrated Circuit (ASIC) designs, Application Specific Integrated Processors (ASIP), and augmenting customizable VHDL cores. **Prerequisite:** CSE 241A or consent of instructor.

CSE 248. Algorithmic and Optimization Foundations for VLSI CAD (4)

Algorithmic techniques and optimization frameworks for large-scale, difficult optimizations. Primal-dual multicommodity flow approximations, approximations for geometric and graph Steiner formulations, continuous placement optimization, heuristics for Boolean satisfiability, multilevel methods, semidefinite programming, and application to other formulations (e.g., scheduling). **Prerequisites:** CSE 241A or CSE 242A or consent of instructor.

CSE 249A. Topics/Seminar in Computer Architecture (1-4)

Topics of special interest in computer architecture to be presented by faculty and students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. **Prerequisite:** consent of instructor.

CSE 249B. Topics/Seminar in VLSI (1-4)

Topics of special interest in VLSI to be presented by faculty and students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. **Prerequisite:** consent of instructor.

CSE 249C. Topics/Seminar in CAD (1-4)

Topics of special interest in CAD to be presented by faculty and students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. **Prerequisite:** consent of instructor.

CSE 250A. Artificial Intelligence: Search and Reasoning (4)

Heuristic search algorithms including A*, constraint satisfaction algorithms including DPPL, randomized search, knowledge representation in first-order logic (FOL), resolution methods for reasoning in FOL, reasoning about action and planning, reasoning with Bayesian networks. CSE 101 recommended. **Prerequisite:** graduate standing in CSE or consent of instructor.

CSE 250B. Artificial Intelligence: Learning (4)

Classifier learning including linear separators, decision trees, and nearest neighbors. Generalization and overfitting; design of learning experiments; the PAC model. Possible topics include ensemble methods, boosting, kernel methods, online learning, and reinforcement learning. **Prerequisite:** graduate standing or consent of instructor.

CSE 252A. Computer Vision I (4)

Comprehensive introduction to computer vision providing broad coverage including low-level vision (image formation, photometry, color, image feature detection), inferring 3-D properties from images (shape-from shading, stereo vision, motion interpretation) and object recognition. Companion to CSE 252B covering complementary topics. **Prerequisites:** Math. 10D and Math. 20A-F or equivalent.

CSE 252B. Computer Vision II (4)

Comprehensive introduction to computer vision providing focused coverage of multiview geometry, structure from motion, image segmentation, motion segmentation, texture analysis and recognition, object detection, and image-based rendering. Companion to CSE 252A covering complementary topics. **Prerequisites:** Math. 10D and Math. 20A-F or equivalent.

CSE 252C. Selected Topics in Vision and Learning (1-4)

Selected topics in computer vision and statistical pattern recognition, with an emphasis on recent developments. Possible topics include: grouping and segmentation, object recognition and tracking, multiple view geometry, kernel-based methods, dimensionality reduction, and mixture models. **Prerequisite:** CSE 252 or equivalent and CSE 250B or equivalent.

CSE 253. Neural Networks for Pattern Recognition (4)

Probability density estimation, perceptrons, multilayer neural networks, radial basis function networks, support vector machines, error functions, data preprocessing. Possible topics include unsupervised learning methods, recurrent networks, and mathematical learning theory. CSE 250B recommended. **Prerequisite:** graduate standing.

CSE 254. Statistical Learning (4)

Learning algorithms based on statistics. Possible topics include minimum-variance unbiased estimators, maximum

likelihood estimation, likelihood ratio tests, resampling methods, linear logistic regression, feature selection, regularization, dimensionality reduction, manifold detection. An upper-division undergraduate course on probability and statistics such as Math. 183 or 186, or any graduate course on statistics, pattern recognition, or machine learning is recommended. **Prerequisite:** graduate standing.

CSE 256/LING 256. Statistical Natural Language Processing (4)

Introduction to modern statistical approaches to natural language processing: part-of-speech tagging, word-sense disambiguation and parsing, using Markov models, hidden Markov models and probabilistic context-free grammars. Recommended **Prerequisite:** one of LIGN 165, LIGN 245, CSE 151, CSE 250A, CSE 254. **Prerequisite:** graduate standing or consent of instructor.

CSE 257. Computational Biology (4)

Computational methods are indispensable to an understanding of the vast datasets emerging from human and other organisms' genomes. This course surveys algorithms underlying genome analysis, sequence alignment, phylogenetic trees, protein folding, gene expression, metabolic pathways, and biological knowledge base design. **Prerequisite:** Pharm. 201 or consent of instructor.

CSE 257B. Algorithms in Computational Biology (4)

Renumbered to CSE 206B (see above).

CSE 258A. Cognitive Modeling (4)

Connectionist models and a sampling of other cognitive modeling techniques. Models of language processing, memory, sequential processes, and vision. Areas covered may vary depending on student and faculty interests. Can be repeated for credit. CSE 151 or CSE 250B or CSE 253 or CSE 254, or equivalent experience recommended. **Prerequisite:** graduate standing.

CSE 259. Seminar in Artificial Intelligence (1)

A weekly meeting featuring local (and occasional external) speakers discussing their current research in Artificial Intelligence Neural Networks, and Genetic Algorithms. (S/U grades only.) **Prerequisite:** none.

CSE 259C. Topics/Seminar in Machine Learning (1-4)

Topics of special interest in machine learning to be presented by faculty and students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. **Prerequisite:** consent of instructor.

CSE 260. Parallel Computation (4)

(Formerly CSE 274A.) This course provides an overview of parallel hardware, algorithms, models, and software. Topics include Flynn's taxonomy, interconnection networks, memory organization, a survey of commercially available multiprocessors, parallel algorithm paradigms and complexity criteria, parallel programming environments and tools for parallel debugging, language specification, mapping, performance, etc. **Prerequisite:** graduate standing or consent of instructor.

CSE 262. System Support for Applications of Parallel Computation (4)

This course will explore design of software support for applications of parallel computation. Topics include: programming languages, run time support, portability, and load balancing. The course will terminate in a project. **Prerequisite:** consent of instructor.

CSE 271. User Interface Design: Social and Technical Issues (4)

Web technologies (HTML, Java, JavaScript, etc.) can quickly build superb new systems, as well as phenomenally ugly systems that still fully meet their performance and functional requirements. This course explores interface usability and representation issues, with some focus on hypermedia and cooperative work. **Prerequisites:** CSE 20, CSE 100, or equivalent.

CSE 272. Advanced Image Synthesis (4)

Computer graphics techniques for creating realistic images. Topics include ray tracing, global illumination, subsurface scattering, and participating media. CSE 168 or equivalent recommended.

CSE 274. Selected Topics in Graphics (2-4)

Selected topics in computer graphics, with an emphasis on recent developments. Possible topics include computer animation, shape modeling and analysis, image synthesis, appearance modeling, and real-time rendering. CSE 168 or CSE 169 recommended. **Prerequisite:** graduate standing or consent of instructor.

CSE 280A. Algorithms in Computational Biology (4)

(Formerly CSE 206B.) The course focuses on algorithmic aspects of modern bioinformatics and covers the following topics: computational gene hunting, sequencing, DNA arrays, sequence comparison, pattern discovery in DNA, genome rearrangements, molecular evolution, computational proteomics, and others. **Prerequisite:** CSE 202 preferred or consent of instructor.

CSE 280B. Advanced Topics in Computational Biology (4)

The advanced topics include, but are not limited to: population genetics, pathways, RNA, database filtering, comparative genomics, and others. Students are expected to pick one of the topics for an intensive research project, and report on their findings at the end of the class. **Prerequisites:** CSE 280A preferred or consent of instructor.

CSE 282/BENG 202. Bioinformatics II: Sequence and Structure Analysis—Methods and Applications (4)

(Formerly CSE 257A/BENG 202.) Introduction to methods for sequence analysis. Applications to genome and proteome sequences. Protein structure, sequence-structure analysis. **Prerequisite:** Pharm. 201 or consent of instructor.

CSE 283/BENG 203. Bioinformatics III: Functional Genomics (4)

Annotating genomes, characterizing functional genes, profiling, reconstructing pathways. **Prerequisites:** Pharm. 201, BENG 202/CSE 282 or consent of instructor.

CSE 290. Seminar in Computer Science and Engineering (1-4)

(Formerly CSE 280A.) A seminar course in which topics of special interest in computer science and engineering will be presented by staff members and graduate students under faculty direction. Topics vary from quarter to quarter. May be repeated for credit. (S/U grades only.) **Prerequisite:** consent of instructor. (Offered as faculty resources permit.)

CSE 291. Topics in Computer Science and Engineering (1-8)

(Formerly CSE 281A.) Topics of interest in computer science and engineering. Topics may vary from quarter to quarter. May be repeated for credit with the consent of instructor. (S/U grades permitted.) **Prerequisite:** consent of instructor. (Offered as faculty resources permit.)

CSE 292. Faculty Research Seminar (1)

(Formerly CSE 282.) Computer science and engineering faculty will present one hour seminars of the current research work in their areas of interest. **Prerequisite:** CSE graduate status.

CSE 293. Special Project in Computer Science and Engineering (1-12)

The student will conceive, design, and execute a project in computer science under the direction of a faculty member. The project will typically include a large programming or hardware design task, but other types of projects are possible. **Prerequisites:** CSE graduate student status. (CS 75, 76, 77, 78, 79, 80, 81) (S/U grades only.)

CSE 294. Research Meeting in CSE (2)

Advanced study and analysis of active research in computer science and computer engineering. Discussion of current research and literature in the research specialty of the staff member teaching the course. **Prerequisite:** consent of instructor.

CSE 298. Independent Study (1-16)

Open to properly qualified graduate students who wish to pursue a problem through advanced study under the direction of a member of the staff. (S/U grades only.) **Prerequisite:** consent of instructor.

CSE 299. Research (1-16)

Research. **Prerequisite:** consent of faculty.

CSE 500. Teaching Assistantship (2-4)

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty: handling of discussions, preparation and grading of examinations and other written exercises, and student relations. May be used to meet teaching experience requirement for candidates for the Ph.D. degree. Number of units for credit depends on number of hours devoted to class or section assistance. **Prerequisites:** graduate standing and consent of instructor.

CSE 501. Teaching Assistantship (2-4)

Renumbered to CSE 500 (see above).

CSE 599. Teaching Methods in Computer Science (2)

Training in teaching methods in the field of computer science. This course examines theoretical and practical communication and teaching techniques particularly appropriate to computer science. **Prerequisite:** consent of faculty.

Electrical and Computer Engineering (ECE)

PROFESSORS

Anthony S. Acampora, Ph.D., *Emeritus Research Professor*
Victor C. Anderson, Ph.D., *Emeritus (not in-residence)*
Peter M. Asbeck, Ph.D., *Skyworks Endowed Chair*
H. Neal Bertram, Ph.D., *Emeritus Research Professor*
William S. C. Chang, Ph.D., *Emeritus Research Professor*
William A. Coles, Ph.D.
Pamela C. Cosman, Ph.D.
Rene L. Cruz, Ph.D.
Sujit Dey, Ph.D.
Sadik C. Esener, Ph.D.
Shaya Fainman, Ph.D., *Cymer Professor in Advanced Optical Technologies*
Joseph Ford, Ph.D.
Eric Fullerton, Ph.D., *CMRR Endowed Chair*
Ian Galton, Ph.D.
Carl W. Helstrom, Ph.D., *Emeritus*
Ramesh C. Jain Ph.D., *Emeritus*
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Kenneth Kreutz-Delgado, Ph.D.
Walter H. Ku, Ph.D., *Emeritus*
Lawrence E. Larson, Ph.D., *Chair, CWC Industry Endowed Chair in Wireless Communications*
S. S. Lau, Ph.D.
Sing H. Lee, Ph.D., *Emeritus*
Yu Hwa Lo, Ph.D.
Robert Lugannani, Ph.D.
Huey-Lin Luo, Ph.D., *Emeritus*
Elias Masry, Ph.D., *Emeritus*
D. Asoka Mendis, Ph.D., *Emeritus Research Professor*
Laurence B. Milstein, Ph.D., *Ericsson Endowed Chair*
Farrokh Najmabadi, Ph.D., *Director, Center for Energy Research*
Truong Q. Nguyen, Ph.D.
Alon Orlitsky, Ph.D., *Qualcomm Professor of Information Theory and its Applications*
George Papen, Ph.D., *Vice Chair*
Kevin B. Quest, Ph.D.
Stojan Radic, Ph.D.
Bhaskar Rao, Ph.D., *Director, Center for Wireless Communications; Ericsson Endowed Chair in Wireless Access Networks*
Ramesh Rao, Ph.D., *Qualcomm Endowed Chair, Director, Calit2, San Diego Division*
Gabriel Rebeiz, Ph.D.
Barnaby J. Rickett, Ph.D., *Emeritus Research Professor*
Manuel Rotenberg, Ph.D., *Emeritus Research Professor*
M. Lea Rudee, Ph.D., *Emeritus Research Professor*
Victor H. Rumsey, Ph.D., *Emeritus (not in-residence)*
Vitali Shapiro, Ph.D., *Emeritus*
Paul H. Siegel, Ph.D., *Director and Professor, Center for Magnetic Recording Research*
Daniel Sievenpiper, Ph.D.

Bang-Sup Song, Ph.D., *Charles Lee Powell Endowed Chair in Wireless Communications*
David Sworder, Ph.D.
Yuan Taur, Ph.D.
Mohan Trivedi, Ph.D.
Charles W. Tu, Ph.D., *Associate Dean, Jacobs School of Engineering*
Alexander Vardy, Ph.D.
Andrew J. Viterbi, Ph.D., *Emeritus*
Harry H. Wieder, Ph.D., *Emeritus*
Jack K. Wolf, Ph.D., *Stephen O. Rice Professor of Electrical and Computer Engineering*
Edward T. Yu, Ph.D.
Paul Yu, Ph.D., *Associate Vice Chancellor, Research Initiatives*
Kenneth A. Zeger, Ph.D.

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Vitaliy Lomakin, Ph.D.
Shayan Mookherjea, Ph.D.
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Nuno Vasconcelos, Ph.D.
Deli Wang, Ph.D.
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Young-Han Kim, Ph.D.
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Zhaowei Liu, Ph.D.
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Pankaj K. Das, Ph.D., *Emeritus, Rensselaer Polytechnic Institute*
Madhu Gupta, Ph.D., *Professor, San Diego State University*
Rajesh Gupta, Ph.D., *Professor, Computer Science and Engineering*
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Prab Bandaru, Ph.D., *Professor, Mechanical and Aerospace Engineering*

OFFICES:

Undergraduate Affairs, Room 2705
Graduate Affairs, Room 2718
Engineering Building Unit 1, Warren College
<http://www.ece.ucsd.edu/>

PROGRAM MISSION STATEMENT

To educate tomorrow's technology leaders.

PROGRAM EDUCATIONAL OBJECTIVES

- To provide our students with training in the fundamental science and mathematics that underlie engineering, and with a general breadth and depth in engineering and in engineering design so that they are prepared for graduate school and for engineering careers. Students should have both proficiency in a specific technical area, and the flexibility and broad knowledge base needed for life-long engineering careers in a changing technical environment.
- To ensure that our students are educated in the classical sense. In particular, that they are broadly aware of social and environmental issues and of the impact of their profession on these issues.
- To assist our students in preparing themselves to work effectively in their profession. Specifically, to develop communications, teamwork, and leadership skills.

PROGRAM OUTCOMES AND ASSESSMENT

Program outcomes have been established based on the Program Educational Objectives. Graduates of the ECE Program in Electrical Engineering are expected to have

1. An understanding of the underlying principles of, and an ability to apply knowledge of mathematics, science, and engineering to electrical engineering problems
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. A knowledge of electrical engineering safety issues
4. An ability to design a system, component, or process to meet desired needs
5.
 - a. An ability to collaborate effectively with others
 - b. An ability to function on multidisciplinary teams
6. An ability to identify, formulate, and solve engineering problems
7. An ability to use the techniques, skills, and modern engineering tools necessary for engineering

- practice, including familiarity with computer programming and information technology
8. An understanding of professional and ethical responsibility
 9.
 - a. An ability to communicate effectively in writing
 - b. An ability to communicate effectively in speech
 - c. An ability to communicate effectively with visual means
 10. The broad education necessary to understand the impact of engineering solutions in a global and societal context
 11. A recognition of the need for, and the ability to engage in, lifelong learning
 12. A knowledge of contemporary issues

THE UNDERGRADUATE PROGRAMS

The Department of Electrical and Computer Engineering offers undergraduate programs leading to the B.S. degree in **electrical engineering**, **engineering physics**, and computer engineering, and the B.A. degree in **electrical engineering and society**. Each of these programs can be tailored to provide preparation for graduate study or employment in a wide range of fields. The Electrical Engineering Program is accredited by the Accreditation Board for Engineering and Technology (ABET).

The Electrical Engineering Program has a common lower-division and a very flexible structure in the upper-division. After the lower-division core, all students take six breadth courses during the junior year. They must then satisfy a depth requirement which can be met with five courses focused on some specialty, and a design requirement of at least one project course. The remainder of the program consists of seven electives, which may range as widely or as narrowly as needed.

The Engineering Physics Program is conducted in cooperation with the Department of Physics. Its structure is very similar to that of electrical engineering except the depth requirement includes seven courses and there are only five electives.

The Computer Engineering Program is conducted jointly with the Department of Computer Science and Engineering. It has a more prescribed structure. The program encompasses the study of hardware design, data storage, computer architecture, assembly languages, and the design of computers for engineering, information retrieval, and scientific research.

The B.A.-Electrical Engineering and Society Program intends to better prepare engineering students in the areas of social sciences and the humanities, as a response to the globalization of engineering and technology. We recognize that "engineering only" training may not be sufficient when students seek alternate career paths besides engineering upon graduation, such as in the law, finance, and public policy sectors.

For information about the program and about academic advising, students are referred to the section on ECE departmental regulations. In order to

complete the programs in a timely fashion, students must plan their courses carefully, starting in their freshman year. Students should have sufficient background in high school mathematics so that they can take freshman calculus in the first quarter.

For graduation, each student must also satisfy general-education requirements determined by the student's college. The six colleges at UC San Diego require widely different numbers of general-education courses. Students should choose their college carefully, considering the special nature of the college and the breadth of education required. They should realize that some colleges require considerably more courses than others. Students wishing to transfer to another college should see their college advisor.

Graduates of community colleges may enter ECE programs in the junior year. However, transfer students should be particularly mindful of the freshman and sophomore course requirements when planning their programs.

These programs have strong components in laboratory experiments and in the use of computers throughout the curricula. In addition, the department is committed to exposing students to the nature of engineering design. This is accomplished throughout the curricula by use of design-oriented homework problems, by exposure to engineering problems in lectures, by courses which emphasize student-initiated projects in both laboratory and computer courses, and finally by senior design-project courses in which teams of students work to solve an engineering design problem, often brought in from industry.

IT IS IMPERATIVE THAT STUDENTS DISCUSS THEIR CURRICULUM WITH THE APPROPRIATE DEPARTMENTAL ADVISOR IMMEDIATELY UPON ENTRANCE TO UCSD, AND THEN AT LEAST ONCE A YEAR UNTIL GRADUATION.

B.S. ELECTRICAL ENGINEERING PROGRAM

Students must complete 180 units for graduation, including the general-education requirements (GER). Note that 144 units (excluding GER) are required.

Lower-Division Requirements (total of seventy-two units)

Mathematics (twenty-four units)

Math. 20A-B-C-D-E-F.

Physics (sixteen units)

Phys. 2A-B-C-D or Phys. 4A-B-C-D-E. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the mathematics placement test permits them to start with Math. 20B or higher may take Phys. 2A in the fall quarter of the freshman year.

Chemistry (four units)

Chem. 6A.

Programming Course (four units)

ECE 15.

Electrical engineering (twenty-four units)

ECE 25, 30, 35, 45, 65, and 75.

Additional Notes

1. Students with AP math credit are strongly advised to take Math. 20B in the fall quarter, leaving room for a GER in the winter quarter.
2. The ECE undergraduate Web site shows several scheduling options. Please refer to the Web site and consult with the staff advisors in the undergraduate offices, rooms 2705 and 2707 in EBU1.

Upper-Division Requirements (total of seventy-two units)

a. Electrical Engineering BREADTH Courses (twenty-four units)

Courses required of all electrical engineering majors:

The six courses, ECE 101, 102, 103, 107, 108, and 109 are required of all electrical engineering majors and they are an assumed prerequisite for senior-level courses, even if they are not explicitly required. Although the courses are largely independent, there are some prerequisites. ECE 102 is a prerequisite for ECE 108. Students who delay some of the breadth courses into the spring should be careful that it does not delay their depth sequence. For the ECE 109 requirement, credit will not be allowed for ECON 120A, Math. 180A-B, Math. 183, or Math. 186.

b. Electrical Engineering DESIGN Course (4 units)

Note: In order to fulfill the design requirement, students must complete one of the following courses with a grade C- or better. Graduation will not be approved until a written copy of the design project is submitted to the ECE undergraduate office. ECE 111, 118, 191 cannot be used to satisfy both the Design and Depth requirements.

The electrical engineering design requirement can be fulfilled in any of the following three ways:

1. Take ECE 191: Engineering Group Design Project
2. Take ECE 190: Engineering Design This course requires the department stamp. Specifications and enrollment forms are available in the undergraduate office.
3. Take one of the following courses:

- ECE 111: Advanced Digital Design Project
- ECE 118: Computer Interfacing
- ECE 155B or 155C: Digital Recording Projects

Students who wish to take one of these courses to satisfy the design requirement must fill out an enrollment form and have departmental approval for the design credit prior to taking the course. The project must meet the same specifications as ECE 190.

c. Electrical Engineering ELECTIVES (twenty-four units)

- Three upper-division engineering, mathematics, or physics courses.
- Three additional electives which students may use to broaden their professional goals.

(For additional information, please refer to the section on "[Elective Policy for Electrical Engineering and Engineering Physics Majors](#).")

d. Electrical Engineering Depth Requirement (twenty units)

Students must complete a “depth requirement” of at least five quarter courses to provide a focus for their studies. This set must include a clear chain of study of at least three courses which depend on the “breadth” courses. Students may choose one of the approved depth sequences listed below, or propose another with the approval of their faculty advisor. Some of the approved sequences have lower-division prerequisites and thus list six courses. Students choosing one of these sequences will have to complete only two “professional” electives. Guidelines for meeting the depth requirement can be obtained from the undergraduate office. *ECE 111, 118, 191 cannot be used to satisfy both the Design and Depth requirements.*

Electronics Circuits and Systems

ECE 163, 164, 165, and any two of ECE 111, 118, 161A, 161B, 161C, and 166.

Electronic Devices and Materials

ECE 135A, ECE 135B, 136L, 139, and 183.

Controls and Systems Theory

ECE 171A, 171B, 174, 175, and 118 or 191.

Machine Intelligence

ECE 172A, 174, 175, and any two of ECE 161A, ECE 176A, 187, 253A, 285, and COGS 108F.

Photonics

ECE 181, 182, 183, 184, and 185.

Communications Systems

ECE 161A, 153, 154A-B-C.

Networks

ECE 153, 159A, 159B, 158A-B.

Queuing Systems

ECE 171A, 174, 159A-B, and Math. 181A.

Signal and Image Processing

ECE 161A, 161B, 161C, 153, and ECE 172A or 174.

Computer Design

CSE 12, 21, and 141, ECE 158A, 111 or 118, and 165.

Software Systems

CSE 12, 21, 100, 101, 141, and 120.

B.S. ENGINEERING PHYSICS

Students must complete a total of 180 units for graduation, including the general-education requirements. Note that 146 units (excluding GER) are required.

All students will initially be placed in pre-major status. Upon successful completion of the following courses (with a minimum 2.0 GPA by the end of the first three quarters if a transfer student, six quarters

if an incoming freshman), students will be admitted into full Engineering-Physics major status.

1. Math. 20A-B-C
2. Phys. 2A-B
3. ECE 15, 25, and 35

To initiate the change from pre-major status to full major status, transfer students must see the ECE undergraduate advisor by the end of their third quarter at UCSD; incoming freshmen by the end of their sixth quarter.

Please refer to the section “[Undergraduate Regulations and Requirements](#)” for important details.

Lower-Division Requirements (total of seventy-four units)

Mathematics (twenty-four units)

Math. 20A-B-C-D-E-F.

Physics (sixteen units)

Phys. 2A-B-C-D or Phys. 4A-B-C-D-E. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the mathematics placement test permits them to start with Math. 20B or higher may take Phys. 2A in the fall quarter of the freshman year.

Physics Lab (two units)

Phys. 2DL is required.

Chemistry (four units)

Chem. 6A.

Programming Course (four units)

ECE 15.

Electrical engineering (twenty-four units)

ECE 25, 30, 35, 45, 65, and 75.

Additional Notes

1. Students with AP math credit are strongly advised to take Math. 20B in the fall quarter, leaving room for a GER in the winter quarter.
2. The ECE undergraduate Web site shows several scheduling options. Please refer to the Web site and consult with the staff advisors in the undergraduate offices, rooms 2705 and 2707 in EBU1.

Upper-Division Requirements (seventy-two units)

a. Engineering Physics BREADTH Courses (twenty-four units)

The electrical engineering breadth courses ECE 101, 102, 103, 107, 108, and 109, are also required of engineering physics majors. However, because of the scheduling of Math. 110, Phys. 110A and 130A, they can only be taken in a specific order (please consult the ECE Web site). For the ECE 109 requirement, credit will not be allowed for ECON 120A, Math. 180A-B, Math. 183, or Math. 186.

b. Engineering Physics DESIGN Course (four units)

Note: In order to fulfill the design requirement, students must complete one of the following courses with a grade C– or better. Graduation will

not be approved until a written copy of the design project is submitted to the ECE undergraduate office.

The engineering physics design requirement can be fulfilled in any of the following three ways:

1. Take ECE 191: Engineering Group Design Project
2. Take ECE 190: Engineering Design. This course requires the department stamp. Specifications and enrollment forms are available in the undergraduate office.
3. Take one of the following courses:

- ECE 111: Advanced Digital Design Project
- ECE 118: Computer Interfacing
- ECE 155B or 155C: Digital Recording Projects

Students who wish to take one of these courses to satisfy the design requirement must fill out an enrollment form and have departmental approval for the design credit prior to taking the course. The project must meet the same specifications as ECE 190.

c. Engineering Physics ELECTIVES (sixteen units)

- One upper-division engineering, mathematics, or physics course.
- Three additional electives which students may use to broaden their professional goals.

(For additional information, please refer to the section on “[Elective Policy for Electrical Engineering and Engineering Physics Majors](#).”)

d. Engineering Physics DEPTH Courses (twenty-eight Units)

All B.S. engineering physics students are required to take Phys. 110A, 130A-B, 140A, Math. 110, ECE 123 and 166; or ECE 135A and 135B; or ECE 182 and (181 or 183).

Elective Policy for Electrical Engineering and Engineering Physics Majors

1. Technical Electives

Technical electives must be upper-division engineering, math or physics courses (except for the bioengineering track). At most one lower-division course in engineering may be used but it must receive prior approval from the ECE department. Certain courses listed below are not allowed as electives because of overlap with ECE courses.

Physics

Students may not receive upper-division elective credit for any lower-division physics courses. Students may not receive credit for both Phys. 100A and ECE 107, Phys. 100B and ECE 107, Phys. 100C and ECE 123.

Mathematic Math. 180A overlaps ECE 109 and 153, and therefore will not qualify for elective credit of either type. Math. 183 or Math. 186 will not be allowed as an elective. Math. 163 will only be allowed as a professional elective. All lower-division mathematics is excluded from elective credit of either type.

Bioengineering

The following series of courses will provide “core” preparation in bioengineering and will satisfy up to five courses of the ECE elective requirements:

BILD 1, BILD 2, BE 100, BE 140A-B.

The bioengineering department will guarantee admission to these courses for ECE students on a space available basis.

CSE

The following courses are excluded as electives: CSE 1, 2, 5A-B, 8A-B, 11, 123A (duplicates ECE 158A), 140 (duplicates ECE 25), 140L (duplicates ECE 36), 143 (duplicates ECE 165). CSE 12, 20, and 21 will count toward the three professional electives ONLY.

Mechanical and Aerospace Engineering (MAE)

Credit will not be allowed for MAE 105, 139, 140, 143B, or 170.

Special Studies

Courses 195–199: At most four units of 195–199 may be used for elective credit.

2. Professional Electives

Normally these will be upper-division courses in engineering, mathematics, or physics. Students may also choose upper-division courses from other departments provided that they fit into a coherent professional program. In such cases, a lower-division prerequisite may be included in the electives. Courses other than upper-division engineering, mathematics, or physics must be justified in terms of such a program, and must be approved by a faculty advisor.

Biology and Chemistry

Of the three electives intended to allow for the professional diversity, one lower-division biology or chemistry course from BILD 1, 2, Chem. 6B-C may be counted for credit in combination with two upper-division biology or chemistry courses. Furthermore, this will count only if the student can demonstrate to a faculty advisor that they constitute part of a coherent plan for professional/career development.

Upper-division biology and chemistry courses will count toward the three professional electives but not the three math/physics/engineering electives.

Economics

Suitable electives would include

Econ. 1 and 3 followed by the courses in one of the following tracks:

- Macroeconomics: Econ. 110A-B.
- Monetary economics: Econ. 111, and another economics upper division elective.
- Economics 1 and 2 followed by two courses in one of the following tracks:
- Public and Environmental: Econ. 118, 130, 131, 132, 133, 137, 145.
- Labor and Human Resources: Econ. 137, 139, 140.

Note: Econ. 100A can be substituted for Econ. 2

Econ. 1 and 100A followed by two courses in one of the following tracks:

- Microeconomics: Econ.100B-C.
- Financial Markets: Econ. 120B and 173A.
- Operations Research: Econ.172A-B (after taking ECE 109 and Math. 20F).
- Human Resources: Econ. 100B and 136.

Note: Econ. 120A, and 158A-B will not be allowed as professional electives. If Economics is chosen for professional electives, only three technical electives are required for electrical engineering majors; only one technical elective is required for engineering physics majors.

B.S. COMPUTER ENGINEERING

Students wishing to pursue the computer engineering curriculum may do so in either the ECE or CSE department. The set of required courses and allowed electives is the same in both departments; please note that the curriculum requires twenty upper-division courses. The Computer Engineering Program requires a total of 151 units (not including the general-education requirements).

The Computer Engineering Program offers a strong emphasis on engineering mathematics and other basic engineering science as well as a firm grounding in computer science. Students should have sufficient background in high school mathematics so that they can take freshman calculus in their first quarter. Courses in high school physics and computer programming, although helpful, are not required for admission to the program.

Lower-Division Requirements (total of seventy-five units)

Mathematics (twenty units)

Math. 20A-B-C-D-F.

Physics (sixteen units)

Phys. 2A-B-C-D, or Phys. 4A-B-C-D. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the mathematics placement test permits them to start with Math. 20B or higher may take Phys. 2A in the fall quarter of the freshman year.

Computer Science (twenty-seven units)

CSE 11 or 8B*, 12, 15L, CSE 20 or Math. 15A, CSE 21 or Math. 15B, CSE 30, CSE 70, and CSE 91.

*CSE 8A and CSE 8B are not required if a student completes CSE 11. CSE 11 is a faster paced version of CSE 8A and CSE 8B. Students will self-select which course they wish to take. Students without programming experience in a compiled language are advised to take CSE 8A and then CSE 8B instead of CSE 11.

Electrical Engineering (twelve units)

ECE 35, ECE 45, ECE 65.

Upper-Division Requirements (total of seventy-six units)

1. All B.S. computer engineering students are required to take CSE 100 or Math. 176, CSE 101 or Math. 188, CSE 105 or Math. 166, CSE 120, 131, 139, 140, 140L (CSE 140 and 140L must be taken

concurrently), 141, 141L (CSE 141 and 141L must be taken concurrently).

2. In addition, all B.S. computer engineering students must fulfill the following upper-division ECE requirements:
 - Engineering Probability and Statistics ECE 109. This course can be taken in the sophomore year.
 - Electronic Circuits and Systems ECE 102 and 108. The department recommends that these courses be taken in the junior year.
 - Linear systems ECE 101.
3. Technical electives: All B.S. computer engineering majors are required to take six technical electives.
 - One technical elective must be either ECE 111 or ECE 118.
 - Of the remaining five technical electives, four must be ECE or CSE upper-division or graduate courses.
 - The remaining course can be any upper-division course listed under the non-CSE/ECE electives. (See the section on electives below.)

Electives

The discipline of computer engineering interacts with a number of other disciplines in a mutually beneficial way. These disciplines include mathematics, computer science, and cognitive science. The following is a list of upper-division courses from these and other disciplines that can be counted as technical electives.

At most four units of 197, 198, or 199 may be used towards technical elective requirements. ECE/CSE 195 cannot be used towards course requirements. Undergraduate students must get instructor's permission and departmental stamp to enroll in a graduate course.

Students may not get duplicate credit for equivalent courses. The *UC San Diego General Catalog* should be consulted for equivalency information and any restrictions placed on the courses. Additional restrictions are noted below. Any deviation from this list must be petitioned.

Mathematics

All upper-division courses except Math. 168A-B, 179A-B, 183, 184A-B, 189A-B, and 195–199. If a student has completed CSE 167, then he or she cannot get elective credit for Math. 155A. Students may receive elective credit for only one of the following courses: CSE 164A, Math. 174, Math. 173, Phys. 105A-B, MAE 107, CENG 100. No credit for any of these courses will be given if Math. 170A-B-C is taken. Students will receive credit for either Math. 166 or CSE 105 (but not both), either Math. 188 or CSE 101 (but not both), and either Math. 176 or CSE 100 (but not both).

Computer Science and Engineering

All CSE upper-division courses except CSE 195. Students will receive credit for either CSE 123A or ECE 158A (but not both).

Cognitive Science

Sensation and Perception 101A, Learning, Memory, and Attention 101B, Language 101C, Distributed Cognition 102A, Cognitive Ethnography 102B, Cognitive Engineering 102C, Neuroanatomy and Physiology 107A, Systems Neuroscience 107B, Cognitive Neuroscience 107C, Programming Methods for Cognitive Science 108D, Neural Networks Models of Cognition I 108E, Advanced Programming Methods for Cognitive Science 108F, Human Computer Interaction 120, Human Computer Interaction Programming 121, Semantics 150, Language Comprehension 153, Natural and Artificial Symbolic Representational Systems 170, Neural Network Models of Cognition II 181, Artificial Intelligence Modeling II 182.

Students may not get credit for both CSE 150 and Advanced Programming Methods for Cognitive Science 108F or for both CSE 151 and Artificial Intelligence Modeling II 182.

Mechanical and Aerospace Engineering (MAE)

All upper-division MAE courses except MAE 140, and MAE 195-199.

Students may receive elective credit for only one of the following courses: CSE 164A, Math. 174, Math. 173, Phys. 105A-B, CENG 100, MAE 107. Students may only get credit for one of the two courses, CSE 167 or MAE 152.

Economics

Microeconomics 100A-B, Game Theory 109, Macroeconomics 110A-B, Mathematical Economics 113, Econometrics 120B-C, Applied Econometrics 121, Management Science Microeconomics 170A-B, Decisions Under Uncertainty 171, Introduction to Operations Research 172A-B-C, Economic and Business Forecasting 178.

Students cannot take Economics 120A since it duplicates ECE 109.

Linguistics

Phonetics 110, Phonology I 111, Phonology II 115, Morphology 120, Syntax I 121, Syntax II 125, Semantics 130, Mathematical Analysis of Languages 160, Computers and Language 163, Computational Linguistics 165, Psycholinguistics 170, Language and the Brain 172, and Sociolinguistics 175.

Engineering

Team Engineering 101 (see course description under the [Jacobs School of Engineering](#) section).

Music

Computer Music II 172, Audio Production: Mixing and Editing 173.

Psychology

Engineering Psychology 161.

B.A. ELECTRICAL ENGINEERING AND SOCIETY

Students must complete a total of 180 units for graduation, including the general-education

requirements (GER). Note that 144 units (excluding GER) are required.

Lower-Division Requirements (total of eighty units)

Mathematics (twenty-four units)

Math. 20A-B-C-D-E-F.

Physics (sixteen units)

Phys. 2A-B-C-D or Phys. 4A-B-C-D-E. Math. 20A is a prerequisite for Phys. 2A. Students whose performance on the mathematics placement test permits them to start with Math. 20B or higher may take Phys. 2A in the fall quarter of the freshman year.

Chemistry (four units)

Chem. 6A.

Programming Course (four units)

ECE 15.

Electrical Engineering (twenty units)

ECE 25, 30, 35, 45, 65, and 75.

Elective Courses in Social Sciences and Humanities Studies (eight units)

These can be prerequisite courses for the upper-division depth sequence in social sciences/humanities. For instance, for history studies, this can be two history lower-division courses (HILD 2,7,10-12). Historically oriented HUM, MMW, and CAT courses would count as well. At least one lower-division course should have a writing component. For economics studies, this can be two lower-division courses (ECON 1, and ECON 4 for the finance track); or one lower-division course (ECON 1) plus one upper-division course for the data analysis track. For political science, the following courses may be utilized: PS10, PS11, PS12, PS13, PS30. For sociology studies, students will choose two lower-division courses from SOCL 1A, 1B, and 30, of which L30 is highly recommended.

Other courses in social sciences/humanities will be available after an agreement between ECE and the respective departments/programs are established and approved.

Additional Notes

1. Students with AP math credit are strongly advised to take Math. 20B in the fall quarter, leaving room for a GER in the winter quarter.
2. The ECE undergraduate Web site shows several scheduling options. Please refer to the Web site and consult with the staff advisors in the undergraduate offices, rooms 2705 and 2707 in EBU1.

Upper-Division Requirements (total of sixty-four units)

a. Electrical Engineering BREADTH Courses (twenty-four units)

Courses required of all electrical engineering majors:

The six courses—ECE 101, 102, 103, 107, 108, and 109—are required of all electrical engineering majors and they are an assumed prerequisite for

senior-level courses, even if they are not explicitly required. Although the courses are largely independent, ECE 102 is a prerequisite for ECE 108. Students who delay some of the BREADTH courses until the spring should be careful to not have delayed their depth sequence.

b. Electrical Engineering DESIGN Course (four units)

Note: In order to fulfill the design requirement, students must complete one of the following courses with a grade C– or better. When taking this course, the student has the option of having a portion of the project related to his/her social sciences/humanities study. Graduation will not be approved until a written copy of the design project is submitted to the ECE undergraduate office.

The electrical engineering design requirement can be fulfilled in any of the following three ways:

1. Take ECE 191. Engineering Group Design Project
2. Take ECE 190. Engineering Design. This course requires the department stamp. Specifications and enrollment forms are available in the undergraduate office.
3. Take one of the following courses:
 - ECE 111. Advanced Digital Design Project
 - ECE 118. Computer Interfacing
 - ECE 155B or 155C. Digital Recording ProjectsStudents who wish to take one of these courses to satisfy the design requirement must fill out an enrollment form and have departmental approval for the design credit prior to taking the course. The project must meet the same specifications as ECE 190.

c. Electrical Engineering ELECTIVES (twelve units)

Three upper-division engineering, mathematics, or physics courses.

d. Social Sciences/Humanities Studies Depth Requirement (twenty-four units)

Students must complete a “depth requirement” of at least six quarter courses to provide a focus for their studies. Sample depth programs for history and economics students are discussed below. Students may choose this demonstrated sequence or they may propose another with the approval of their faculty co-advisor from the respective social sciences/humanities department.

History Studies (six courses, twenty-four units)

- At least four of these should belong to the specific field the student is pursuing (e.g., History of: East Asia, United States, Europe, Science, etc.).
- At least one course should be in the field of history of science and technology.
- At least one course should be a colloquium (i.e., a small course, with an emphasis on essay writing).

HISC 105. History of Environmentalism

HISC 106. The Scientific Revolution

HISC 107. The Emergence of Modern Science

HISC 108. Science and Technology in the Twentieth Century

HISC 109. Science in Western Civilization

HISC 111. The Atomic Bomb and the Atomic Age

HISC 115. Making Modern Medicine

HISC 131. Science Technology and Law

HISC 173/273. Darwin and Darwinism
 HILD 2A. United States History
 HILD 7A. Race and Ethnicity
 HILD 10. East Asia: The Great Tradition
 HILD 11. East Asia and the West
 HILD 12. Twentieth-Century East Asia
 HIUS 140. Economic History of the United States
 HIUS 151. American Legal History 1865 to the Present
 HIUS 187. Social Movements in the United States
 HIUS 148. American Cities in the Twentieth Century
 HIEU 143. European Intellectual History
 HIGR 222. European History
 HILA 102. Latin America in the Twentieth Century

Economics Studies

- Track A: Finance (six courses, twenty-four units)
- Intermediate Microeconomic sequence: ECON 100A-B-C
 - Finance sequence: ECON 173A-B
 - One elective course from the following: ECON 104, 105, 109, 113, 119, 120B, 141, 142, 143, 147, 150, 151, 155, 171, 172A
- Track B: Data Analysis (seven courses, twenty-eight units, one of them can be taken during lower-division years)
- Intermediate Microeconomic sequence: ECON 100A-B-C
 - Data Analysis sequence: ECON 120B-C
 - Two elective courses from the following: ECON 104, 105, 109, 119, 121, 125, 150, 151, 152, 155, 173A, 173B, 174, 176, 178
 - Other upper-division courses for satisfying the depth sequences for other studies in social sciences/humanities will be available after an agreement is established between ECE and the respective department/program in social sciences/humanities.

Political Science Studies (six courses, twenty-four units)

Policy Analysis
 At least four courses from
 PS 160AA. Introduction to Policy Analysis
 PS 160AB. Introduction to Policy Analysis
 PS 162. Environmental Policy
 PS 163. Analyzing Politics
 PS 165. Special Topic: Policy Analysis
 PS 168. Policy Assessment
 PS 170A. Introductory Statistics for Political Science and Public Policy

and at least two courses from
 PS 100H. Race and Ethnicity
 PS 102J. Advanced Topics in Urban Politics
 PS 103A. California Government and Politics
 PS 103B. Politics and Policymaking in Los Angeles
 PS 103C. Politics and Policymaking/San Diego
 PS 125. Politics of Conservation
 PS 125A. Communities and the Environment
 PS 126AA. Modern Capitalism
 PS 142A. United States Foreign Policy
 PS 142B. U.S. Foreign Economic Policy
 PS 142J. National Security Strategy
 PS 142M. U. S. Foreign Policy/Regional Security

Sociology Studies (six courses, twenty-four units)

Students may specialize in one of four departmental concentrations or complete the “general sociology” track.

Students will choose eight courses, two lower-division and six upper-division courses from their choice of concentrations in Science and Medicine, Law and Society, Economy and Society, International Studies, or General Sociology. Note: SOCL 30 and SOCC 168T are highly recommended for all tracks.

Concentration in Science and Medicine (eight courses, thirty-two units)

Students will choose two lower division courses from SOCL 1A, 1B, and 30, of which L30 is highly recommended; and six upper division courses from the list below, in which SOCC 168T is highly recommended.

Lower-Division

L 1A. The Study of Society
 L 1B. The Study of Society
 L 30. Science, Technology, and Society (highly recommended)

Upper-Division

C 168T. Sociology of Technology (highly recommended)
 B 113. Sociology of the AIDS Epidemic
 C 134A. The Making of Modern Medicine
 C 135. Medical Sociology
 C 136A. Sociology of Mental Illness: An Historical Approach
 C 136B. Sociology of Mental Illness in Contemporary Society
 C 138. Genetics and Society
 C 149. Sociology of the Environment
 C 167. Science and War
 C 168E. Sociology of Science

Concentration in Law and Society (eight courses, thirty-two units)

Students will choose two lower-division courses from SOCL 1A, 1B, and 30, of which L30 is highly recommended; and six upper-division courses from the list below, in which SOCC 168T is highly recommended.

Lower-Division

L 1A. The Study of Society
 L 1B. The Study of Society
 L 30. Science, Technology, and Society (highly recommended)

Upper-Division

C 168T. Sociology of Technology (highly recommended)
 B 111. Human Rights
 B 112. Social Psychology
 B 142. Social Deviance
 B 143. Suicide
 B 146. Law Enforcement in America
 B 160L. Law and Culture
 B 173. Elite Crime
 C 140. Sociology of Law
 C 140F. Law and the Workplace
 C 141. Crime and Society

C 147. Organizations, Society, and Social Justice
 C 159. Special Topics in Social Organizations and Institutions
 C 163. Migration and the Law

Concentration in Economy and Society (eight courses, thirty-two units)

Students will choose two lower-division courses from SOCL 1A, 1B, and 30, of which L30 is highly recommended; and six upper-division courses from the list below, in which SOCC 168T is highly recommended.

Lower-Division

L 1A. The Study of Society
 L 1B. The Study of Society
 L 30. Science, Technology, and Society (highly recommended)

Upper-Division

C 168T. Sociology of Technology (highly recommended)
 B 125. Sociology of Immigration
 B 137. Sociology of Food
 C 121. Economy and Society
 C 132. Gender and Work
 C 139. Social Inequality: Class, Race, and Gender
 C 140F. Law and the Workplace
 C 148L. Inequality and Jobs
 C 152. Social Inequality and Public Policy
 C 163. Migration and the Law
 C 167. Science and War
 D 185. Globalization and Social Development

Concentration in International Studies (eight courses, thirty-two units)

Students will choose two lower-division courses from SOCL 1A, 1B, and 30, of which L30 is highly recommended; and six upper-division courses from the list below, in which SOCC 168T is highly recommended.

Lower-Division

L 1A. The Study of Society
 L 1B. The Study of Society
 L 30. Science, Technology, and Society (highly recommended)

Upper-Division

C 168T. Sociology of Technology (highly recommended)
 B 111A. Human Rights: Principles and Problems
 B 111B. Human Rights: Practices and Cases
 B 130. Population and Society
 B 145. Violence and Society
 B 151. Comparative Race and Ethnic Relations
 B 162R. Religion and Popular Culture in East Asia
 C 148. Political Sociology
 C 152. Urban Sociology
 C 157. Religion in Contemporary Society
 D 158. Islam in the Modern World
 D 169. Citizenship, Community, and Culture
 D 176. War and Society
 D 177. International Terrorism
 D 178. The Holocaust
 D 179. Social Change
 D 180. Social Movements and Social Protest

- D 181. Modern Western Society
- D 182. Ethnicity and Indigenous Peoples in Latin America
- D 183. Minorities and Nations
- D 185. Globalization and Social Development
- D 187. African Societies Through Film
- D 188A. Community and Social Change in Africa
- D 188B. Chinese Society
- D 188F. Modern Jewish Societies and Israeli Society
- D 188D. Latin America: Society and Politics
- D 188J. Change in Modern South Africa
- D 189. Special Topics in Comparative-Historical Sociology

General Sociology (eight courses, thirty-two units)

Students will choose two lower-division courses from SOCL 1A, 1B, and 30, of which 30 is highly recommended; and six upper-division courses, including one from EACH of the following four concentrations:

- Science and Medicine
- Law and Society
- Economy and Society
- International Studies

Note: SOCL 30 and SOCC 168T are highly recommended as two of the eight total courses.

Sample of a four-year program for the B.A. in Engineering Majors

1. Lower-Division Requirements (total of seventy-six units excluding GERs)

FALL	WINTER	SPRING
FRESHMEN YEAR		
Math. 20A ECE 15 (Computer Programming)	Math. 20B Phys. 2A	Math. 20C Phys. 2B
Chem. 6A	ECE 25 (Intro to EE, Digital)	ECE 35 (Intro to EE, Analog)
GER	GER	GER
SOPHMORE YEAR		
Math. 20F Phys. 2C ECE 30 (Intro to CE)	Math. 20D Phys. 2D ECE 45 (Circuits and Systems)	Math. 20E GER ECE 65 (Components and Circuit Lab)
GER	S/H Elective	S/H Elective

2. Upper-Division Requirements (total of sixty-eight units excluding GERs)

FALL	WINTER	SPRING
JUNIOR YEAR		
ECE 101 (Linear Systems)	ECE 107 (Electromagnetism)	GER
ECE 102 (Active Circuits)	ECE 108 (Digital Circuits)	Depth #1
ECE 109 (Prob. and Statistics)	ECE 103 (Devices and Materials)	Depth #2
GER	GER	GER
SENIOR YEAR		
Depth #3	Depth #5	Depth #6
Depth #4	E. Elective	E. Elective
E. Elective	E. Elective	E. Elective
GER	GER	GER

Notes:

- Depth = Depth sequence courses
- S/H Elective = Social sciences/humanities elective courses
- E. Elective = Electrical engineering elective courses, which can be engineering, mathematics, or physics courses. Three of these electives must be upper division. The fourth may be either lower or upper division.
- GER = General-Education Requirements

MINOR CURRICULA

ECE offers three minors in accord with the general university policy that a minor requires five upper-division courses. Students must realize that these upper-division courses have extensive lower-division prerequisites (please consult the ECE undergraduate office). Students should also consult their college provost's office concerning the rules governing minors and programs of concentration.

Electrical Engineering: Twenty units chosen from the breadth courses ECE 101, 102, 103, 107, 108, 109.

Engineering Physics: Twenty units chosen from the junior year courses Phys. 110A, 130A, Math. 110, ECE 101, 102, 103, 107, 108, 109.

Computer Engineering: Twenty units chosen from the junior year courses ECE 102, 108, CSE 100, 101, 105, 120, 140, 140L, 141, 141L.

The department will consider other mixtures of upper-division ECE, CSE, physics, and mathematics courses by petition.

UNDERGRADUATE ADMISSIONS, POLICIES, AND PROCEDURES

FRESHMAN ELIGIBILITY

1. Computer Engineering

Freshmen students who have declared Computer Engineering on their application will be directly admitted into the major.

2. Electrical Engineering

Freshmen students who have declared Electrical Engineering on their application will be directly admitted into the major.

3. Engineering Physics

All students will initially be placed in pre-major status. Upon successful completion of the following courses (with a minimum 2.0 GPA by the end of the first three quarters if a transfer student, six quarters if an incoming freshman), students will be admitted into full Engineering-Physics major status.

1. Math. 20A-B-C
2. Phys. 2A-B
3. ECE 15, 25, and 35

To initiate the change from pre-major status to full major status, transfer students must see the ECE undergraduate advisor by the end of their third

quarter at UCSD; incoming freshmen by the end of their sixth quarter.

Please refer to the section "[Undergraduate Regulations and Requirements](#)" for important details.

TRANSFER STUDENTS ELIGIBILITY

It is strongly recommended that transfer students complete the following course preparation for engineering majors:

- Calculus I—for Science and Engineering (Math. 20A)
- Calculus II—for Science and Engineering (Math. 20B)
- Calculus and Analytic Geometry (Math. 20C)
- Differential Equations (Math. 20D)
- Linear Algebra (Math. 20F)
- Complete calculus-based physics series with lab experience (Phys. 2A-B-C)
- Chemistry 6A (except computer science and computer engineering majors)
- Highest level of introductory computer programming language course offerings at the community college*

*Refer to the UC San Diego General Catalog to select major prerequisite requirement for computer language courses.

1. Computer Engineering

Applicants seeking admission as transfer students will be directly admitted into the Computer Engineering major.

2. Electrical Engineering

Applicants seeking admission as transfer students will be directly admitted into the electrical engineering major.

3. Engineering Physics

Students are accepted into the pre-major and must complete the following courses in order to be accepted into the engineering physics major: Math. 20A-B-C, Phys. 2A-B, ECE 15, 25, and 35. Students who wish to enter in the engineering physics major must contact the department before the beginning of the fall quarter, submitting course descriptions and transcripts for courses used to satisfy their lower-division requirements. Normally, admission will be for the fall quarter; students entering in the winter or spring quarter should be aware that scheduling difficulties may occur because upper-division sequences normally begin in the fall quarter.

GRADE REQUIREMENT IN THE MAJOR

Courses required for the major must be taken for a letter grade. All major courses must be completed with a grade of C– or better.

A GPA of 2.0 is required in all upper-division courses in the major, including technical electives. The grade of D will not be considered an adequate prerequisite for any ECE course and will not be allowed for graduation. The engineering design requirement must be completed with a grade of C– or better.

ADVISING

Students are required to complete an academic planning form and to discuss their curriculum with the appropriate departmental advisor immediately upon entrance to UCSD, and then every year until graduation. This is intended to help students in: a) their choice of depth sequence, b) their choice of electives, c) keeping up with changes in departmental requirements. A faculty advisor will be assigned by the ECE department undergraduate office.

NEW TRANSFER STUDENTS IN ELECTRICAL ENGINEERING AND ENGINEERING PHYSICS

The entire curriculum is predicated on the idea of actively involving students in engineering from the time they enter as freshmen. The freshman courses have been carefully crafted to provide an overview of the engineering mindset with its interrelationships among physics, mathematics, problem solving, and computation. All later courses are specifically designed to build on this foundation. All transfer students should understand that the lower-division curriculum is demanding. Transfer students will be required to take all lower-division requirements or their equivalent. Transfer students are advised to consult the ECE Web site for sample recommended course schedules and for the ECE course requirement guide.

NEW TRANSFER STUDENTS IN COMPUTER ENGINEERING

Transfer students are advised to consult the ECE Web site for sample recommended course schedules and for the ECE course requirement guide.

Students who do not have any programming experience are encouraged to take the CSE 8A-B sequence instead of CSE 11. Experience has shown that most students who are not familiar with programming and take CSE 11 have to retake the class because the accelerated pace makes it difficult to learn the new material.

Note: Transfer students are encouraged to consult with the ECE undergraduate office for academic planning upon entrance to UCSD.

ECE HONORS PROGRAM

The ECE Undergraduate Honors Program is intended to give eligible students the opportunity to work closely with faculty in a project, and to honor the top graduating undergraduate students.

ELIGIBILITY FOR ADMISSION TO THE HONORS PROGRAM

1. Students with a minimum GPA of 3.5 in the major and 3.25 overall will be eligible to apply. Students may apply at the end of the winter quarter of their junior year and no later than the end of the second week of fall quarter of their senior year. No late applications will be accepted.
2. Students must submit a project proposal (sponsored by an ECE faculty member) to the honors program committee at the time of application.
3. The major GPA will include ALL lower-division required for the major and all upper-division

required for the major that are completed at the time of application (a minimum of twenty-four units of upper-division course work).

REQUIREMENTS FOR AWARD OF HONORS

1. Completion of all ECE requirements with a minimum GPA of 3.5 in the major based on grades through winter quarter of the senior year.
2. Formal participation (i.e., registration and attendance) in the ECE 290 graduate seminar program in the winter quarter of their senior year.
3. Completion of an eight-unit approved honors project (ECE 193H: Honors Project) and submission of a written report by the first day of spring quarter of the senior year. This project must contain enough design to satisfy the ECE B.S. four-unit design requirement.
4. The ECE honors committee will review each project final report and certify the projects which have been successfully completed at the honors level.

PROCEDURE FOR APPLICATION TO THE HONORS PROGRAM

Between the end of the winter quarter of their junior year and the second week of the fall quarter of their senior year, interested students must advise the department of their intention to participate by submitting a proposal for the honors project sponsored by an ECE faculty member. Admission to the honors program will be formally approved by the ECE honors committee based on GPA and the proposal.

UNIT CONSIDERATIONS

Except for the two-unit graduate seminar, this honors program does not increase a participant's total unit requirements. The honors project will satisfy the departmental design requirement and students may use four units of their honors project course as a technical elective.

THE GRADUATE PROGRAMS

FIVE-YEAR B.S./MASTER'S PROGRAM

Undergraduates in the ECE department who have maintained a good academic record in both departmental and overall course work are encouraged to participate in the five-year B.S./master's program offered by the department. Participation in the program will permit students to complete the requirements for the M.S. or M.Eng. degree within one year following receipt of the B.S. degree. Complete details regarding admission to and participation in the program are available from the ECE Undergraduate Affairs office.

ADMISSION TO THE PROGRAM

Students should submit an application for the B.S./master's program, including three letters of recommendation, by the program deadline during the spring quarter of their junior year. Applications are available from the ECE Undergraduate Affairs office. No GRE's are required for application to the B.S./master's program. A GPA of at least 3.0

both overall and in the major and strong letters of recommendation are required to be considered for program admission. Students should indicate at that time whether they wish to be considered for the M.S. degree program.

In the winter quarter of the senior year, applications of students admitted to the program will be forwarded by the department to the UC San Diego Office of Graduate Studies. Each student must submit the regular graduate application fee prior to the application deadline for their application to be processed. Students who have been accepted into the B.S./master's program will automatically be admitted for graduate study beginning the following fall provided they maintain an overall GPA through the winter quarter of the senior year of at least 3.0. Upper-division (up to twelve units) or graduate courses taken during the senior year that are not used to satisfy undergraduate course requirements may be counted towards the forty-eight units required for the M.S. degree.

CONTINUATION IN THE PROGRAM

Once admitted to the B.S./master's program, students must maintain a 3.0 cumulative GPA in all courses through the winter quarter of the senior year and in addition must at all times maintain a 3.0 cumulative GPA in their graduate course work. Students not satisfying these requirements may be re-evaluated for continuation in the program.

Admission for graduate study through the B.S./master's program will be for the M.S. or M.Eng. degree only. Undergraduate students wishing to continue toward the Ph.D. degree must apply and be evaluated according to the usual procedures and criteria for admission to the Ph.D. program.

CURRICULUM

Students in the five-year B.S./master's program must complete the same requirements as those in the regular M.S. program. Completion of the M.S. degree requirements within one year following receipt of the B.S. degree will generally require that students begin graduate course work in their senior year. All requirements for the B.S. degree should be completed by the end of the senior (fourth) year, and the B.S. degree awarded prior to the start of the fifth year. Courses taken in the senior year may be counted toward the B.S. degree requirements or the M.S. degree requirements, but not both. Students must have received their B.S. degree before they will be eligible to enroll as graduate students in the department.

The department offers graduate programs leading to the M.Eng., M.S., and Ph.D. degrees in electrical engineering. Students can be admitted into ECE graduate studies through either the M.Eng., M.S. or Ph.D. programs.

The Ph.D. program is strongly research oriented and is for students whose final degree objective is the Ph.D. If a student with a B.S. is admitted to this program, he or she will be expected to complete the requirements for the M.S. degree (outlined below) before beginning doctoral research. The M.S. is a technically intensive, research-oriented degree intended as preparation for advanced technical work in the engineering profession, or subsequent pursuit of a Ph.D. By contrast, the M. Eng. is intended to be a

terminal professional degree, for those not planning to pursue the Ph.D. The M. Eng. has only a course work requirement.

In addition, the department offers M.S. and Ph.D. programs in computer engineering jointly with CSE, and a Ph.D. program in applied ocean science jointly with MAE and Scripps Institution of Oceanography.

Admission to an ECE graduate program is in accordance with the general requirements of the UCSD graduate division, and requires at least a B.S. Degree in engineering, physical sciences, or mathematics with a minimum upper division GPA of 3.0. Applicants must provide three letters of recommendation and recent GRE General Test scores. TOEFL or IELTS scores are required from international applicants whose native language is not English. Applicants should be aware that the University does not permit duplication of degrees.

Support: The department makes every effort to provide financial support for Ph.D. students who are making satisfactory progress. Support may take the form of a fellowship, teaching assistantship, research assistantship, or some combination thereof. International students will not be admitted unless there is reasonable assurance that support can be provided for the duration of their Ph.D. Program. Students in the M.Eng. and M.S. programs may also obtain support through teaching or research assistantships, but this is less certain.

Advising: Students should seek advice on requirements and procedures from the departmental graduate office and/or the departmental Web site <http://www.ece.ucsd.edu>. All students will be assigned a faculty academic advisor upon admission and are strongly encouraged to discuss their academic program with their advisor immediately upon arrival and subsequently at least once per academic year.

MASTER OF ENGINEERING

The Master of Engineering (M. Eng.) program is intended primarily for engineers who desire master's-level work but do not intend to continue with Ph.D.-level research. It differs from the M.S. program in that it is a terminal professional degree, whereas the M.S. may serve as an entry to a Ph.D. program. Salient features of the M. Eng. program include the following: It can be completed in four quarters at full-time or eight quarters at half time; it does not require a thesis, a research project, or a comprehensive exam; and it has an option of three courses in business, management, and finance.

Course Requirements

The total course requirements are forty-eight units (twelve quarter courses). At least thirty-six units must be at the graduate level. The choice of courses is subject to general focus and breadth requirements. Students will be assigned a faculty advisor who will help select courses.

1. The Focus Requirement: (five courses) The M.Eng. program should reflect, among other things, a continuity and focus in one subject area. The course selection must therefore include at least twenty units (five quarter courses) in closely related courses leading to the state of the art in that area. The requirement may be met by selecting five courses from within one of the focus areas

listed below. In some cases it may be appropriate to select five closely related courses from two of the areas listed below. Such cases must be approved by a faculty advisor and the ECE Graduate Affairs Committee.

2. The Breadth Requirement: (two courses) A graduate student often cannot be certain of his or her future professional career activities and may benefit from exposure to interesting opportunities in other subject areas. The breadth requirement is intended to provide protection against technical obsolescence, open up new areas of interest, and provide for future self-education and interaction with people from related and sometime disparate disciplines. The minimum breadth requirement is eight units (two quarter courses) of ECE/CSE graduate courses selected from among the courses listed below, in an area distinctly different from that of the focus requirement.

3. Technical Electives: (two courses) Two technical electives may be any graduate courses in ECE, CSE, Physics, or Mathematics. Other technical courses may be selected with the approval of the faculty advisor and the ECE Graduate Affairs Committee. Technical electives may include a maximum of four units of ECE 298 (Independent Study), or ECE 299 (Research).

4. Professional Electives: (three courses) The three professional electives may be used in several ways: for the IP/Core 401, 420, 421 series in business, management, and finance; for upper-division undergraduate technical courses specified as prerequisites for graduate-level focus, breadth, or technical elective courses taken to satisfy the M.Eng. Degree requirements; or for additional graduate technical electives. Use of other courses to satisfy the Professional Elective requirement must be approved by the faculty advisor.

Scholarship Requirement: The forty-eight units of required course work must be taken for a letter grade (A–F), except for ECE 298 or 299, for which only S/U grades are allowed. Courses for which a D or F is received may not be counted. Students must maintain a GPA of 3.0 overall.

MASTER OF ENGINEERING PROGRAM FOCUS COURSES

Please consult the ECE graduate office or the ECE Web site <http://www.ece.ucsd.edu> for the current list of focus areas and courses.

1. Applied Physics

Allied Ph.D. research areas: Applied Physics—Applied Optics, Applied Physics—Electronic Devices and Materials, Photonics, Radio Space Science, and Magnetic Recording.

ECE 222A-B-C. **Electromagnetic Theory**
ECE 230A-B-C. **Solid State Electronics**
ECE 236A-B-C-D. **Semiconductors**
ECE 238A-B. **Materials Science**
MS 201A-B-C. **Materials Science**
ECE 240A-B-C. **Optics**
ECE 241A-B-C. **Optics**

2. Communications and Signal Analysis

Allied Ph.D. Research areas: Communication Theory and Systems, Intelligent Systems, Robotics, and Control, Magnetic Recording, Signal and Image Processing.

ECE 250. **Random Processes**
ECE 251AN-BN-CN-DN. **Digital Signal Processing**
ECE 252A-B. **Speech Compression and Recognition**
ECE 253A-B. **Digital Image Analysis**
ECE 254. **Detection Theory**
ECE 255AN. **Information Theory**
ECE 255BN-CN. **Source Coding**
ECE 256A-B. **Time Series Analysis**
ECE 257A-B. **Wireless Communications**
ECE 258A-B. **Digital Communications**
ECE 259AN-BN-CN. **Channel Coding**
ECE 275A-B. **Statistical Parameter Estimation**
ECE 285. **Special Topic: Computer Vision; Pattern Recognition (offerings vary annually)**

3. Electronic Circuits and Systems

Allied Ph.D. Research areas: Computer Engineering, Electronic Circuits and Systems.

ECE 222A-B-C. **Applied Electromagnetic Theory**
ECE 230A-B-C. **Solid State Electronics**
ECE 236A-B-C. **Semiconductor Hetero-structure Materials**
ECE 250. **Random Processes**
ECE 260A-B-C. **VLSI Circuits**
ECE 264A-B-C-D. **Analog IC Design**
ECE 265A-B. **Wireless Circuit Design**
CSE 240A, 240B. **Computer Architecture**
CSE 242A, 243A. **Computer Aided Design**
ECE 251AN-BN-CN-DN. **Digital Signal Processing**

TRANSFERRING TO THE PH.D. PROGRAM

Although the M. Eng. is intended as a terminal degree, the department recognizes that degree goals can change, including the possibility that a student admitted to the M. Eng. may wish to pursue a Ph.D. To this end, we outline below the procedure that must be followed to effect such a change. At the outset, however, we stress that this option should not be used in an attempt to circumvent the normal Ph.D. admissions process. Students who fail to meet the standards for the Ph.D. program at the time of admission have little chance of being allowed into the Ph.D. program at a later date.

Students in the M.Eng. program wishing to be considered for admission to the Ph.D. program should consult their academic advisor as soon as possible. Transfer from M. Eng. to the Ph.D. program is possible provided that the student

- Satisfy all requirements for initial admission to the Ph.D. program, including submission of GRE General Test Scores, and be approved for consideration for transfer to the Ph.D. program by the ECE Graduate Admissions Committee.
- Identify a faculty member who agrees, in writing, to serve as that student's academic and Ph.D. research advisor.
- In consultation with the academic advisor, design and complete a program of course work that satisfies all course requirements and constraints for a Ph.D. discipline appropriate to their research. All students in the Ph.D. programs are required to

satisfy all Ph.D. degree requirements as described below. Should the student not be admitted to the Ph.D. program, this program of course work will serve, with the approval of the academic advisor and the ECE Graduate Affairs Committee, to satisfy the course work requirements for the M.S. or M.Eng. degree (see below).

- Pass the comprehensive examination at the level required for continuation in the Ph.D. program. A student failing to pass the comprehensive exam at this required level will not be admitted to the Ph.D. program, and will instead continue in the M.S. or M.Eng. degree program (see below).
- Maintain a GPA of at least 3.4 in the appropriate core graduate courses.

A student who has fulfilled all of the above requirements should, after passing the departmental comprehensive exam, submit a petition to change their degree objective from M.Eng. to Ph.D.

MASTER OF SCIENCE

The ECE department offers M.S. programs in electrical and computer engineering. The M.S. program in computer engineering is jointly administered with the Department of Computer Science and Engineering. The M.S. programs are research oriented, are intended to provide the intensive technical preparation necessary for advanced technical work in the engineering profession or subsequent pursuit of a Ph.D. The M.S. degree may be earned either with a thesis (Plan 1) or with a research project followed by a comprehensive examination (Plan 2). However, continuation in the Ph.D. program requires a comprehensive examination so most students opt for Plan 2.

Course Requirements: The total course requirements for the master of science degrees in electrical engineering and in computer engineering are forty-eight units (twelve quarter courses) and forty-nine units, respectively, of which at least thirty-six units must be in graduate courses. Note that this is greater than the minimum requirements of the university. The department maintains a list of core courses for each disciplinary area from which the thirty-six graduate course units must be selected. The current list may be obtained from the department graduate office or the official Web site of the department. Students in interdisciplinary programs may select other core courses with the approval of their academic advisor. The course requirements must be completed within two years of full-time study. Students will be assigned a faculty advisor who will help select courses and approve their overall academic curriculum.

Scholarship Requirement: The forty-eight units of required course work must be taken for a letter grade (AF), except for graduate research (e.g. ECE 298, 299) for which only S/U grades are allowed. Courses for which a D or F is received may not be counted. Students must maintain a GPA of 3.0 overall.

Thesis and Comprehensive Requirements: The department offers both M.S. Plan 1 (thesis) and M.S. Plan 2 (written comprehensive exam). Students in the M.S. program may elect either Plan 1 or Plan 2 any time. Students in the M.S. Plan 1 (thesis) must take twelve units of ECE 299 (Research) and must

submit a thesis as described in the general requirements of the university. Students in the M.S. Plan 2 (written comprehensive exam) may count four units of ECE 299 (Research) toward the thirty-six graduate units required and must pass the departmental written comprehensive examination not later than the end of the fall quarter of their second year of study. Students who pass the written examination at the MS level will receive a terminal masters degree, if they do not already have one.

Students in the computer engineering discipline may elect to take examinations in the Department of Computer Science and Engineering, in accordance with the CSE guidelines, in place of the written comprehensive examination in ECE.

Transfer to the Ph.D. Program: Students in the M.S. program wishing to be considered for admission to the Ph.D. program should consult their academic advisor as soon as possible. Transfer from the M.S. to the Ph.D. program is possible provided that the student

- Satisfy all requirements for initial admission to the Ph.D. program, including submission of GRE general test scores, and be approved for consideration for transfer to the Ph.D. program by the ECE Graduate Admissions Committee.
- Identify a faculty member who agrees, in writing, to serve as that student's academic and Ph.D. research advisor.
- In consultation with the academic advisor, design and complete a program of course work that satisfies all course requirements and constraints for a Ph.D. discipline appropriate to the student's research. All students in the Ph.D. program are required to satisfy all Ph.D. degree requirements as described below. Should the student not be admitted to the Ph.D. program, this program of course work will serve, with the approval of the academic advisor and the ECE Graduate Affairs Committee, to satisfy the course work requirements for the M.S. degree.
- Pass the comprehensive examination at the level required for continuation in the Ph.D. program. A student failing to pass the comprehensive exam at this required level will not be admitted to the Ph.D. program, and will instead continue in the M.S. degree program.
- Maintain a GPA of at least 3.4 in the appropriate core graduate courses.

A student who has fulfilled all of the above requirements should, after passing the departmental comprehensive exam, submit a petition to change his or her degree objective from M.S. to Ph.D.

THE DOCTORAL PROGRAMS

The ECE department offers graduate programs leading to the Ph.D. degree in ten disciplines within electrical and computer engineering, as described in detail below. The Ph.D. is a research degree requiring completion of the Ph.D. Program course requirements, satisfactory performance on the comprehensive (Ph.D. Preliminary) examination and university Qualifying Examination, and submission and defense of a doctoral thesis (as described under the "Graduate Studies" section of this catalog). Students in the Ph.D. Program must pass the comprehensive

exam (Ph.D. Preliminary) before the beginning of the winter quarter of the second year of graduate study. To ensure timely progress in their research, students are strongly encouraged to identify a faculty member willing to supervise their doctoral research by the end of their first year of study.

Students should begin defining and preparing for their thesis research as soon as they have passed the comprehensive exam (Ph.D. Preliminary). They should plan on taking the university Qualifying Examination about one year later. The university does not permit students to continue in graduate study for more than four years without passing this examination. At the Qualifying Examination the student will give an oral presentation on research accomplishments to date and the thesis proposal to a campus-wide committee. The committee will decide if the work and proposal has adequate content and reasonable chance for success. They may require that the student modify the proposal and may require a further review.

The final Ph.D. requirements are the submission of a dissertation and the dissertation defense (as described under the "Graduate Studies" section of this catalog).

Course Requirements: The total course requirements for the Ph.D. degree in electrical engineering are essentially the same as the M.S. degree and consists of forty-eight units (twelve quarter courses), of which at least thirty-six units must be in graduate courses. Note that this is greater than the minimum requirements of the university. The department maintains a list of core courses for each disciplinary area from which the thirty-six graduate course units must be selected. The current list may be obtained from the ECE department graduate office or the official Web site of the department. Students in the interdisciplinary programs may select other core courses with the approval of their academic advisor. The course requirements must be completed within two years of full-time study.

Students in the Ph.D. programs may count no more than eight units of ECE 299 towards their course requirements.

Students who already hold an M.S. degree in electrical engineering must nevertheless satisfy the requirements for the core courses. However, graduate courses taken elsewhere can be substituted for specific courses with the approval of the academic advisor.

Scholarship Requirement: The forty-eight units of required courses must be taken for a letter grade (AF), except for ECE 299 (Research) for which only S/U grades are allowed. Courses for which a D or F is received may not be counted. Students must maintain a GPA of 3.0 overall. In addition, a GPA of 3.4 in the core graduate courses is generally expected.

Comprehensive Exam (Ph.D. Preliminary): Ph.D. students must find a faculty member who will agree to supervise their thesis research. This should be done before the start of the second year of study. They should then devote at least half their time to research and must pass the Ph.D. Preliminary Examination by the end of their second year of study. This is an oral exam in which the student presents his or her research to a committee of three ECE faculty members, and is examined orally for proficiency in his or her area of specialization. The outcome of the

exam is based on the student's research presentation, proficiency demonstrated in the student's area of specialization and overall academic record and performance in the graduate program. Successful completion of the Ph.D. Preliminary Examination will also satisfy the M.S. Plan 2 comprehensive exam requirement.

*Students in the computer engineering discipline may elect to take examinations in the Department of Computer Science and Engineering, in accordance with the CSE guidelines, in place of the ECE comprehensive examination as described above.

University Qualifying Exam: Students who have passed the comprehensive exam (Ph.D. Preliminary) should plan to take the university Qualifying Examination approximately a year after passing the comprehensive exam (Ph.D. Preliminary). The university does not permit students to continue in graduate study for more than four years without passing this examination. The university Qualifying Examination is an oral exam in which the student presents his or her thesis proposal to a university-wide committee. After passing this exam the student is "advanced to candidacy."

Dissertation Defense: The final Ph.D. requirements are the submission of a dissertation, and the dissertation defense (as described under the "Graduate Studies" section of this catalog). Students who are advanced to candidacy may register for any ECE course on an S/U basis.

Departmental Time Limits: Students who enter the Ph.D. Program with an M.S. degree from another institution are expected to complete their Ph.D. requirements a year earlier than B.S. entrants. They must discuss their program with an academic advisor in their first quarter of residence. If their Ph.D. Program overlaps significantly with their earlier M.S. work, the time limits for the comprehensive and qualifying exams will also be reduced by one year. Specific time limits for the Ph.D. Program, assuming entry with a B.S. degree, are as follows:

1. The Comprehensive Exam (Ph.D. Preliminary)

must be completed before the start of the winter quarter of the second year of full-time study.

2. The University Qualifying Exam must be completed before the start of the fifth year of full-time study.

3. Support Limit: Students may not receive financial support through the university for more than seven years of full-time study (six years with an M.S. degree).

4. Registered Time Limit: Students may not register as graduate students for more than eight years of full-time study (seven years with an M.S. degree).

Half-Time Study: Time limits are extended by one quarter for every two quarters of approved half-time status. Students on half-time status may not take more than six units each quarter.

PH.D. RESEARCH PROGRAMS

1. Applied Ocean Sciences: This program in applied science related to the oceans is interdepartmental with the Graduate Department of the Scripps Institution of Oceanography (SIO) and the Department of Mechanical and Aerospace Engineering (MAE). It is administered by SIO.

All aspects of man's purposeful and unusual intervention into the sea are included.

2. Applied Physics—Applied Optics and Photonics:

These programs encompass a broad range of interdisciplinary activities involving optical science and engineering, optical and optoelectronic materials and device technology, communications, computer engineering, and photonic systems engineering. Specific topics of interest include ultrafast optical processes, nonlinear optics, quantum cryptography and communications, optical image science, multi-dimensional optoelectronic I/O devices, spatial light modulators and photodetectors, artificial dielectrics, multifunctional diffractive and micro-optics, volume and computer-generated holography, optoelectronic and micromechanical devices and packaging, wave modulators and detectors, semiconductor-based optoelectronics, injection lasers, and photodetectors. Current research projects are focused on applications such as optical interconnects in high-speed digital systems, optical multidimensional signal and image processing, ultrahigh-speed optical networks, 3D optical memories and memory interfaces, 3D imaging and displays, and biophotonic systems. Facilities available for research in these areas include electron-beam and optical lithography, material growth, microfabrication, assembly, and packaging facilities, cw and femtosecond pulse laser systems, detection systems, optical and electro-optic components and devices, and electronic and optical characterization and testing equipment.

3. Communication Theory and Systems:

Communications theory and systems concerns the transmission, processing, and storage of information. Topics covered by the group include wireless and wireline communications, spread-spectrum communication, multi-user communication, network protocols, error-correcting codes for transmission and magnetic recording, data compression, time-series analysis, and image and voice processing.

4. Computer Engineering

consists of balanced programs of studies in both hardware and software, the premise being that knowledge and skill in both areas are essential both for the modern-day computer engineer to make the proper unbiased tradeoffs in design, and for researchers to consider all paths towards the solution of research questions and problems. Toward these ends, the programs emphasize studies (course work) and competency (comprehensive examinations, and dissertations or projects) in the areas of VLSI and logic design, and reliable computer and communication systems. Specific research areas include computer systems, signal processing systems, multiprocessing and parallel and distributed computing, computer communications and networks, computer architecture, computer-aided design, fault-tolerance and reliability, and neurocomputing. The faculty is composed of interested members of the Departments of Electrical and Computer Engineering (ECE), Computer Science and Engineering (CSE), and related areas. The specialization is administered by both departments;

the requirements are similar in both departments, with students taking the comprehensive exam, if necessary, given by the student's respective department.

5. Electronic Circuits and Systems:

This program involves the study and design of analog, mixed-signal (combined analog and digital), and digital electronic circuits and systems. Emphasis is on the development, analysis, and implementation of integrated circuits that perform analog and digital signal processing for applications such as wireless and wireline communication systems, test and measurement systems, and interfaces between computers and sensors. Particular areas of study currently include radio frequency (RF) power amplifiers, RF low noise amplifiers, RF mixers, fractional-N phase-locked loops (PLLs) for modulated and continuous-wave frequency synthesis, pipelined analog-to-digital converters (ADCs), delta-sigma ADCs and digital-to-analog converters (DACs), PLLs for clock recovery, adaptive and fixed continuous-time, switched-capacitor, and digital filters, echo cancellation circuits, adaptive equalization circuits, wireless receiver and transmitter linearization circuits, mixed-signal baseband processing circuits for wireless transmitters and receivers, high-speed digital circuits, and high-speed clock distribution circuits.

6. Applied Physics—Electronic Devices and Materials:

This program addresses the synthesis and characterization of advanced electronic materials, including semiconductors, metals, and dielectrics, and their application in novel electronic, optoelectronic, and photonic devices. Emphasis is placed on exploration of techniques for high-quality epitaxial growth of semiconductors, including both molecular-beam epitaxy (MBE) and metalorganic chemical vapor deposition (MOCVD); fabrication and characterization of materials and devices at the nanoscale; development of novel materials processing and integration techniques; and high-performance electronic devices based on both Group IV (Si/SiGe) and III-V compound semiconductor materials. Areas of current interest include novel materials and high-speed devices for wireless communications; electronic and optoelectronic devices for high-speed optical networks; high-power microwave-frequency devices; nanoscale CMOS devices and circuits; heterogeneous materials integration; novel device structures for biological and chemical sensing; advanced tools for nanoscale characterization and metrology; and novel nanoscale electronic, optoelectronic, and photonic devices. Extensive facilities are available for research in this area, including several MBE and MOCVD systems; a complete microfabrication facility; electron-beam lithography and associated process tools for nanoscale fabrication; a Rutherford backscattering system; x-ray diffractometers; electron microscopy facilities; extensive scanning-probe instrumentation; cryogenic systems; and comprehensive facilities for DC to RF electrical device characterization and optical characterization of materials and devices.

7. Intelligent Systems, Robotics, and Control: This information sciences-based field is concerned with the design of human-interactive intelligent systems that can sense the world (defined as some specified domain of interest); represent or model the world; detect and identify states and events in the world; reason about and make decisions about the world; and/or act on the world, perhaps all in real-time. A sense of the type of systems and applications encountered in this discipline can be obtained by viewing the projects shown at the Web site <http://www.ece.ucsd.edu/grad/curricula/MS-PhD/ISRC/index.php>.

The development of such sophisticated systems is necessarily an interdisciplinary activity. To sense and succinctly represent events in the world requires knowledge of signal processing, computer vision, information theory, coding theory, and data-basing; to detect and reason about states of the world utilizes concepts from statistical detection theory, hypothesis testing, pattern recognition, time series analysis, and artificial intelligence; to make good decisions about highly complex systems requires knowledge of traditional mathematical optimization theory and contemporary near-optimal approaches such as evolutionary computation; and to act upon the world requires familiarity with concepts of control theory and robotics. Very often learning and adaptation are required as either critical aspects of the world are poorly known at the outset, and must be refined online, or the world is non-stationary and our system must constantly adapt to it as it evolves. In addition to the theoretical information and computer science aspects, many important hardware and software issues must be addressed in order to obtain an effective fusion of a complicated suite of sensors, computers, and problem dynamics into one integrated system.

Faculty affiliated with the ISRC subarea are involved in virtually all aspects of the field, including applications to intelligent communications systems; advanced human-computer interfacing; statistical signal- and image-processing; intelligent tracking and guidance systems; biomedical system identification and control; and control of teleoperated and autonomous multiagent robotic systems.

8. Magnetic Recording is an interdisciplinary field involving physics, material science, communications, and mechanical engineering. The physics of magnetic recording involves studying magnetic heads, recording media, and the process of transferring information between the heads and the medium. General areas of investigation include: nonlinear behavior of magnetic heads, very high frequency loss mechanisms in head materials, characterization of recording media by micromagnetic and many body interaction analysis, response of the medium to the application of spatially varying vectorial head fields, fundamental analysis of medium nonuniformities leading to media noise, and experimental studies of the channel transfer function emphasizing non-linearities, interferences, and noise. Current projects include numerical simulations of high density digital recording in metallic thin films,

micromagnetic analysis of magnetic reversal in individual magnetic particles, theory of recorded transition phase noise and magnetization induced nonlinear bit shift in thin metallic films, and analysis of the thermal-temporal stability of interacting fine particles.

Research laboratories are housed in the Center for Magnetic Recording Research, a national center devoted to multidisciplinary teaching and research in the field.

9. Applied Physics—Radio and Space Science:

The Radio Science Program focuses on the study of radio waves propagating through turbulent media. The primary objectives are probing of otherwise inaccessible media such as the solar wind and interstellar plasma. Techniques for removing the effects of the turbulent medium to restore the intrinsic signals are also studied.

The Space Science Program is concerned with the nature of the sun, its ionized and supersonic outer atmosphere (the solar wind), and the interaction of the solar wind with various bodies in the solar system. Theoretical studies include: the interaction of the solar wind with the earth, planets, and comets; cosmic dusty-plasmas; waves in the ionosphere; and the physics of shocks. A major theoretical effort involves the use of supercomputers for modeling and simulation studies of both fluid and kinetic processes in space plasmas.

Students in radio science will take measurements at various radio observatories in the U.S. And elsewhere. This work involves a great deal of digital signal processing and statistical analysis. All students will need to become familiar with electromagnetic theory, plasma physics, and numerical analysis.

10. Signal and Image Processing: This program explores engineering issues related to the modeling of signals starting from the physics of the problem, developing and evaluating algorithms for extracting the necessary information from the signal, and the implementation of these algorithms on electronic and opto-electronic systems. Examples of research areas include filter design, fast transforms, adaptive filters, spectrum estimation and modeling, sensor array processing, image processing, image restoration, video processing, pattern recognition, and the implementation of signal processing algorithms using appropriate technologies. Signal and image processing techniques have found application in a number of areas such as sonar, radar, speech, geophysics, medical imaging, robotic vision, digital communications, and multimedia systems among others.

11. Nanoscale Devices and Systems: This program area will address the science and engineering of materials and device structures at length scales of ~100nm and below, at which phenomena such as quantum confinement and single-electron effects in electronics, near-field behavior in optics and electromagnetics, single-domain effects in magnetism, and a host of other effects in mechanical, fluidic, and biological systems emerge and become dominant. Engineering activities such as

scaling of transistors and other circuit elements in microelectronics, design of new, artificial materials with engineered optical properties and of photonic components and systems based on these materials, engineering of high-density magnetic storage media and systems, development of new technologies for renewable energy conversion and storage, advancement of sensor technology, and others now depend upon engineering both solid-state and “soft” materials and device structures at the nanoscale. Furthermore, the integration of such technologies into complex systems, as well as consideration of system drivers and constraints as guides for the development of new materials and devices, is emerging as a critical aspect of nanotechnology.

RESEARCH FACILITIES

Most of the research laboratories of the department are associated with individual faculty members or small informal groups of faculty. Larger instruments and facilities, such as those for electron microscopy and e-beam lithography are operated jointly. In addition the department operates several research centers and participates in various university wide organized research units.

The department-operated research centers are the Center for Wireless Communications which is a university-industry partnership; the Institute for Neural Computation, and the Center for Information Theory and Application in conjunction with Calit2.

Department research is also associated with the Center for Astronomy and Space Science, the Center for Magnetic Recording Research, the California Space Institute, the Institute for Nonlinear Science, and Calit2 (<http://www.calit2.net>). Departmental researchers also use various national and international laboratories, such as the National Nanofabrication Facility, the National Radio Astronomy Laboratory, and the Center for Networked Systems (CSE).

The department emphasizes computational capability and maintains numerous computer laboratories for instruction and research. One of the NSF national supercomputer centers is located on the campus. This is particularly useful for those whose work requires high data bandwidths.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

The department will endeavor to offer the courses as outlined below; however, unforeseen circumstances sometimes require a change of scheduled offerings. Students are strongly advised to check the Schedule of Classes or the department before relying on the schedule below. For the names of the instructors who will teach the course, please refer to the quarterly Schedule of Classes. The departmental Web site <http://www.ece.ucsd.edu> includes the present best estimate of the schedule of classes for the entire academic

LOWER-DIVISION

1A-B-C. Mesa Orientation Course (1-1-1)

Students will be given an introduction to the engineering profession and our undergraduate program. Exercises and practicums will develop the problem-solving skills needed to succeed in engineering. **Prerequisite:** none. (F,W,S)

15. Engineering Computation (4)

Students learn the C programming language with an emphasis on high-performance numerical computation. The commonality across programming languages of control structures, data structures, and I/O is also covered. Techniques for using MatLab to graph the results of C computations are developed. **Prerequisites:** a familiarity with basic mathematics such as trigonometry functions and graphing is expected but this course assumes no prior programming knowledge. (F,W)

25. Introduction to Digital Design (4)

This course emphasizes digital electronics. Principles introduced in lectures are used in laboratory assignments, which also serve to introduce experimental and design methods. Topics include Boolean algebra, combination and sequential logic, gates and their implementation in digital circuits. (Course material and/or program fees may apply.) **Prerequisite:** none. (F,W,S)

30. Introduction to Computer Engineering (4)

The fundamentals of both the hardware and software in a computer system. Topics include: representation of information, computer organization and design, assembly and microprogramming, current technology in logic design. (Students who have taken CSE 30 may not take ECE 30 for credit.) **Prerequisites:** ECE 15 and 25 with grades of C- or better. (F,S)

35. Introduction to Analog Design (4)

Fundamental circuit theory concepts, Kirchoff's voltage and current laws, Thevenin's and Norton's theorems, loop and node analysis, time-varying signals, transient first order circuits, steady-state sinusoidal response. (Course material and/or program fees may apply.) **Prerequisites:** Math. 20A-B; Math. 20C and Physics 2B must be taken concurrently. (F,W,S)

45. Circuits and Systems (4)

Steady-state circuit analysis, first and second order systems, Fourier Series and Transforms, time domain analysis, convolution, transient response, Laplace Transform, and filter design. **Prerequisites:** Math. 20A-B-C, ECE 15, and ECE 35. (F,W,S)

65. Components and Circuits Laboratory (4)

Introduction to linear and nonlinear components and circuits. Topics will include: two terminal devices, bipolar and field-effect transistors, and large and small signal analysis of diode and transistor circuits. (Course material and/or program fees may apply.) **Prerequisites:** ECE 15, 25, and 35. (F,W,S)

80. Photonics of Everyday Life (4)

This course is a general elective for students interested in the impact of photonic technology in our everyday lives. Topics include digital camera and photography, photography vs. holography, holograms for counterfeiting, LCD display and optical storage (CD and DVD) in computers, some varieties of lasers, differences between laser light and ordinary light, optics for telecom, telescope, microscope, spectroscopy, and biophotonics. **Prerequisite:** simple concepts of calculus (see instructor), or Math. 10A or 20A. (W or S)

87. Freshman Seminar (1)

The freshman seminar program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to 15 to 20 students, with preference given to entering freshmen. **Prerequisite:** none.

90. Undergraduate Seminar (1)

This seminar class will provide a broad review of current research topics in both electrical engineering and computer engineering. Typical subject areas are signal processing, VLSI design, electronic materials and devices,

radio astronomy, communications, and optical computing.

Prerequisite: none. (F,W,S)

UPPER-DIVISION

100. Linear Electronic Systems (4)

Linear active circuit and system design. Topics include frequency response; use of Laplace transforms; design and stability of filters using operational amplifiers. Integrated lab and lecture involves analysis, design, simulation, and testing of circuits and systems. **Prerequisites:** ECE 15, ECE 25, ECE 35, and ECE 45. **Corequisite:** ECE 102 (F,W)

101. Linear Systems Fundamentals (4)

Complex variables. Singularities and residues. Signal and system analysis in continuous and discrete time. Fourier series and transforms. Laplace and z-transforms. Linear Time Invariant Systems. Impulse response, frequency response, and transfer functions. Poles and zeros. Stability. Convolution. Sampling. Aliasing. **Prerequisite:** ECE 45 with grade of C- or better (F,W)

102. Introduction to Active Circuit Design (4)

Design and stability of linear active circuits. Nonlinear models for diodes, bipolar and field-effect transistors. Design of analog transistor circuits, biasing, and small-signal transfer functions. Design of digital transistor circuits, logic levels, noise margins, and fanout. Circuit designs simulated by computer and tested in the laboratory. **Prerequisites:** ECE 65 and 101, with grades of C- or better. (F,W)

103. Fundamentals of Devices and Materials (4)

Introduction to semiconductor materials and devices. Semiconductor crystal structure, energy bands, doping, carrier statistics, drift and diffusion. p-n junctions, metal-semiconductor junctions. Bipolar junction transistors: current flow, amplification, switching, non-ideal behavior. Metal-oxide-semiconductor structures, MOSFETs, device scaling. **Prerequisites:** Phys. 2D or Phys. 4D and 4E with grades of C- or better. (F,W)

107. Electromagnetism (4)

Electrostatics and magnetostatics; electrodynamics; Maxwell's equations; plane waves; skin effect. Electromagnetics of transmission lines: reflection and transmission at discontinuities, Smith chart, pulse propagation, dispersion. Rectangular waveguides. Dielectric and magnetic properties of materials. Electromagnetics of circuits. **Prerequisites:** Phys. 2A-D or 4A-E and ECE 45 or 53B with grades of C- or better. (W,S)

108. Digital Circuits (4)

Digital integrated electronic circuits for processing technologies. Analytical methods for static and dynamic characteristics. MOS field-effect transistors and bipolar junction transistors, circuits for logic gates, flip-flop, data paths, programmable logic arrays, memory elements. (Course material and/or program fees may apply.) **Prerequisites:** Math. 20A-B, 21C-D, 20F-E; Phys. 2A-D or 4A-E; (ECE 25, 35, 45, and 65); ECE 30 or CSE 30; ECE 102 with grades of C- or better. (W,S)

109. Engineering Probability and Statistics (4)

Axioms of probability, conditional probability, theorem of total probability, random variables, densities, expected values, characteristic functions, transformation of random variables, central limit theorem. Random number generation, engineering reliability, elements of estimation, random sampling, sampling distributions, tests for hypothesis. Students who completed Math. 180A-B, Math. 183, Math. 186, Econ. 120A, or Econ. 120AH will not receive credit for ECE 109. **Prerequisites:** Math. 20A-B-C or 21C, 20D or 21D, 20F, with grades of C- or better. (ECE 101 recommended). (W,S)

111. Advanced Digital Design Project (4)

Advanced topics in digital circuits and systems. Use of computers and design automation tools. Hazard elimination, synchronous/asynchronous FSM synthesis, synchronization and arbitration, pipelining and timing issues. Problem sets and design exercises. A large-scale design project. Simulation and/or rapid prototyping. **Prerequisite:** ECE 108 or CSE 140 with grades of C- or better. (F,W,S)

118. Computer Interfacing (4)

Interfacing computers and embedded controllers to the real world: busses, interrupts, DMA, memory mapping, concurrency, digital I/O, standards for serial and parallel communications, A/D, D/A, sensors, signal conditioning, video, and closed loop control. Students design and construct an interfacing project. (Course material and/or program fees may apply.) **Prerequisites:** ECE 30 or CSE 30 and ECE 60A-B-L or ECE 53A-B. (S)

120. Solar System Physics (4)

General introduction to planetary bodies, the overall structure of the solar system, and space plasma physics. Course emphasis will be on the solar atmosphere, how the solar wind is produced, and its interaction with both magnetized and unmagnetized planets (and comets). **Prerequisites:** Phys. 2A-C or 4A-D, Math. 20A-B, 20C or 21C with grades of C- or better. (S)

123. Antenna Systems Engineering (4)

The electromagnetic and systems engineering of radio antennas for terrestrial wireless and satellite communications. Antenna impedance, beam pattern, gain, and polarization. Dipoles, monopoles, paraboloids, phased arrays. Power and noise budgets for communication links. Atmospheric propagation and multipath. **Prerequisite:** ECE 107 with a grade of C- or better. (W or S)

134. Electronic Materials Science of Integrated Circuits (4)

Electronic materials science with emphasis on topics pertinent to microelectronics and VLSI technology. Concept of the course is to use components in integrated circuits to discuss structure, thermodynamics, reaction kinetics, and electrical properties of materials. **Prerequisites:** Phys. 2C-D with grades of C- or better. (S)

135A. Semiconductor Physics (4)

Crystal structure and quantum theory of solids; electronic band structure; review of carrier statistics, drift and diffusion, p-n junctions; nonequilibrium carriers, imrefs, traps, recombination, etc; metal-semiconductor junctions and heterojunctions. **Prerequisite:** ECE 103 with a grade of C- or better. (F)

135B. Electronic Devices (4)

Structure and operation of bipolar junction transistors, junction field-effect transistors, metal-oxide-semiconductor diodes and transistors. Analysis of dc and ac characteristics. Charge control model of dynamic behavior. **Prerequisite:** ECE 135A with a grade of C- or better. (W)

136. Fundamentals of Semiconductor Device Fabrication (4)

Crystal growth, controlled diffusion, determination of junction-depth and impurity profile, epitaxy, ion-implantation, oxidation, lithography, chemical vapor deposition, etching, process simulation and robust design for fabrication. **Prerequisite:** ECE 103 with a grade of C- or better. (S)

136L. Microelectronics Laboratory (4)

Laboratory fabrication of diodes and field effect transistors covering photolithography, oxidation, diffusion, thin film deposition, etching and evaluation of devices. (Course material and/or program fees may apply.) **Prerequisite:** ECE 103. (F,S)

138L. Microstructuring Processing Technology Laboratory (4)

A laboratory course covering the concept and practice of microstructuring science and technology in fabricating devices relevant to sensors, lab-chips and related devices. (Course material and/or program fees may apply.) **Prerequisite:** upper-division standing for science and engineering students. (W)

139. Semiconductor Device Design and Modeling (4)

Device physics of modern field effect transistors and bipolar transistors, including behavior of submicron structures. Relationship between structure and circuit models of transistors. CMOS and BiCMOS technologies. Emphasis on computer simulation of transistor operation and application in integrated circuits. **Prerequisites:** ECE 135A-B with grades of C- or better. (S)

145AL-BL-CL. Acoustics Laboratory (4-4-4)

Automated laboratory based on H-P GPIB controlled instruments. Software controlled data collection and analysis. Vibrations and waves in strings and bars of electromechanical systems and transducers. Transmissions, reflection, and scattering of sound waves in air and water. Aural and visual detection. **Prerequisite:** ECE 107 with a grade of C- or better or consent of instructor. (F,W,S)

146. Introduction to Magnetic Recording (4)

A laboratory introduction to the writing and reading of digital information in a disk drive. Basic magnetic recording measurements on state-of-art disk drives to evaluate signals, noise, erasure, and non-linearities that characterize this channel. Lectures on the recording process will allow comparison of measurements with basic voltage expressions. E/M FEM software utilized to study geometric effects on the record and play transducers. **Prerequisite:** ECE 107 with a grade of C- or better. (W)

153. Probability and Random Processes for Engineers (4)

Random processes. Stationary processes: correlation, power spectral density. Gaussian processes and linear transformation of Gaussian processes. Point processes. Random noise in linear systems. **Prerequisite:** ECE 109 with a grade of C- or better. (F,S)

154A. Communications Systems I (4)

Study of analog modulation systems including AM, SSB, DSB, VSB, FM, and PM. Performance analysis of both coherent and noncoherent receivers, including threshold effects in FM. **Prerequisite:** ECE 101 and 153 with a grade of C- or better. (F)

154B. Communications Systems II (4)

Design and performance analysis of digital modulation techniques, including probability of error results for PSK, DPSK, and FSK. Introduction to effects of intersymbol interference and fading. Detection and estimation theory, including optimal receiver design and maximum-likelihood parameter estimation. **Prerequisite:** ECE 154A with a grade of C- or better. (W)

ECE 15154C. Communications Systems III (4)

Introduction to information theory and coding, including entropy, average mutual information, channel capacity, block codes and convolutional codes. **Prerequisite:** ECE 154B with a grade of C- or better. (S)

155A. Digital Recording Systems (4)

This course will be concerned with modulation and coding techniques for digital recording channels. **Prerequisites:** ECE 109 and 153 with grades of C- or better and concurrent registration in ECE 154A required. Department stamp required. (F)

155B. Digital Recording Projects I (4)

Students registered in this course work one-on-one with a researcher on a project involving the design and evaluation of a digital recording system based upon material covered in ECE 155A. **Prerequisites:** ECE 155A with grade of C- or better. Concurrent registration in ECE 154B. Department stamp required. (W,S)

155C. Digital Recording Projects II (4)

Students registered in this course work one-on-one with a researcher on a project involving the design and evaluation of a digital recording system based upon material covered in ECE 155A. The project can be a continuation of a project initiated in Digital Recording Projects I or it can be an entirely new project. **Prerequisites:** ECE 155B with grade of C- or better. Concurrent registration in ECE 154C. Department stamp required. (W,S)

156. Sensor Networks (4)

Characteristics of chemical, biological, seismic, and other physical sensors; signal processing techniques supporting distributed detection of salient events; wireless communication and networking protocols supporting formation of robust sensor fabrics; current experience with low power, low cost sensor deployments. Undergraduate students must take a final exam; graduate students must write a term paper or complete a final project. Cross-listed with MAE 149 and SIO 238. **Prerequisite:** upper-division standing and consent of instructor, or graduate student in science and engineering. (S)

157A. Communications Systems Laboratory I (4)

Experiments in the modulation and demodulation of baseband and passband signals. Statistical characterization of signals and impairments. (Course material and/or program fees may apply.) **Prerequisite:** ECE 154A with a grade of C+ or better. (W)

157B. Communications Systems Laboratory II (4)

Advanced Projects in communication systems. Students will plan and implement design projects in the laboratory, updating progress weekly and making plan/design adjustments based upon feedback. (Course material and/or program fees may apply.) **Prerequisite:** ECE 154A with a grade of C+ or better. (S)

158A. Data Networks I (4)

Layered network architectures, data link control protocols and multiple-access systems, performance analysis. Flow control; prevention of deadlock and throughput degradation. Routing, centralized and decentralized schemes, static dynamic algorithms. Shortest path and minimum average delay algorithms. Comparisons. **Prerequisite:** ECE 109 with a grade of C- or better. ECE 159A recommended. (W)

158B. Data Networks II (4)

Layered network architectures, data link control protocols and multiple-access systems, performance analysis. Flow control; prevention of deadlock and throughput degradation. Routing, centralized and decentralized schemes, static dynamic algorithms. Shortest path and minimum average delay algorithms. Comparisons. **Prerequisite:** ECE 158A with a grade of C- or better. (S)

159A. Queuing Systems: Fundamentals (4)

Analysis of single and multiserver queuing systems; queue size and waiting times. Modeling of telephone systems, interactive computer systems and the machine repair problems. **Prerequisite:** ECE 109 with a grade of C- or better. (F)

159B. Queuing Systems: Computer Systems and Data Networks (4)

M/G/1 queuing systems. Computer systems applications: priority scheduling; time-sharing scheduling. Open and closed queuing networks; modeling and performance of interactive computer systems. Elements of computer-communication networks: stability and delay analysis; optimal design issues. **Prerequisite:** ECE 159A with a grade of C- or better. (W)

161A. Introduction to Digital Signal Processing (4)

Review of discrete-time systems and signals, Discrete-Time Fourier Transform and its properties, the Fast Fourier Transform, design of Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) filters, implementation of digital filters. (Course material and/or program fees may apply.) **Prerequisite:** ECE 101 with grades of C- or better. (F,S)

161B. Digital Signal Processing I (4)

Sampling and quantization of baseband signals; A/D and D/A conversion, quantization noise, oversampling and noise shaping. Sampling of bandpass signals, undersampling downconversion, and Hilbert transforms. Coefficient quantization, roundoff noise, limit cycles and overflow oscillations. Insensitive filter structures, lattice and wave digital filters. Systems will be designed and tested with Matlab, implemented with DSP processors and tested in the laboratory. **Prerequisite:** ECE 161A with a grade of C- or better. (W)

161C. Applications of Digital Signal Processing (4)

This course discusses several applications of DSP. Topics covered will include: speech analysis and coding; image and video compression and processing. A class project is required, algorithms simulated by MATLAB. **Prerequisite:** ECE 161A with a grade of C- or better. (S)

163. Electronic Circuits and Systems (4)

Analysis and design of analog circuits and systems. Feedback systems with applications to operational amplifier circuits. Stability, sensitivity, bandwidth, compensation. Design of active filters. Switched capacitor circuits. Phase-locked loops. Analog-to-digital and digital-to-analog conversion. (Course material and/or program fees may apply.) **Prerequisites:** ECE 101 and 102 with grades of C- or better. (S)

164. Analog Integrated Circuit Design (4)

Design of linear and non-linear analog integrated circuits including operational amplifiers, voltage regulators, drivers, power stages, oscillators, and multipliers. Use of feedback and evaluation of noise performance. Parasitic effects of integrated circuit technology. Laboratory simulation and testing of circuits. **Prerequisite:** ECE 102 with a grade of C- or better. ECE 163 recommended. (F)

165. Digital Integrated Circuit Design (4)

VLSI digital systems. Circuit characterization, performance estimation, and optimization. Circuits for alternative logic styles and clocking schemes. Subsystems include ALUs, memory, processor arrays, and PLAs. Techniques for gate arrays, standard cell, and custom design. Design and simulation using CAD tools. (Students who have taken CSE 143 may not take ECE 165 for credit.) **Prerequisite:** ECE 108 with a grade of C- or better. (S)

166. Microwave Systems and Circuits (4)

Waves, distributed circuits, and scattering matrix methods. Passive microwave elements. Impedance matching. Detection and frequency conversion using microwave diodes. Design of transistor amplifiers including noise performance. Circuits designs will be simulated by computer and tested in the laboratory. (Course material and/or program fees may apply.) **Prerequisites:** ECE 102 and 107 with grades of C- or better. (F)

171A. Linear Control System Theory (4)

Stability of continuous- and discrete-time single-input/single-output linear time-invariant control systems emphasizing frequency domain methods. Transient and steady-state behavior. Stability analysis by root locus, Bode, Nyquist, and Nichols plots. Compensator design. **Prerequisite:** ECE 60B or ECE 53A-B or MAE 140 with a grade of C- or better. (S)

171B. Linear Control System Theory (4)

Time-domain, state-variable formulation of the control problem for both discrete-time and continuous-time linear systems. State-space realizations from transfer function system description. Internal and input-output stability, controllability/observability, minimal realizations, and pole-placement by full-state feedback. **Prerequisite:** ECE 171A with a grade of C- or better. (F)

172A. Introduction to Intelligent Systems: Robotics and Machine Intelligence (4)

This course will introduce basic concepts in machine perception. Topics covered will include edge detection, segmentation, texture analysis, image registration, and compression. **Prerequisite:** ECE 101 with a grade of C- or better, ECE 109 recommended. (F)

174. Introduction to Linear and Nonlinear Optimization with Applications (4)

The linear least squares problem, including constrained and unconstrained quadratic optimization and the relationship to the geometry of linear transformations. Introduction to nonlinear optimization. Applications to signal processing, system identification, robotics, and circuit design. **Prerequisite:** Math. 20F with a grade of C- or better. (S)

175. Elements of Machine Intelligence: Pattern Recognition and Machine Learning (4)

Introduction to pattern recognition and machine learning. Decision functions. Statistical pattern classifiers. Generative vs. discriminant methods for pattern classification. Feature selection. Regression. Unsupervised learning. Clustering. Applications of machine learning. **Prerequisites:** ECE 109 and ECE 174 with grades of C- or better. (S)

181. Physical Optics and Fourier Optics (4)

Ray optics, wave optics, beam optics, Fourier optics, and electromagnetic optics. Ray transfer matrix, matrices of cascaded optics, numerical apertures of step and graded index fibers. Fresnel and Fraunhofer diffractions, interference of waves. Gaussian and Bessel beams, the ABCD law for transmissions through arbitrary optical systems. Spatial frequency, impulse response and transfer function of optical systems, Fourier transform and imaging properties of lenses, holography. Wave propagation in various (inhomogeneous, dispersive, anisotropic or nonlinear) media. (Course material and/or program fees may

apply.) **Prerequisites:** ECE 103 and 107 with grades of C– or better. (S)

182. Electromagnetic Optics, Guided-Wave, and Fiber Optics (4)

Polarization optics: crystal optics, birefringence. Guided-wave optics: modes, losses, dispersion, coupling, switching. Fiber optics: step and graded index, single and multimode operation, attenuation, dispersion, fiber optic communications. Resonator optics. (Course material and/or program fees may apply.) **Prerequisites:** ECE 103 and 107 with grades of C– or better. (F)

183. Optical Electronics (4)

Quantum electronics, interaction of light and matter in atomic systems, semiconductors. Laser amplifiers and laser systems. Photodetection. Electrooptics and acousto-optics, photonic switching. Fiber optic communication systems. Labs: semiconductor lasers, semiconductor photodetectors. (Course material and/or program fees may apply.) **Prerequisites:** ECE 103 and 107 with grades of C– or better. (W)

184. Optical Information Processing and Holography (4)

(Conjoined with ECE 241AL) Labs: optical holography, photorefractive effect, spatial filtering, computer generated holography. Students enrolled in ECE 184 will receive four units of credit; students enrolled in ECE 241AL will receive two units of credit. (Course material and/or program fees may apply.) **Prerequisite:** ECE 182 with a grade of C– or better. (W)

185. Lasers and Modulators (4)

(Conjoined with ECE 241BL) Labs: CO₂ laser, HeNe laser, electrooptic modulation, acousto-optic modulation, spatial light modulators. Students enrolled in ECE 185 will receive four units of credit; students enrolled in ECE 241BL will receive two units of credit. (Course material and/or program fees may apply.) **Prerequisite:** ECE 183 with a grade of C– or better. (S)

186L. Optical Information Systems (4)

Lab covering concepts in optical data systems including free-space communications, remote sensing and wavelength-multiplexed optical fiber transmission. (Course material and/or program fees may apply.) **Prerequisites:** ECE 181 and 182 or 183 with grades of C– or better, or consent of instructor.

187. Introduction to Biomedical Imaging and Sensing (4)

Image processing fundamentals: imaging theory, image processing, pattern recognition; digital radiography, computerized tomography, nuclear medicine imaging, nuclear magnetic resonance imaging, ultrasound imaging, microscopy imaging. **Prerequisite:** Math. 20A-B-F, 20C or 21C, 20D or 21D, Phys. 2A–D, ECE 101 (may be taken concurrently) with grades of C– or better. (F)

190. Engineering Design (4)

Students complete a project comprising at least 50 percent or more engineering design to satisfy the following features: student creativity, open-ended formulation of a problem statement/specifications, consideration of alternative solutions/realistic constraints. Written final report required. **Prerequisites:** students enrolling in this course must have completed all of the breadth courses and one depth course. The department stamp is required to enroll in ECE 190. (Specifications and enrollment forms are available in the undergraduate office.)

191. Engineering Group Design Project (4)

Groups of students work to design, build, demonstrate, and document an engineering project. All students give weekly progress reports of their tasks and contribute a section to the final project report. **Prerequisites:** completion of all of the breadth courses and one depth course. (F,W,S)

192. Senior Seminar (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small setting to explore an intellectual topic in ECE (at the upper-division level). Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. ECE 192 is no longer valid for ECE design credit, students

should take ECE 190 instead. **Prerequisites:** department stamp and/or consent of instructor.

193H. Honors Project (4–8)

An advanced reading or research project performed under the direction of an ECE faculty member. Must contain enough design to satisfy the ECE program's four-unit design requirement. Must be taken for a letter grade. May extend over two quarters with a grade assigned at completion for both quarters. **Prerequisite:** admission to the ECE departmental honors program.

195. Teaching (2 or 4)

Teaching and tutorial activities associated with courses and seminars. Not more than four units of ECE 195 may be used for satisfying graduation requirements. (P/NP grades only.) **Prerequisite:** consent of the department chair.

197. Field Study in Electrical and Computer Engineering (4, 8, 12, or 16)

Directed study and research at laboratories and observatories away from the campus. (P/NP grades only.) **Prerequisites:** consent of instructor and approval of the department.

198. Directed Group Study (2 or 4)

Topics in electrical and computer engineering whose study involves reading and discussion by a small group of students under direction of a faculty member. (P/NP grades only.) **Prerequisite:** consent of instructor.

199. Independent Study for Undergraduates (2 or 4)

Independent reading or research by special arrangement with a faculty member. (P/NP grades only.) **Prerequisite:** consent of instructor.

GRADUATE

200. Research Conference (2)

Group discussion of research activities and progress of group members. (Consent of instructor is strongly recommended.) (S/U grades only.) **Prerequisite:** graduate standing. (F,W,S)

212AN. Principles of Nanoscience and Nanotechnology (4)

Introduction to and rigorous treatment of electronic, photonic, magnetic, and mechanical properties of materials at the nanoscale. Concepts from mathematical physics, quantum mechanics, quantum optics, and electromagnetic theory will be introduced as appropriate. Students may not receive credit for both ECE 212A and ECE 212AN. **Prerequisite:** graduate standing. (F)

212BN. Nanoelectronics (4)

Quantum states and quantum transport of electrons; single-electron devices; nanoelectronic devices and system concepts; introduction to molecular and organic electronics. Students may not receive credit for both ECE 212BN and ECE 212C. **Prerequisites:** ECE 212AN; graduate standing. (S)

212CN. Nanophotonics (4)

Photonic properties of artificially engineered inhomogeneous nanoscale composite materials incorporating dielectrics, semiconductors, and/or metals. Near-field localization effects and applications. Device and component applications. Students may not receive credit for both ECE 212CN and 212B. **Prerequisites:** ECE 212BN; graduate standing. (W)

222A. Antennas and Their System Applications (4)

Antennas, waves, polarization. Friis transmission and Radar equations, dipoles, loops, slots, ground planes, traveling wave antennas, array theory, phased arrays, impedance, frequency independent antennas, microstrip antennas, cell phone antennas, system level implications such as MIMO, multi-beam and phased array systems. (Recommended prerequisite: ECE107 or an equivalent undergraduate course in electromagnetics.) **Prerequisite:** graduate standing. (F)

222B. Applied Electromagnetic Theory—Electromagnetics (4)

Graduate-level introductory course on electromagnetic theory with applications. Topics covered include Maxwell's equations, plane waves in free space and in the presence

of interfaces, polarization, fields in metallic and dielectric waveguides including surface waves; fields in metallic cavities, Green's functions, electromagnetic field radiation and scattering. **Prerequisites:** ECE 222A; graduate standing. (W)

222C. Applied Electromagnetic Theory—Computational Methods for Electromagnetics (4)

Computational techniques for numerical analysis of electromagnetic fields, including the finite difference time domain (FDTD) method, finite difference frequency domain (FDFD) method, method of moments (MOM), and finite element method (FEM). Practice in writing numerical codes. Review of commercial electromagnetic simulators. **Prerequisites:** ECE 222B; graduate standing. (S/even years)

222D. Advanced Antenna Design (4)

Review of 222A–B. Fourier transform, waveguide antennas. Mutual coupling, active impedance, Floquet modes in arrays. Microstrip antennas, surface waves. Reflector and lens analysis: taper, spillover, aperture and physical optics methods. Impedance surfaces. Advanced concepts: Sub-wavelength propagation, etc. (chosen by instructor). (Recommended prerequisite(s): ECE 222A, ECE 222B, or equivalent.) **Prerequisites:** ECE 222C; graduate standing. (S/odd years)

230A. Solid State Electronics I (4)

This course is designed to provide a general background in solid state electronic materials and devices. Course content emphasizes the fundamental and current issues of semiconductor physics related to the ECE solid state electronics sequences. (Recommended prerequisite: ECE 135A–B or equivalent.) **Prerequisite:** graduate standing. (F)

230B. Solid State Electronics II (4)

Physics of solid-state electronic devices, including p-n diodes, Schottky diodes, field-effect transistors, bipolar transistors, pnnp structures. Computer simulation of devices, scaling characteristics, high frequency performance, and circuit models. **Prerequisites:** ECE 230A; graduate standing. (W)

230C. Solid State Electronics III (4)

This course is designed to provide a treatise of semiconductor devices based on solid state phenomena. Band structures carrier scattering and recombination processes and their influence on transport properties will be emphasized. (Recommended prerequisite: ECE 230A or equivalent.) **Prerequisites:** ECE 230B; graduate standing. (S)

235. Nanometer-Scale VLSI Devices (4)

This course covers modern research topics in sub-100 nm scale, state-of-the-art silicon VLSI devices. Starting with the fundamentals of CMOS scaling to nanometer dimensions, various advanced device and circuit concepts, including RF CMOS, low power CMOS, silicon memory, silicon-on-insulator, SiGe bipolar, strained silicon MOSFET's, etc. will be taught. The physics of nearballistic transport in an ultimately scaled 10 nm MOSFET will be discussed in light of the recently developed scattering theory. **Prerequisite:** graduate standing. (F)

236A. III-V Compound Semiconductor Materials (4)

This course covers the growth, characterization, and heterojunction properties of III-V compound semiconductors and group-IV heterostructures for the subsequent courses on electronic and photonic device applications. Topics include epitaxial growth techniques, electrical properties of heterojunctions, transport and optical properties of quantum wells and superlattices. (Recommended prerequisite: ECE 230A-B-C.) **Prerequisite:** graduate standing. (W)

236B. Optical Processes in Semiconductors (4)

Absorption and emission of radiation in semiconductors. Radiative transition and nonradiative recombination. Laser, modulators, and photodetector devices will be discussed. (Recommended prerequisites: ECE 230A and ECE 230C or equivalent.) **Prerequisites:** ECE 236A; graduate standing. (S)

236C. Heterojunction Field Effect Transistors (4)

Device physics and applications of isotype and anisotype heterojunctions and quantum wells, including band-edge discontinuities, band bending and space charge layers at heterojunction interfaces, charge transport normal and parallel to such interfaces, two-dimensional electron

gas structures, modulation doping, heterojunction and insulated gate field effect transistors. **Prerequisites:** ECE 236B; graduate standing. (S, alternating years)

236D. Heterojunction Bipolar Transistors (4)
Current flow and charge storage in bipolar transistors. Use of heterojunctions to improve bipolar structures. Transient electron velocity overshoot. Simulation of device characteristics. Circuit models of HBTs. Requirements for high-speed circuit applications. Elements of bipolar process technology, with emphasis on III-V materials. **Prerequisites:** ECE 236C; graduate standing. (F, alternating years)

238A. Thermodynamics of Solids (4)
The thermodynamics and statistical mechanics of solids. Basic concepts, equilibrium properties of alloy systems, thermodynamic information from phase diagrams, surfaces and interfaces, crystalline defects. Multiple listed with Materials Science 201A. **Prerequisite:** consent of instructor. (F)

238B. Solid State Diffusion and Reaction Kinetics (4)
Thermally activated processes. Boltzmann factor, homogeneous and heterogeneous reactions, solid state diffusion, Fick's law, diffusion mechanisms, Kirkendall effects, Boltzmann-Manano analysis, high diffusivity paths. Multiple listed with Materials Science 201B. **Prerequisite:** ECE 238A. (W)

240A. Lasers and Optics (4)
Fresnel and Fraunhofer diffraction theory. Optical resonators, interferometry. Gaussian beam propagation and transformation. Laser oscillation and amplification, Q-switching and mode locking of lasers, some specific laser systems. (Recommended prerequisites: ECE 107 and ECE 182 or equivalent, introductory quantum mechanics or ECE 183.) **Prerequisite:** graduate standing. (F)

240B. Optical Information Processing (4)
Space-bandwidth product, superresolution, space-variant optical system, partial coherence, image processing with coherent and incoherent light, processing with feedback, real-time light modulators for hybrid processing, nonlinear processing. Optical computing and other applications. (Recommended prerequisite: ECE 182 or equivalent.) **Prerequisites:** ECE 240A; graduate standing. (W)

240C. Optical Modulation and Detection (4)
Propagation of waves and rays in anisotropic media. Electro-optical switching and modulation. Acousto-optical deflection and modulation. Detection theory. Heterodyne detection, incoherent and coherent detection. (Recommended prerequisites: ECE 181, ECE 183 or equivalent.) **Prerequisites:** ECE 240B; graduate standing. (S)

241A. Nonlinear Optics (4)
Second harmonic generation (color conversion), parametric amplification and oscillation, photorefractive effects and four-wave mixing, optical bistability; applications. (Recommended prerequisites: ECE 240A, C.) **Prerequisite:** graduate standing. (F)

241B. Optical Devices for Computing. (4)
Application of electro-optic, magneto-optic, acousto-optic, and electro-absorption effects to the design of photonic devices with emphasis on spatial light modulation and optical storage techniques. (Recommended prerequisites: ECE 240A-C.) **Prerequisites:** ECE 241A; graduate standing. (F)

241C. Holographic Optical Elements (4)
Fresnel, Fraunhofer, and Fourier holography. Analysis of thin and volume holograms, reflection and transmission holograms, color and polarization holograms. Optically recorded and computer-generated holography. Applications to information storage, optical interconnects, 2-D and 3-D display, pattern recognition, and image processing. (Recommended prerequisite: ECE 182 or equivalent.) **Prerequisites:** ECE 241B; graduate standing. (W)

243B. Optical Fiber Communication (4)
Optical fibers, waveguides, laser communication system., Modulation and demodulation; detection processes and communication-receivers. (Recommended prerequisites: ECE 240A-B-C or equivalent.) **Prerequisites:** ECE 243A; graduate standing. (W)

244A. Statistical Optics (4)
Introduction to statistical phenomena in optics including first order properties of light waves generated from various sources. Coherence of optical waves, high-order coherence. Partial coherence and its effects on imaging systems. Imaging in presence of randomly inhomogeneous medium. Limits in photoelectric detection of light. (Recommended prerequisites: ECE 240A-B.) **Prerequisite:** graduate standing. (F)

244B. Quantum Electronics of Femtosecond Optical Pulses (4)
Femtosecond optical pulses in linear dispersive media. Self-action of optical pulses. Parametric interaction of optical pulses. Self- and cross-phase modulation. Fast phase control, compression and shaping of optical pulses. Optical solutions. Applications of femtosecond optical pulses. (Recommended prerequisites: ECE 240A-B-C.) **Prerequisites:** 244A; graduate standing. (W)

247A. Advanced BioPhotonics (4)
Basic physics and chemistry for the interaction of photons with matter, including both biological and synthetic materials; use of photonic radiation pressure for manipulation of objects and materials; advanced optoelectronic detection systems, devices and methods, including time resolved fluorescent and chemiluminescent methods, fluorescent energy transfer (FRET) techniques, quantum dots, and near-field optical techniques; underlying mechanisms of the light sensitive biological systems, including chloroplasts for photosynthetic energy conversion and the basis of vision processes. Cross-listed with BENG 247A. **Prerequisite:** graduate standing. (F)

247B. BioElectronics (4)
Topics to be covered will include photolithographic techniques for high-density DNA microarray production, incorporation of CMOS control into electronic DNA microarrays, direct electronic detection technology used in microarrays and biosensor devices, and focus on problems related to making highly integrated devices (lab-on-a-chip, in-vivo biosensors, etc.) from heterogeneous materials and components. Cross-listed with BENG 247B. **Prerequisite:** graduate standing. (W)

247C. BioNanotechnology (4)
Topics include: nanosensors and nanodevices for both clinical diagnostics and biowarfare (bioterror) agent detection; nanostructures for drug delivery; nanoarrays and nanodevices; use of nanoanalytical devices and systems; methods and techniques for modification or functionalization of nanoparticles and nanostructures with biological molecules; nanostructural aspects of fuel cells and bio-fuel cells; potential use of DNA and other biomolecules for computing and ultra-high-density data storage. Cross-listed with BENG 247C. **Prerequisite:** graduate standing. (S)

250. Random Processes (4)
Random variables, probability distributions and densities, characteristic functions. Convergence in probability and in quadratic mean, Stochastic processes, stationarity. Processes with orthogonal and independent increments. Power spectrum and power spectral density. Stochastic integrals and derivatives. Spectral representation of wide sense stationary processes, harmonizable processes, moving average representations. (Recommended prerequisite: ECE 153.) **Prerequisite:** graduate standing.

251A. Digital Signal Processing I (4)
Discrete random signals; conventional (FFT based) spectral estimation. Coherence and transfer function estimation; model-based spectral estimation; linear prediction and AR modeling. Levinson-Durbin algorithm and lattice filters, minimum variance spectrum estimation. Cross-listed with SIO 207B. SIO 207A is intended for graduate students who have not had an undergraduate course in DSP. (Recommended prerequisites: ECE 153 in addition to either ECE 161 or 161A and SIO 207A or equivalent background.) **Prerequisite:** graduate standing. (W)

251B. Digital Signal Processing II (4)
Adaptive filter theory, estimation errors for recursive least squares and gradient algorithms, convergence and tracking analysis of LMD, RLS, and Kalman filtering algorithms, comparative performance of Weiner and adaptive filters, transversal and lattice filter implementations,

performance analysis for equalization, noise cancelling, and linear prediction applications. Cross-listed with SIO 207C. (Recommended prerequisite: ECE 251A or ECE 251AN.) **Prerequisites:** graduate standing; ECE 251A (for ECE 251B); SIO 207B (for SIO 207C). (S)

251C. Filter Banks and Wavelets (4)
Fundamentals of multirate systems (Noble Identities, Polyphase representations), maximally decimated filter banks (QMF filters for 2-channels, M-channel perfect reconstruction systems), Paraunitary perfect reconstruction filter banks, the wavelet transform (Multiresolution, discrete wavelet transform, filter banks and wavelet). (Recommended prerequisite: ECE 161 or equivalent.) **Prerequisites:** ECE 251B; graduate standing.

251D. Array Processing (4)
The coherent processing of data collected from sensors distributed in space for signal enhancement and noise rejection purposes or wavefield directionality estimation. Conventional and adaptive beamforming. Matched field processing. Sparse array design and processing techniques. Applications to acoustics, geophysics, and electromagnetics. Cross-listed with SIO 207D. (Recommended prerequisite: ECE 251A or ECE 251AN.) **Prerequisites:** graduate standing; ECE 251C (for ECE 251D); SIO 207C (for SIO 207D). (F)

252A. Speech Compression (4)
Speech signals, production and perception, compression theory, high rate compression using waveform coding (PCM, DPCM, ADPCM, . . .), DSP tools for low rate coding, LPC vocoders, sinusoidal transform coding, multi-band coding, medium rate coding using code excited linear prediction (CELP). (Recommended prerequisite: ECE 161A.) **Prerequisite:** graduate standing. (W)

252B. Speech Recognition (4)
Signal analysis methods for recognition, dynamic time warping, isolated word recognition, hidden markov models, connected word, and continuous speech recognition. **Prerequisites:** ECE 252A; graduate standing. (S)

253. Fundamentals of Digital Image Processing (4)
Image quantization and sampling, image transforms, image enhancement, image compression. (Recommended prerequisites: ECE 109, 153, ECE 161, ECE 161A.) (W)

254. Detection Theory (4)
Hypothesis testing, detection of signals in white and colored Gaussian noise; estimation of signal parameters, maximum-likelihood detection; resolution of signals; detection and estimation of stochastic signals; applications to radar, sonar, and communications. (Recommended prerequisite: ECE 153.) **Prerequisite:** graduate standing. (F)

255AN. Information Theory (4)
Introduction to basic concepts, source coding theorems, capacity, noisy-channel coding theorem. **Prerequisite:** ECE 154A-B-C or consent of instructor. (F)

255BN. Source Coding I (4)
Theory and practice of lossy source coding, vector quantization, predictive and differential encoding, universal coding, source-channel coding, asymptotic theory, speech and image applications. **Prerequisite:** ECE 250 and 259A or 259AN, or consent of instructor. (W)

256A-B. Time Series Analysis and Applications (4-4)
Stationary processes; spectral representation; linear transformation. Recursive and nonrecursive prediction and filtering; Wiener-Hopf and Kalman-Bucy filters. Series expansions and applications. Time series analysis; probability density, covariance and spectral estimation. Inference from sampled-data, sampling theorems; equally and non-equally spaced data, applications to detection and estimation problem. **Prerequisite:** ECE 153. (F;W)

257A. Multiuser Communication Systems (4)
Congestion control, convex programming and dual controller, fair end-end rate allocation, max-min fair vs. proportional fairness. Markov Chains and recurrence, Lyapunov-Foster theorem, rate stable switch scheduling, stable (back-pressure) routing versus minimum delay routing versus shortest path routing. **Prerequisite:** graduate standing. (W)

257B. Principles of Wireless Networks (4)

This course will focus on the principles, architectures, and analytical methodologies for design of multi-user wireless networks. Topics to be covered include cellular approaches, call processing, digital modulation, MIMO technology, broadband networks, ad-hoc networks, and wireless packet access. (Recommended prerequisites: ECE 159A and 154B, or equivalent.) **Prerequisites:** ECE 257A; graduate standing. (S)

257C. Stochastic Wireless Networks Models (4)

Elements of spatial point processes. Spatial stochastic models of wireless networks. Topological structure, interference, stochastic dependencies. Elements of network information theory/statistical physics models of information flow. Role of signal propagation/random fading models. Decentralized operation, route discovery, architectural principles. Energy limitations/random failures. (Recommended prerequisites: previous exposure to stochastic processes and information theory.) **Prerequisites:** ECE 257A–B. (S)

258A–B. Digital Communication (4-4)

Digital communication theory including performance of various modulation techniques, effects of inter-symbol interference, adaptive equalization, spread spectrum communication. **Prerequisites:** ECE 154A–B–C and ECE 254 or consent of instructor. (W,S)

259A. Algebraic Coding (4)

Fundamentals of block codes, introduction to groups, rings and finite fields, nonbinary codes, cyclic codes such as BCH and RS codes, decoding algorithms, applications. Students who have taken ECE 259AN may not receive credit for ECE 259A. **Prerequisite:** graduate standing.

259B. Probabilistic Coding (4)

Convolutional codes, maximum-likelihood (ML) decoding, maximum a-posteriori (MAP) decoding, parallel and serial concatenation architectures, turbo codes, repeat-accumulate (RA) codes, the turbo principle, turbo decoding, graph-based codes, message-passing decoding, low-density parity check codes, threshold analysis, applications. Students who have taken ECE 259BN may not receive credit for ECE 259B. (Recommended prerequisites: ECE 154A–B–C.) **Prerequisites:** ECE 259A or 259AN; graduate standing. (W)

259C. Advanced Topics in Coding (4)

Advanced topics in coding theory. Course contents vary by instructor. Example course topics: Coded-modulation for bandwidth-efficient data transmission; advanced algebraic and combinatorial coding theory; space-time coding for wireless communications; constrained coding for digital recording. Students who have taken ECE 259CN may not receive credit for ECE 259C. **Prerequisites:** ECE 259A–B or 259AN–BN; graduate standing. (S)

260A. VLSI Digital System Algorithms and Architectures (4)

Custom and semi-custom VLSI design from both the circuit and system designer's perspective. MOS transistor theory, circuit characterization, and performance estimation. CMOS logic design will be emphasized. Computer-aided design (CAD) tools for transistor level simulation, layout and verification will be introduced. (Recommended prerequisites: undergraduate-level semiconductor electronics and digital system design, ECE 165 or equivalent.) **Prerequisite:** graduate standing. (F)

260B. VLSI Integrated Circuits and Systems Design (4)

VLSI implementation methodology across block, circuit, and layout levels of abstraction. Circuit building blocks including embedded memory and clock distribution. Computer-aided design (synthesis, place-and-route, verification) and performance analyses, and small-group block implementation projects spanning RTL to tape-out using leading-edge EDA tools. (Recommended prerequisite: ECE 165.) **Prerequisites:** ECE 260A; graduate standing. (W)

260C. VLSI Advanced Topics (4)

Advanced topics in design practices and methodologies for modern system-on-chip design. Different design alternatives are introduced and analyzed. Advanced design tools are used to design a hardware-software system. Class discussion, participation, and presentations of projects and

special topics assignments are emphasized. **Prerequisites:** ECE 260B; graduate standing. (S)

264A. CMOS Analog Integrated Circuits and Systems I (4)

Frequency response of the basic CMOS gain stage and current mirror configurations. Advanced feedback and stability analysis; compensation techniques. High-Performance CMOS operational amplifier topologies. Analysis of noise and distortion. (Recommended prerequisites: ECE 164 and ECE 153, or equivalent courses.) **Prerequisite:** graduate standing. (W)

264B. CMOS Analog Integrated Circuits and Systems II (4)

Non-ideal effects and their mitigation in high-performance operational amplifiers. Switched-capacitor circuit techniques: CMOS circuit topologies, analysis and mitigation of non-ideal effects, and filter synthesis. Overview of CMOS samplers, data converters, and PLLs. (Recommended prerequisite: ECE 251A or ECE 251AN.) **Prerequisites:** ECE 264A; graduate standing. (S)

264C. CMOS Analog Integrated Circuits and Systems III (4)

Integrated CMOS analog/digital systems: Analog to digital and digital to analog converters, Nyquist versus oversampling, linearity, jitter, randomization, calibration, speed versus resolution, pipeline, folding, interpolation, averaging. (Recommended prerequisites: ECE 163 and 164.) **Prerequisites:** ECE 264B; graduate standing. (W)

264D. CMOS Analog Integrated Circuits and Systems IV (4)

PLL: Phase noise effect, VCO, phase detector, charge pump, integer/fractional-N frequency synthesizer, clock and data recovery, decision feedback. Filter: Continuous-time filter, I-Q complex filter, raised-cosine, Gaussian, delay, zero equalizers. (Recommended prerequisites: ECE 163 and 164.) **Prerequisites:** ECE 264C; graduate standing

265A. Communication Circuit Design I (4)

Introduction to noise and linearity concepts. System budgeting for optimum dynamic range. Frequency plan tradeoffs. Linearity analysis techniques. Down-conversion and up-conversion techniques. Modulation and de-modulation. Microwave and RF system design communications. Current research topics in the field. **Prerequisite:** ECE 166 or consent of instructor. (W)

265B. Communication Circuit Design II (4)

Radio frequency integrated circuits: low-noise amplifiers, AGCs, mixers, filters, voltage-controlled oscillators. BJT and CMOS technologies for radio frequency and microwave applications. Device modeling for radio frequency applications. Design and device tradeoffs of linearity, noise, power dissipation, and dynamic range. Current research topics in the field. **Prerequisites:** ECE 166 and ECE 265A or consent of instructor. (S)

265C. Power Amplifiers for Wireless Communications (4)

Design of power amplifiers for mobile terminals and base-stations, with emphasis on high linearity and efficiency. After a discussion of classical designs (Class A, AB, B, C, D, E, F, and S), linearization procedures are presented and composite architectures (envelope tracking, EER, and Doherty) are covered. Familiarity with basic microwave design and communication system architecture is assumed. (Recommended prerequisite: ECE 166.) **Prerequisites:** ECE 265A and B; consent of instructor. (F)

267. Wireless Embedded and Networked Systems (4)

Study of wireless networked systems from a system design perspective, covering the protocol stack from physical to network layer with a focus on energy. Topics include digital communications, networking and programming, and a basic knowledge of these is recommended. **Prerequisite:** graduate standing. (F)

270A–B–C. Neurocomputing (4-4-4)

Neurocomputing is the study of biological information processing from an artificial intelligence engineering perspective. This three-quarter sequence covers neural network structures for arbitrary object (perceptual, motor, thought process, abstraction, etc.) representation, learning of pairwise object attribute descriptor antecedent support

relationships, the general mechanism of thought, and situationally responsive generation of movements and thoughts. Experimental homework assignments strongly reinforce the fundamental concepts and provide experience with myriad associated technical issues. **Prerequisite:** graduate standing, an understanding of mathematics through basic linear algebra and probability, or consent of instructor. (F,W,S)

271A. Statistical Learning I (4)

Bayesian decision theory; parameter estimation; maximum likelihood; the bias-variance trade-off; Bayesian estimation; the predictive distribution; conjugate and noninformative priors; dimensionality and dimensionality reduction; principal component analysis; Fisher's linear discriminant analysis; density estimation; parametric vs. kernel-based methods; expectation-maximization; applications. (Recommended Prerequisite: ECE 109.) **Prerequisite:** graduate standing.

271B. Statistical Learning II (4)

Linear discriminants; the Perceptron; the margin and large margin classifiers; learning theory; empirical vs. structural risk minimization; the VC dimension; kernel functions; reproducing kernel Hilbert spaces; regularization theory; Lagrangian optimization; duality theory; the support vector machine; boosting; Gaussian processes; applications. (Recommended prerequisite: ECE 109.) **Prerequisites:** ECE 271A; graduate standing.

272A. Stochastic Processes in Dynamic Systems (4)

Stochastic processes, focusing on detailed discussion of discrete-time Markov chains. Demonstrate the relationship to dynamic systems under uncertainty, introducing ergodicity, diffusion, estimation, and detection. Extend to continuous-time Markov chains and optimization of stochastic dynamic systems. (Recommended prerequisite: ECE 250.) **Prerequisite:** graduate standing.

273. Convex Optimization and Applications (4)

This course covers some convex optimization theory and algorithms. It will mainly focus on recognizing and formulating convex problems, duality, and applications in a variety of fields (system design, pattern recognition, combinatorial optimization, financial engineering, etc.). (Recommended prerequisite: basic linear algebra.) (F)

275A. Parameter Estimation I (4)

Linear least Squares (batch, recursive, total, sparse, pseudo-inverse, QR, SVD); Statistical figures of merit (bias, consistency, Cramer-Rao lower-bound, efficiency); Maximum likelihood estimation (MLE); Sufficient statistics; Algorithms for computing the MLE including the Expectation Maximization (EM) algorithm. The problem of missing information; the problem of outliers. (Recommended prerequisites: ECE 109 and ECE 153.) **Prerequisite:** graduate standing.

275B. Parameter Estimation II (4)

The Bayesian statistical framework; Parameter and state estimation of Hidden Markov Models, including Kalman Filtering and the Viterbi and Baum-Welsh algorithms. A solid foundation is provided for follow-up courses in Bayesian machine learning theory. (Recommended prerequisite: ECE 153.) **Prerequisites:** ECE 275A; graduate standing.

280. Special Topics in Electronic Devices and Materials/Applied Physics (4)

A course to be given at the discretion of the faculty at which topics of interest in electronic devices and materials or applied physics will be presented by visiting or resident faculty members. Subject matter will not be repeated, may be taken for credit more than once. **Prerequisite:** graduate standing.

281. Special Topics in Nanoscience/Nanotechnology (4)

A course to be given at the discretion of the faculty at which topics of interest in nanoscience and nanotechnology will be presented by visiting or resident faculty members. Subject matter will not be repeated, may be taken for credit more than once. **Prerequisite:** graduate standing.

282. Special Topics in Photonics/Applied Optics (4)

A course to be given at the discretion of the faculty at which topics of interest in photonics, optoelectronic materials, devices, systems, and applications will be presented by

visiting or resident faculty members. Subject matter will not be repeated, may be taken for credit more than once. **Prerequisite:** graduate standing.

283. Special Topics in Electronic Circuits and Systems (4)

A course to be given at the discretion of the faculty at which topics of interest in electronic circuits and systems will be presented by visiting or resident faculty members. Subject matter will not be repeated, may be taken for credit more than once. **Prerequisite:** graduate standing.

284. Special Topics in Computer Engineering (4)

A course to be given at the discretion of the faculty at which topics of interest in computer engineering will be presented by visiting or resident faculty members. Subject matter will not be repeated may be taken for credit more than once. **Prerequisite:** graduate standing.

285. Special Topics in Signal and Image Processing/Robotics and Control Systems (4)

A course to be given at the discretion of the faculty at which topics of interest in signal and image processing or robotics and control systems will be presented by visiting or resident faculty members. Subject matter will not be repeated, may be taken for credit more than once. **Prerequisite:** graduate standing.

286. State-of-the-Art Topics in Computational Statistics and Machine Learning (4)

Class discusses both fundamental and state-of-the-art research topics in computational statistics and machine learning. Topics vary based upon current research, and have included: non-parametric Bayesian models; sampling methods for inference in graphical models; Markov Chain Monte Carlo (MCMC) methods. **Prerequisite:** graduate standing.

287. Special Topics in Communication Theory and Systems (4)

A course to be given at the discretion of the faculty at which topics of interest in information science will be presented by visiting or resident faculty members. It will not be repeated so it may be taken for credit more than once. **Prerequisite:** graduate standing.

290. Graduate Seminar on Current ECE Research (2)

Weekly discussion of current research conducted in the Department of Electrical and Computer Engineering by the faculty members involved in the research projects. (S/U grade only.) **Prerequisite:** graduate standing.

291. Industry Sponsored Engineering Design Project (4)

Design, build, and demonstrate an engineering project by groups. All students give weekly progress reports on tasks and write final report, with individual exams and presentations. Projects/sponsorships originate from the needs of local industry. May count toward M.Eng. degree. (Recommended prerequisites: ECE 230 or ECE 240 or ECE 251 or ECE 253 or ECE 258 or equivalent.) **Prerequisite:** graduate standing.

292. Graduate Seminar in Electronic Circuits and Systems (2)

Research topics in electronic circuits and systems. **Prerequisite:** graduate standing.

293. Graduate Seminar in Communication Theory and Systems (2)

Weekly discussion of current research literature.

294. Graduate Seminar in Electronic Devices and Materials/Applied Physics (2)

Research topics in electronic devices and materials or applied solid state physics and quantum electronics.

295R. Graduate Seminar in Signal and Image Processing/Robotics and Control Systems (2)

Weekly discussion of research topics in signal and image processing of robotics and control systems. **Prerequisite:** graduate standing.

296. Graduate Seminar in Photonics/ Applied Optics (2)

Research topics of current interest in photonics and applied optics, including imaging, photonic communications, sens-

ing, energy and signal processing. **Prerequisite:** graduate standing.

298. Independent Study (1-16)

Open to properly qualified graduate students who wish to pursue a problem through advanced study under the direction of a member of the staff. (S/U grades only.) **Prerequisite:** consent of instructor.

299. Research (1-16)

(S/U grade only.)

501. Teaching (1-4)

Teaching and tutorial activities associated with courses and seminars. Number of units for credit depends on number of hours devoted to class or section assistance. (S/U grade only.) **Prerequisite:** consent of department chair.

Mechanical and Aerospace Engineering (MAE)

PROFESSORS

F. Beg, Ph.D.
T. Bewley, Ph.D.
R. Bitmead, Ph.D., *Cymer Corporation Endowed Chair*
R. J. Cattolica, Ph.D.
C. H. Gibson, Ph.D.
S. Gille, Ph.D.
J. D. Goddard, Ph.D.
A. Hoger, Ph.D.
S. Jin, Ph.D., *Director, Materials Science Program, Kazuo Iwama Endowed Chair*
J. Kosmatka, Ph.D., *Calloway Golf Endowed Chair*
S. Krasheninnikov, Ph.D.
M. Krstic, Ph.D.
R. Lal, Ph.D.
J. Lasheras, Ph.D.
P. F. Linden, Ph.D., *Blasker Chair in Environmental Engineering*
S. G. Llewellyn Smith, Ph.D.
X. Markenscoff, Ph.D.
W. M. McEneaney, Ph.D.
J. M. McKittrick, Ph.D.
M. A. Meyers, Ph.D.
H. Murakami, Ph.D.
S. Nemat-Nasser, Ph.D., *Director, Center of Excellence for Advanced Materials*
V. Nesterenko, Ph.D.
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K. Seshadri, Ph.D.
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G. Tynan, Ph.D.
F. A. Williams, Ph.D.

PROFESSORS EMERITI

H. Bradner, Ph.D.
R. W. Conn, Ph.D.
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S.-C. Lin, Ph.D.
S. Middleman, Ph.D.
John W. Miles, Ph.D.
D. R. Miller, Ph.D.
D. B. Olfe, Ph.D.
S. S. Penner, Ph.D.
C. Pozrikidis, Ph.D.
A. M. Schneider, Sc.D.
R.E. Skelton, Ph.D.
H. W. Sorenson, Ph.D.

ASSOCIATE PROFESSORS

P. Bandaru, Ph.D.
J. Cortes, Ph.D.
R. deCallafon, Ph.D.

E. Lauga, Ph.D.
S. Martinez Diaz, Ph.D.

ASSISTANT PROFESSORS

J.C. del Alamo, Ph.D.
R. Chen, Ph.D.
J. Kleissl, Ph.D.
A. Marsden, Ph.D.

AFFILIATED FACULTY

M. Anderson, Ph.D., *Lecturer with Potential Security of Employment*,
L. Armi, Ph.D., *Professor, SIO*
M. Baskes, *Adjunct Professor, MAE*
M. Buckingham, Ph.D., *Professor, SIO*
N. Delson, Ph.D., *Lecturer with Security of Employment*
A. Groisman, Ph.D., *Assistant Professor, Physics*
G. Hegemier, Ph.D., *Professor, Structural Engineering*
V. Lubarda, Ph.D., *Adjunct Professor, MAE*
W. K. Melville, Ph.D., *Professor, SIO*
F. Najmabadi, *Professor, Electrical and Computer Engineering*
M. De Oliveira, Ph.D., *Associate Adjunct Professor, MAE*
R. Pinkel, Ph.D., *Professor, SIO*
J. Rottman, Ph.D., *Adjunct Professor, MAE*
J. Whitesell, Ph.D., *Chemistry/Biochemistry*
K. Winters, Ph.D., *Adjunct Professor, MAE*

PROFESSIONAL RESEARCH STAFF

A. Amirkhizi, Ph.D., *Assistant Research Scientist, MAE*
G. Antar, Ph.D., *Assistant Research Scientist, CER/MAE*
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P.F. Teran Arce, Ph.D., *Assistant Project Scientist, MAE*
M. Tillack, Ph.D., *Research Scientist, MAE/CER*

STUDENT AFFAIRS: 180 Engineering Building II,
Warren College
<http://maeweb.ucsd.edu>

DEPARTMENT FOCUS

The instructional and research programs are grouped into two major areas: mechanical engineering and aerospace engineering. Both the undergraduate and graduate programs are characterized by strong interdisciplinary relationships with the Departments of Physics, Mathematics, Bioengineering, Chemistry, Electrical and Computer Engineering, Computer Science and Engineering, Structural Engineering, the Materials Science Program, and associated campus institutes such as the UCSD Center for Energy Research, the Institute for Nonlinear Science, Institute of Geophysics and Planetary Physics, Institute for Pure and

Applied Physical Sciences, Institute for Biomedical Engineering, Center for Magnetic Recording Research, Center of Excellence for Advanced Materials, California Space Institute, and Scripps Institution of Oceanography.

This broad mission is supported by the following specific educational objectives:

- To provide our students with a strong technical education that will enable them to have successful careers as engineers, technology leaders and innovators.
- To prepare our students for rapid technological change with the core knowledge central to assuring that they are able to further their knowledge across a range of disciplines throughout their professional careers and pursue advanced education.
- To prepare our students to communicate effectively and to deal knowledgeably and ethically with the impact of technology in our society and on global issues.

THE UNDERGRADUATE PROGRAM

DEGREE AND PROGRAM OPTIONS

The Department of Mechanical and Aerospace Engineering (MAE) offers traditional ABET accredited engineering programs leading to the B.S. degree in mechanical engineering, and aerospace engineering. MAE also offers traditional nonaccredited engineering programs leading to the B.S. degree in engineering science and environmental engineering. The B.S. programs require a minimum of 196 units.

All MAE programs of study have strong components in laboratory experimentation, numerical computation, and engineering design. Design is emphasized throughout the curricula by open-ended homework problems, by laboratory and computer courses that include student-initiated projects, and finally by senior design project courses which often involve teams of students working to solve engineering design problems brought in from industry. The MAE programs are designed to prepare students receiving bachelor's degrees for professional careers or for graduate education in their area of specialization. In addition, the programs can also be taken by students who intend to use their undergraduate engineering education as preparation for postgraduate professional training in nontechnical fields such as business administration, law, or medicine.

Mechanical engineering is a traditional four-year curriculum in mechanics, vibrations, thermodynamics, fluid flow, heat transfer, materials, control theory, and mechanical design. Graduates find employment in the mechanical and aerospace industries as well as electro-mechanical or biomedical industries. Mechanical engineers are involved in material processing, manufacturing, assembling, and maintenance of life-line facilities such as power plants.

Mechanical design includes conceptual design, drafting with 3D CAD programs, stress, dynamics, heat transfer or fluid dynamics analyses, and the optimization of the total system for superior performance and customer satisfaction. In manufacturing, the objective is to enhance efficiency and economy

by utilizing numerical control (NC) of machine tools, mechatronics, micro-machining, and rapid prototyping. Currently, engineers have available computers, process models, and sensors to improve the quality and productivity of the manufacturing lines. In preparation for this modern era, the mechanical engineering curriculum emphasizes CAD courses, computer courses, laboratory courses, and design courses in addition to providing a strong background in basic science.

Aerospace engineering is a four-year curriculum that prepares students for a career in the aeronautical and astronautical industries, related technology industries, or for graduate school.

The curriculum was developed to emphasize engineering fundamentals, aerospace topics, and the integration of these fundamentals and topics into the design of an aerospace system. Courses in engineering fundamentals include materials, solid and fluid mechanics, thermodynamics, computer modeling, computer-aided-design, numerical analysis, and controls. Courses covering the aerospace engineering topics include aerodynamics, aerospace structures, flight mechanics, dynamics and control of aerospace vehicles, and propulsion. Students complete the program by taking a two-quarter capstone design course that integrates all of their aerospace education into the design, development, and testing of an aeronautical or astronautical vehicle or component. Throughout the program, students take laboratory courses that expose them to modern testing techniques and enhance their understanding of complex engineering topics. The program's main objectives are to provide students with a strong foundation in engineering fundamentals; in-depth knowledge of key topics in aerospace engineering including aerodynamics, propulsion, flight mechanics, orbital mechanics, aerospace structures and materials, and design and control of aerospace systems; and an awareness of the value of life-long learning.

The **engineering science** program resembles the Mechanical Engineering Program, except the amount of mechanical design is reduced and control theory is not required. In addition to core courses in dynamics, vibrations, structures, fluid mechanics, thermodynamics, heat transfer, and laboratory experimentation, a large number of technical electives are scheduled. This aspect of the curriculum allows flexibility by permitting specialization and in-depth study in one area of the engineering sciences or through a sequence of courses on various emerging technologies. Students must consult their advisors to develop a sound course of study to fulfill the technical elective of this program. Although a sequence in non-sciences may be permitted, the faculty advisors may insist on a substantial number of MAE or other science courses as technical electives.

Environmental engineering is a four-year curriculum with fundamental engineering courses in mechanics, thermodynamics, physics, chemistry, and mathematics. In the third and fourth year, an environmental engineering sequence is offered, as well as further specialization in fluid mechanics, and a wide choice of technical electives, both from within MAE and other departments. The environmental engineering major focuses on conveying an understanding and awareness of the fundamental

processes associated with human industrial activity that have environmental implications, and on equipping the next generation of engineers with the tools to develop technologies that enable sustainable economic growth.

OTHER UNDERGRADUATE PROGRAMS OF STUDY IN MAE

The **engineering mechanics minor** involves successful completion of seven MAE courses, including at least five upper-division courses open to students who meet the course prerequisites: one must be MAE 130A; one must be 101A (or CENG 101A) or 131A (or both may be taken); and the balance must be selected from MAE 3, 9, 20, 110A, 130B, 160, and CENG 102. This set of courses provides a good introduction to engineering analysis and would be useful to non-engineering majors desiring a background that could be used in professional communication with engineers.

DOUBLE MAJORS AND MINORS

It is the policy of the UC San Diego Academic Senate not to approve double majors within engineering departments.

PROGRAM ACCREDITATION

The B.S. Programs in mechanical engineering and aerospace engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET/EAC).

MAJOR REQUIREMENTS

Specific course requirements for each major program are outlined in tables in this section of the catalog. In addition to the required technical courses specifically indicated, a suggested scheduling of humanities and social science courses (HSS) are distributed in the curricula for students to use to meet college general-education requirements. To graduate, students must maintain an overall GPA of at least 2.0, and the department requires at least a C- grade in each course required for the major.

Deviations from these programs of study must be approved by the Undergraduate Affairs Committee prior to taking alternative courses. In addition, technical elective (TE) course selections must have departmental approval prior to taking the courses. In the accredited programs, TE courses are restricted to meet ABET standards. Courses such as MAE 195, 197, and 198 are not allowed as a technical elective in meeting the upper-division major requirements. MAE 199 can be used as a technical elective only under restrictive conditions. Policy regarding these conditions may be obtained from the department's Student Affairs Office.

Students with different academic preparation may vary the scheduling of lower-division courses such as math, physics and chemistry, but should consult the department. Deviations in scheduling MAE upper-division courses are discouraged and require prior approval. Most lower-division courses are offered more than once each year to permit students some flexibility in their program scheduling. However, many MAE upper-division courses are taught only once per year, and courses are scheduled to be consistent with the curricula as

shown in the tables. When possible, MAE does offer large enrollment courses more than once each year. A tentative schedule of course offerings is available from the department each spring for the following academic year.

GENERAL-EDUCATION/COLLEGE REQUIREMENTS

For graduation each student must satisfy general-education course requirements determined by the student's college as well as the major requirements determined by the department. The six colleges at UCSD require widely different general-education courses, and the number of such courses differs from one college to another. Each student should choose his or her college carefully, considering the special nature of the college and the breadth of general education.

Each MAE program allows for humanities and social science (HSS) courses so that students can fulfill their college requirements. In the ABET accredited programs, students must develop a program that includes a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. It should be noted, however, that some colleges require more than the nine or ten HSS courses indicated in the curriculum tables. Accordingly, students in these colleges could take longer to graduate than the indicated four-year schedule. Students must consult with their college to determine which HSS courses to take.

PROFESSIONAL LICENSING

After graduation, all students are encouraged to take the Fundamentals of Engineering (FE) examination as the first step in becoming licensed as a professional engineer (PE). Students graduating from an accredited program can take the PE examination after FE certification and two years of work experience; students graduating from a non-accredited program can take the PE examination after FE certification and four years of work experience.

For further information please contact your local Board of Registration for Professional Engineers and Land Surveyors.

MECHANICAL ENGINEERING

The Mechanical Engineering Program has a traditional ABET accredited four-year curriculum involving mechanics, vibrations, thermodynamics, fluid flow, heat transfer, materials, control theory, and mechanical design. Graduates of this program are expected to have the following skills, knowledge, and abilities:

1. An ability to apply knowledge of mathematics including multivariable calculus, differential equations, linear algebra, science, and engineering to mechanical engineering problems
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs
4. An ability to function on multi-disciplinary teams

5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global and societal context
9. A recognition of the need for, and an ability to engage in lifelong learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
12. A familiarity with chemistry and calculus-based physics
13. A familiarity with statistics
14. Ability to work professionally in mechanical system areas including the design and realization of such areas
15. Ability to work professionally in thermal systems areas including design and realization of such systems

**Recommended Course Sequence—
Mechanical Engineering**

FALL	WINTER	SPRING
Freshman Year		
Math. 20A	Math. 20B	Math. 20C
MAE 9	Phys. 2A	Phys. 2B & 2BL
Chem. 6A	Chem. 6B	MAE 3
HSS	HSS	HSS
Sophomore Year		
Math. 20D	Math. 20F	Math. 20E
Phys. 2C & 2CL	HSS	MAE 130B or SE 101B
MAE 20	MAE 130A or SE 101A	MAE 131A
HSS	HSS	HSS
Junior Year		
MAE 110A	MAE 101A	MAE 101B
MAE 105	MAE 143A	MAE 143B
MAE 140	MAE 130C	MAE 170
MAE 107	MAE 160 or MAE 131B	HSS
Senior Year		
MAE 101C	MAE 171A	MAE 171B
MAE 156A	MAE 156B	TE
MAE 150	TE	TE
TE	HSS	HSS

Chem. 6AH–6BH sequence may be taken in place of Chem. 6A–B.

- In fulfilling the humanities and social science requirements (HSS), students must take a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. Ten HSS courses are listed here; individual college requirements may be higher.
- Technical electives (TE) must be an upper-division or graduate course in the engineering sciences, natural sciences or mathematics.

See the MAE Student Affairs Office for a complete list of technical electives.

ENGINEERING SCIENCE

The **engineering science** program resembles the mechanical engineering program, except that the course load of mechanical design is reduced, and control theory is not required. In addition to core courses in dynamics, vibrations structures, fluid mechanics, thermodynamics, heat transfer, and laboratory experimentation, a large number of technical electives are scheduled. This aspect of the curriculum allows flexibility, permitting specialization and in-depth study in one area of the engineering sciences or development of a sequence of courses emerging from the current research interests of the faculty of MAE and/or other departments, e.g., sequences in the earth sciences, transportation, or energy-related studies. Students intending to pursue postgraduate professional careers in non-technical fields such as business administration, law, or medicine may develop an appropriate sequence of courses. Although a sequence in the non-sciences may be permitted, the faculty advisor may insist on a substantial number of MAE or other science courses as technical electives. Students must consult their advisors to develop a balanced course of study to fulfill the technical elective requirements of this program. This curriculum also allows the highest number of humanities and social science courses (HSS) to meet college general-education requirements.

**Recommended Course Sequence—
Engineering Science**

FALL	WINTER	SPRING
Freshman Year		
Math. 20A	Math. 20B	Math. 20C
MAE 9	Phys. 2A	Phys. 2B & 2BL
Chem. 6A	Chem. 6B	MAE 3
HSS	HSS	HSS
Sophomore Year		
Math. 20D	Math. 20F	Math. 20E
Phys. 2C & 2CL	HSS	MAE 130B or SE 101B
MAE 20	MAE 130A or SE 101A	MAE 131A
HSS	HSS	HSS
Junior Year		
MAE 110A	MAE 101A	MAE 101B
MAE 105	MAE 160 or MAE 131B	MAE 170
MAE 140	MAE 130C	HSS
MAE 107	HSS	HSS
Senior Year		
MAE 101C	MAE 171A	MAE 171B
MAE 150	TE	TE
TE	TE	TE
HSS	HSS	HSS

Chem. 6AH–6BH sequence may be taken in place of Chem. 6A–B.

- Humanities and social science (HSS) courses should be selected to meet general-education requirements of the colleges. Individual college requirements may be higher or lower than what is listed here.
- Four technical elective (TE) courses must be upper-division or graduate courses in the engineering sciences, natural sciences or

mathematics selected with prior approval of the department. A sequence of non-science courses may also be selected with prior approval (see program description).

See the Student Affairs Office for a complete list of technical electives.

AEROSPACE ENGINEERING

Aerospace engineering is an ABET-accredited four-year curriculum that begins with fundamental engineering courses in mechanics, thermodynamics, materials, solid mechanics, fluid mechanics, and heat transfer. Additional courses are required in aerospace structures, aerodynamics, flight mechanics, propulsion, controls, and aerospace design. Graduates of this program enter graduate school or enter the aerospace industry to develop aircraft and spacecraft, but also they find employment in other areas that use similar technologies, such as mechanical and energy-related fields. Examples include automobile, naval, and sporting equipment manufacturing.

Graduates of this program are expected to have the following skills, knowledge, and abilities:

1. an ability to apply knowledge of mathematics, science, and engineering
2. an ability to design and conduct experiments, as well as to analyze and interpret data
3. an ability to design a system, component, or process to meet desired needs
4. an ability to function on multidisciplinary teams
5. an ability to identify, formulate, and solve engineering problems
6. an understanding of professional and ethical responsibility.
7. an ability to communicate effectively with written, oral, and visual means
8. the broad education necessary to understand the impact of engineering solutions in a global and societal context
9. a recognition of the need for, and an ability to engage in lifelong learning
10. a knowledge of contemporary issues
11. an ability to use modern engineering techniques, skills, and computing tools necessary for engineering practice
12. knowledge of key topics in aeronautical engineering including aerodynamics, aerospace materials, structures, propulsion, flight mechanics, and stability and control
13. knowledge of topics in astronautical engineering including attitude determination and control, space structures, orbital mechanics, and rocket propulsion
14. an ability to integrate knowledge of the fundamental topics in the design of an aerospace system

Recommended Course Sequence— Aerospace Engineering

FALL	WINTER	SPRING
Freshman Year		
Math. 20A	Math. 20B	Math. 20C
MAE 2	Phys. 2A	Phys. 2B & 2BL
Chem. 6A	HSS	SE 2
HSS	HSS	HSS

Sophomore Year

Math. 20D	Math. 20F	Math. 20E
Phys. 2C & 2CL	MAE 9 or 10	MAE 131A
MAE 3	MAE 130A or SE 101A	MAE 130B or SE 101B
HSS	HSS	HSS

Junior Year

MAE 105	MAE 101A	MAE 101B
MAE 110A	MAE 130C	MAE 143B
MAE 140	MAE 143A	MAE 170
MAE 107	HSS	SE 160A

Senior Year

MAE 101C	MAE 155A	MAE 155B
MAE 104	MAE 142	HSS
MAE 150	MAE 175A	HSS
SE 160B	MAE 113	TE

Chem. 6AH may be taken in place of Chem. 6A.

- In fulfilling the humanities and social science (HSS) requirements, students must take a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. Ten HSS courses are listed here; individual college requirements may be higher.
- Technical elective (TE) course must be upper-division or graduate courses in engineering sciences, natural sciences, or mathematics selected with a prior approval of the department. See Student Affairs in MAE for a current list of approved TEs.

ENVIRONMENTAL ENGINEERING

The **environmental engineering** is a four-year curriculum with fundamental engineering courses in mechanics, thermodynamics, physics, chemistry, and math. In the third and fourth year, an environmental engineering sequence is offered, as well as further specialization in fluid mechanics, and a wide choice of technical elective (TE) courses, both from within MAE and in other departments.

The environmental engineering curriculum is currently undergoing review for future ABET accreditation. Please see MAE Student Affairs for more information.

FALL	WINTER	SPRING
Freshman Year		
Math. 20A	Math. 20B	Math. 20C
MAE 9 or 10	Phys. 2A	Phys. 2B & 2BL
Chem. 6A	Chem. 6B	Chem. 6C/6BL
HSS	HSS	HSS

Sophomore Year

Math. 20D	Math. 20F	Math. 20E
Phys. 2C & 2CL	CENG 100	CENG 102
Chem. 131	Chem. 132	Chem. 140A
HSS	HSS	HSS

Junior Year

MAE 105	MAE 101A	MAE 101B
CENG 120	TE	MAE 170
MAE 107	TE	MAE 124
HSS	HSS	HSS

Senior Year

MAE 101C	MAE 126A	MAE 126B
MAE 125A	MAE 125B	TE
TE	TE	TE
HSS	HSS	HSS

Humanities and social science (HSS) courses should be selected to meet general-education requirements of the colleges. Individual college requirements may be higher or lower than what is listed here.

- Technical electives (6): At least four technical electives must be upper-division, and two or more of them must be from the MAE department.
- See MAE Student Affairs Office for a complete list of TE's.

POLICIES AND PROCEDURES FOR MAE UNDERGRADUATE STUDENTS

ADMISSION TO THE MAJOR

The B.S. degrees in mechanical and aerospace engineering are impacted. Because of heavy student interest in these two majors, and the limited resources available to accommodate this demand, maintenance of a high-quality program makes it necessary to limit enrollments.

Environmental engineering and engineering science continue to be open majors.

FRESHMAN STUDENTS

Freshman students who have excelled in high school and have declared mechanical, aerospace, environment engineering, or engineering sciences on their UCSD application are eligible for direct admission into those majors. Enrollment is limited in the mechanical and aerospace majors due to its heavy demand and limited resources. Students will be notified by the UC San Diego Office of Admissions whether they have been admitted into their chosen major, based on admissions criteria and their ranking in the applicant pool.

TRANSFER STUDENTS

Applicants seeking admission as transfer students will be considered for admission into the mechanical, aerospace, environmental engineering, and engineering science majors. Enrollment is limited in the mechanical and aerospace majors due to its heavy demand and limited resources. Impacted status will be in effect in 2011. Transfer students who have excelled in their community college courses, especially courses in math., physics, and chemistry, will have the strongest advantage.

Students who have taken equivalent courses elsewhere may request to have transfer credit apply toward the department's major requirements. To receive transfer credit, complete a MAE Student Petition form and submit it to MAE Student Affairs. For mathematics, chemistry and physics, transfer equivalencies are determined by the respective departments. An Undergraduate Student Petition must be submitted to each department from which you are requesting transfer credit.

It is **strongly recommended** that transfers complete the following preparation for all engineering majors.

- Calculus I—for Science and Engineering (Math. 20A)
- Calculus II—for Science and Engineering (Math. 20B)
- Calculus and Analytic Geometry (Math. 20C)
- Differential Equations (Math. 20D)
- Linear Algebra (Math. 20F)
- Complete calculus-based physics series with lab experience (Physics 2A, B, and C)
- Chemistry 6A
- Highest level of introductory computer programming language course offerings at the community college

CONTINUING STUDENTS CHANGING MAJORS

Continuing students who wish to change into an impacted major (mechanical engineering and aerospace engineering) must submit an application to the department. Applications will be accepted twice a year. Please see the department Web site maeweb.ucsd.edu for details.

Continuing students who wish to be considered must submit an application to the MAE department on or before the target dates and must meet the following minimum requirements:

- completed at least one year/three quarters in residence at UCSD
- complete all lower-division requirements for the requested major

Applications will be ranked by their UCSD GPA on the date of the application. Students will be allowed into the major based on a ranking system, up to a maximum number.

Students who apply later than the final day of their sixth academic quarter at UCSD will not be considered.

ACADEMIC ADVISING

Upon admission to the major, students should consult the catalog or MAE Web site (<http://maeweb.ucsd.edu>) for their program of study or their undergraduate advisor if they have questions. The program plan may be revised in subsequent years, but revisions involving curricular requirements require approval by the undergraduate advisor or the Undergraduate Affairs Committee. Because some course and/or curricular changes may be made every year, it is imperative that students consult with the department's undergraduate advisor on an annual basis.

Some MAE courses are offered only once a year and therefore should be taken in the recommended sequence. If courses are taken out of sequence, it may not always be possible to enroll in courses as desired or needed. If this occurs, students should seek immediate departmental advice. When a student deviates from the sequence of courses specified for each curriculum in this catalog, it may be impossible to complete an MAE major within the normal four-year period.

In addition to the advising available through the Student Affairs Office, programmatic or technical

advice may be obtained from MAE faculty members. A specific MAE faculty mentor is assigned to each MAE student. It is recommended that all MAE students meet with their faculty mentor at least once a quarter.

PROGRAM ALTERATIONS/EXCEPTIONS TO REQUIREMENTS

Variations from or exceptions to any program or course requirements are possible only if a petition is approved by the MAE Undergraduate Affairs Committee before the courses in question are taken. Petition forms may be obtained from the MAE Student Affairs Office and must be processed through this office.

INDEPENDENT STUDY

MAE students may take MAE 199, Independent Study for Undergraduates, under the guidance of an MAE faculty member. This course is taken as an elective on a P/NP basis. Under very restrictive conditions, however, it may be used to satisfy upper-division technical elective course requirements for the major. Students interested in this alternative must identify an MAE faculty member with whom they wish to work and propose a two-quarter research or study topic. After obtaining the faculty member's concurrence on the topic and scope of the study, the student must submit a Special Studies Course form (each quarter) and an MAE 199 as Technical Elective Contract form to the Undergraduate Affairs Committee. These forms must be completed, approved, and processed prior to the add/drop deadline. Detailed policy in this regard and the requisite forms may be obtained from the Student Affairs Office.

TEACHING

Students interested in participating in the instructional activities of the department may take MAE 195, Undergraduate Teaching. Normally, this course is taken as an elective on a P/NP basis. Under very restrictive conditions, it may be used to satisfy upper-division technical elective course requirements for the major. Policy in this regard and the appropriate forms may be obtained from the Student Affairs Office.

THE GRADUATE PROGRAM

The Department of Mechanical and Aerospace Engineering at UC San Diego offers graduate instruction leading to the **M.S. and Ph.D. degrees in engineering sciences** with a designated specialization in each of the following areas: aerospace engineering, applied mechanics, applied ocean sciences, engineering physics, and mechanical engineering.

In fall 2007, a new Ph.D. specialization was introduced: computational science. Computational science seeks to gain understanding principally through the analysis of mathematical models on high performance computers. It is a blend of applications, computations, and mathematics. It is a mode of scientific investigation that supplements the traditional lab and theoretical models of acquiring knowledge. This is done by formulating mathematical models whose solutions are approximated by computer simulations.

The computational science specialization leverages the strength of the existing mathematics, science, and engineering departments. Ph.D. students must demonstrate advanced undergraduate-level proficiency in numerical analysis and in computer algorithms and data structures.

For more information, please contact the MAE Graduate Affairs Office at (858) 534-4387.

Admission to the graduate program is in accordance with the general requirements of the graduate division, which requires a B.S. and/or M.S. degree in some branch of engineering, the physical sciences, or mathematics; an overall GPA of 3.0; and three letters of recommendation from individuals who can attest to the applicant's academic or professional competence and to the depth of their interest in pursuing graduate study. In addition, all applicants are required to submit GRE General Test scores.

A minimum score of 550 on the Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. Students who score below 600 on the TOEFL examination are strongly encouraged to enroll in an English as a second language program before beginning graduate work. (UC San Diego Extension offers an excellent English language program during the summer as well as the academic year.)

Applicants are judged competitively. Based on the candidate's background, qualifications, and goals, admission to the program is in one of three categories: M.S. only, M.S., or Ph.D. Admission to the M.S. only category is reserved for students for whom the M.S. degree is likely to be the terminal graduate degree. The M.S. designation is reserved for students currently interested in obtaining an M.S. degree but who at a later time may wish to continue in the doctoral degree program. Admission to the Ph.D. program is reserved for qualified students whose final aim is a doctoral degree. Policies for possible changes in status are given under "[Master's Degree Program](#)" below.

Non-matriculated students are welcome to seek enrollment in MAE courses via UC San Diego's Extension's Concurrent Enrollment program but an extension student's enrollment in an MAE graduate course must be approved by the instructor.

MASTER'S DEGREE PROGRAM

The M.S. program is intended to extend and broaden an undergraduate background and/or equip practicing engineers with fundamental knowledge in their particular fields. The degree may be terminal, or obtained on the way to the Ph.D. The degree is offered under both the Thesis Plan I and the Comprehensive Examination Plan II (see "[Graduate Studies: Master's Degree](#)"). A strong effort is made to schedule M.S. level course offerings so that students may obtain their M.S. degree in one year of full-time study or two years of part-time study.

M.S. Time Limit Policy: Full-time M.S. students are permitted seven quarters in which to complete all requirements. While there are no written time limits for part-time students, the department has the right to intervene and set individual deadlines if it becomes necessary.

Course requirements are flexible in the applied mechanics and engineering physics programs. Specific departmental requirements for the M.S. degree are as follows:

MASTER'S PLAN I—THESIS DEFENSE

This plan of study involves both course work and research, culminating in the preparation of a thesis. A total of thirty-six units of credit is required: twenty-four units (six courses) must be in course work, and twelve units must be in research. The student's program is arranged, with prior approval of the faculty advisor, according to the following policies:

1. Course work must include at least sixteen units (four courses) of MAE 200-level courses.
2. Units obtained in MAE 205 or 299 may not be applied toward the course work requirement.
3. No more than a total of eight units of MAE 296 and 298 may be applied toward the course work requirement.
4. No more than twelve units of upper-division 100-level courses (engineering-based or technically serious) may be applied toward the course work requirement.
5. Only four units from the ENG series may be applied to the degree.
6. Twelve units of MAE 299 must be taken to fulfill the research requirement.

The thirty-six units are arranged into three areas of specialization, organized as follows:

- Specialization 1: Three courses (four units each course)
- Specialization 2: Three courses (four units each course)
- Specialization 3: Three courses (four units each course)

At least two of the three areas of specialization must be chosen from the list below of MAE research areas. The third specialization can be one of the listed MAE areas or a math./science area.

Current MAE Research Areas

- Applied and Solid Mechanics
- Material Sciences
- Fluid Mechanics
- Thermal Sciences
- Engineering Physics
- Dynamics Systems and Controls
- Environmental Engineering
- Biomechanics
- Design

Students should reference the MAE Graduate Course Structure to see which courses fall into which of the research areas.

Students must maintain at least a B average in the courses taken to fulfill the degree requirements. A thesis based on the research is written and subsequently reviewed by the thesis advisor and two other faculty members appointed by the dean

of Graduate Studies. The review is normally an oral defense of the thesis.

COMPREHENSIVE EXAMINATION PLAN II (EFFECTIVE JANUARY 2010)

This plan of study involves a written report on a topical area of current research. A total of thirty-six units of credit (nine courses) are required. The student's program is arranged, with prior approval of the faculty advisor, according to the following policies:

1. A written report on a science/technology topic that has relevance today.
2. The topic must be interdisciplinary and cover two different core areas of MAE (for example, energy and dynamics/controls).
3. The report must be between fifteen and thirty pages in length.
4. There must be a minimum of five papers cited in the report. These five papers must be reviewed and approved by the student's faculty advisor.
5. Two faculty members will read the report and grade it. One of the members must be the student's faculty advisor. The other member may be chosen by the student.
6. Both faculty members will sign the report as a "pass" or a "no pass."
7. The final report is due to the committee members during finals week but no later than the last day of finals.

Students must maintain at least a B average in the courses taken to fulfill the degree requirements.

Students already in the M.S. program in MAE have the option of joining the new Written Plan II or following the previous MS Plan I or II. Beginning fall 2010, all M.S. students will be required to follow the new Written Plan II or the Thesis Defense Plan I.

The thirty-six units of course work must be arranged accordingly:

1. Course work must include sixteen units (four courses) of MAE 200-level courses.
2. Units obtained in MAE 205 or 299 may not be applied toward the course work requirement.
3. No more than a total of eight units of MAE 296 and 298 may be applied toward the course work requirement.
4. No more than twelve units of upper-division 100-level courses (engineering-based or technically serious) may be applied toward the course work requirement.
5. Only four units from the ENG series may be applied to the degree.
6. Twelve units of MAE 299 must be taken to fulfill the research requirement.

The thirty-six units are arranged into three areas of specialization, organized as follows:

- Specialization 1: Three courses (four units each course)
- Specialization 2: Three courses (four units each course)
- Specialization 3: Three courses (four units each

course)

At least two of the three areas of specialization must be chosen from the list below of MAE research areas. The third specialization can be one of the listed MAE areas or a math./science area.

Current MAE Research Areas

- Applied and Solid Mechanics
- Material Sciences
- Fluid Mechanics
- Thermal Sciences
- Engineering Physics
- Dynamics Systems and Controls
- Environmental Engineering
- Biomechanics
- Design

Students should reference the MAE Graduate Course Structure to see which courses fall into which of the research areas.

Change of Degree. Upon completion of the requirements for the M.S. degree, students admitted as M.S. only or M.S. candidates are not automatically eligible for admission to the Ph.D. Program. M.S. only candidates who subsequently wish to pursue a doctorate must submit an application for a change in status to their examining committee. If the recommendation is positive and the request approved, the student must submit a general petition for graduate students to effect the change of status. In addition, the examining committee may recommend that the examination satisfy one of the three topics required in the departmental qualifying examination for the doctorate.

M.S. candidates who subsequently wish to pursue a doctorate must also submit an application for a change in status to their examining committee. In this case, a special examination is not required. The application, however, must be approved and signed by an MAE faculty member who expects to serve as the student's Ph.D. advisor. When the request is approved, the student must submit a general petition for graduate students to effect the change of status. If the student elects the comprehensive written plan for the M.S. degree, this report may be used not only to fulfill the requirement for the M.S. degree but also to satisfy one of the three topics required in the departmental qualifying examination for the doctorate.

M.S. PROGRAM

To complete an M.S. degree with specialization in aerospace engineering, engineering physics, mechanical engineering, applied mechanics, or applied ocean sciences, students must complete a sequence of courses unique to their area. Students should consult with their faculty advisor, as well as the MAE Graduate Student Affairs Office, when choosing their courses.

DOCTORAL DEGREE PROGRAM

The MAE Ph.D. Program is intended to prepare students for a variety of careers in research and

teaching. Therefore, depending on the student's background and ability, research is initiated as soon as possible. In general, there are no formal course requirements for the Ph.D. All students, in consultation with their advisors, develop course programs that will prepare them for the MAE Departmental Qualifying Examination and for their dissertation research. However, these programs of study and research must be planned to meet the time limits established to advance to candidacy and to complete the requirements for the degree. Doctoral students who have passed the Departmental Examination may take any course for an S/U grade, with the exception of any course that the student's Departmental or Ph.D. Qualifying Examination Committee stipulates must be taken in order to remove a deficiency. It is strongly recommended that all MAE graduate students take a minimum of two courses (other than research) per academic year after passing the Departmental Qualifying Examination. Specific details in this regard can be obtained from the MAE Student Affairs Office.

Doctoral Examinations: An MAE Ph.D. student is required to pass three examinations. The first is a **Departmental Qualifying Examination (DQE)** that is intended to determine the candidate's ability to successfully pursue a research project level appropriate for the doctorate. This first exam must be taken within the first six quarters of registration as a graduate student. The DQE is an oral examination by a committee of four persons (two of which must be in the MAE department) and is based on material taught over 36 units in three areas of study: a major area (four courses), a minor area (two introductory courses), and a study in mathematics or basic science (three courses). Students must submit a plan of study, approved by their advisor, to the Graduate Affairs Committee for final approval by the end of their second quarter of graduate study.

Teaching Experience is required of all MAE Ph.D. students prior to taking the Ph.D. Qualifying Exam. The teaching experience is defined as lecturing one hour per week in either a problem-solving section or regular lecture for one quarter in a course designated by the department. The requirement can be fulfilled by teaching assistant service or taken as a course for academic credit (MAE 501). Students must contact the Student Affairs Office to plan for completion of this requirement.

The **Ph.D. Qualifying Examination** is the second examination required of MAE Ph.D. Students In preparation for the Ph.D. Qualifying Examination, students must have completed the Departmental Qualifying Examination and the Departmental Teaching Experience requirement, obtained a faculty research advisor, and have identified a topic for their dissertation research and have made initial progress. At the time of application for advancement to candidacy, a doctoral committee responsible for the remainder of the student's graduate program is appointed by the Graduate Council. The committee conducts the Ph.D. Qualifying Examination, during which students must demonstrate the ability to engage in dissertation research. This involves the presentation of a plan for the dissertation research project. The committee may ask questions directly or indirectly related to the project and general questions that it determines to be relevant. Upon

successful completion of this examination, students are advanced to candidacy and are awarded the candidate in philosophy degree (see “[Graduate Studies](#)” section in this catalog). The **Dissertation Defense** is the final Ph.D. Examination. Upon completion of the dissertation research project, the student writes a dissertation that must be successfully defended in an oral examination and public presentation conducted by the doctoral committee. A complete copy of the student’s dissertation must be submitted to each member of the doctoral committee approximately four weeks before the defense. It is understood that the copy of the dissertation given to committee members will not be the final copy, and that the committee members may suggest changes in the text at the time of the defense. This examination may not be conducted earlier than three quarters after the date of advancement to doctoral candidacy. Acceptance of the dissertation by the Office of Graduate Studies and the university librarian represents the final step in completion of all requirements for the Ph.D. There is no formal foreign language requirement for doctoral candidates. Students are expected to master whatever language is needed for the pursuit of their own research.

Ph.D. Time Limit Policy. Pre-candidacy status is limited to four years. Doctoral students are eligible for university support for six years (engineering physics, seven years). The defense and submission of the doctoral dissertation must be within seven years (engineering physics, eight years).

Evaluations. In the spring of each year, faculty advisors evaluate each doctoral student’s overall performance in course work, research during the past academic year, and prospects for financial support for the next year. A written assessment is given to the student. If a student’s work is found to be inadequate, the faculty advisor may determine that the student cannot continue in the doctoral program and will recommend dismissal to the dean of Graduate Studies.

JOINT DOCTORAL PROGRAM WITH SAN DIEGO STATE UNIVERSITY

The Department of Mechanical and Aerospace Engineering at UCSD participates in a joint doctoral program with the Graduate Group in Applied Mechanics at SDSU. The program leads to the degree of doctor of philosophy in engineering sciences (applied mechanics). Participants in the program are required to spend one year enrolled at UCSD; their dissertation research is carried out under the supervision of an SDSU faculty member. Information regarding admission may be obtained from the departmental Student Affairs Office.

THE GRADUATE CURRICULUM IN CHEMICAL ENGINEERING

The chemical engineering (CENG) graduate program is an interdepartmental program and is described more completely under the Chemical Engineering Program in this catalog.

PH.D. IN MECHANICAL AND AEROSPACE ENGINEERING WITH SPECIALIZATION IN MULTI-SCALE BIOLOGY

As of fall 2010, the UCSD campus is offering a new Ph.D. specialization in multi-scale biology that

Lab	Course Numbers	Title	Contributing Programs or Departments	Instructors	Quarter
1	BENG 283 Chem. 28/ BIOM 283	Supramolecular Complex Characterization	Chemistry and Biochemistry, Bioinformatics	Komives (Chemistry and Biochemistry), Bafna (Computer Science and Engineering)	Spring
2	BENG 276 Chem. 276 Math. 276 PHARM 276	Numerical Analysis for Multi-Scale Biology	Chemistry and Biochemistry, Mathematics, Bioengineering	McCammon (Chemistry and Biochemistry), Holst (Mathematics), Sejnowski (Biological Sciences) McCulloch (Bioengineering)	Spring
3	NEU 260 Chem. 260	Light and Electron Microscopy of Cells and Tissues	Neuroscience, Chemistry and Biochemistry, Molecular Pathology, Biology	Martone, Sosinsky, Ellisman (Neurosciences), Baker (Chemistry and Biochemistry), Hanein (Pathology)	Spring
4	BENG 278 RAD 278	Magnetic Resonance Imaging	Radiology, Bioengineering	Wong, Buxton, Frank, Liu (Radiology), Dale (Neurosciences)	Winter
5	PHYS 245 BGGN 265	Optical Imaging of Structure and Function in Excitable Systems	Physics, Neurosciences, Radiology, Bioengineering, Medicine, Biology	Kleinfeld (Physics), Wang (Biological Sciences), Berns (Bioengineering)	Spring
6	BENG 277 BIOM 287	Tissue Engineering	Bioengineering, Biomedical Science, Pediatrics, Pharmacology	Sah, Christman, Varghese (Bioengineering), Nigam (Pediatrics), Evans (Pharmacology)	TBA
7	BENG 260 BGGN 260	Neurodynamics	Bioengineering, Biology	Cauwenberghs (Bioengineering)	Winter

will be available to doctoral candidates in participating programs that span four divisions: Biological Sciences, Physical Sciences, Jacobs School of Engineering, and Health Sciences at UCSD.

The Ph.D. specialization is designed to allow students to obtain standard basic training in their chosen field within the biological sciences, physical sciences, engineering, and health sciences with training in integrative and quantitative analysis across multiple scales of biological organization from molecule to organism in health and disease into their graduate studies. It trains a new cadre of Ph.D. scientists and provides a unique interdisciplinary education at the interfaces between the biological, medical, physical and engineering sciences.

The specific objectives of this program are

- 1. Focused Collaboration** across nine graduate degree programs at UCSD to train a new generation of cross-disciplinary scientist
- 2. State-of-the-art interdisciplinary training** through a new technology-centered hands-on graduate laboratory course curriculum
- 3. Novel emphasis on research** aimed at integrative and quantitative analysis across multiple scales of biological organization from molecule to organism in health and disease

Students in the specialization are required to take at minimum three laboratory courses and serve as a TA one course. Courses offered are shown in the table at the top right portion of this page.

Prospective students must apply and be admitted into the Ph.D. program in mechanical and aerospace engineering described previously. (For more information, see the Mechanical and Aerospace Engineering Graduate program and/or the Interfaces Graduate Training Program administered within the Department of Chemistry and Biochemistry, 4010 York Hall, Revelle College)

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

All undergraduate students enrolled in MAE courses or admitted to an MAE program are expected to meet prerequisite and performance standards, i.e., students may not enroll in any MAE courses or courses in another department which are required for the major prior to having satisfied prerequisite courses with a C– or better. (The department does not consider D or F grades as adequate preparation for subsequent material.) Additional details are given under the various program outlines, course descriptions, and admission procedures for the Jacobs School of Engineering in this catalog. Furthermore, the majority of MAE courses have enrollment restrictions which give priority to or are open only to students who have been admitted to an MAE major. Where these restrictions apply, the registrar will not enroll other students except by department stamp on class enrollment cards. The department expects that students will adhere to these policies of their own volition and enroll in courses accordingly. Students are advised that they may be dropped at any time from course rosters if prerequisites have not been met. While most lower-division courses are offered more than once each year, many MAE upper-division courses are taught only once per year, and courses are scheduled to be consistent with the curricula as shown in the tables. When possible, MAE does offer selected large enrollment courses more than once each year.

LOWER-DIVISION

MAE 02. Introduction to Aerospace Engineering (4)

An introduction to topics in aeronautical and astronautical engineering including aerodynamics, propulsion, flight mechanics, structures, materials, orbital mechanics,

design, mission planning, and environments. General topics include historical background, career opportunities, engineering ethics, and professionalism. Must be taken for a letter grade. **Prerequisite:** none.

MAE 03. Introduction to Engineering Graphics and Design (4)

Introduction to design process through a hands-on design project performed in teams. Topics include problem identification, concept generation, project management, risk reduction. Engineering graphics and communication skills are introduced in the areas of: Computer-Aided Design (CAD), hand sketching, and technical communication. **Prerequisite:** grade of C- or better in Physics 2A or 4A (or concurrent enrollment). Priority enrollment given to engineering majors.

MAE 05. Quantitative Computer Skills (4)

Introductory course for non-engineering majors. Use of computers in solving problems; applications from life sciences, physical sciences, and engineering. Students run existing computer programs and complete some programming in BASIC. **Prerequisite:** none.

MAE 09. C/C++ Programming (4)

C/C++ computer programming under the UNIX environment with applications to numerical problems fundamental to computational mechanics. Arithmetic operations, branches, arrays, data structures, and use of pointers are introduced. Programming ethics are discussed. Priority enrollment given to pre-engineering and engineering majors.

MAE 20. Elements of Materials Science (4)

The structure of materials: metals, ceramics, glasses, semiconductors, superconductors and polymers. Control of internal structure to produce desired properties. Mechanical, rheological, electrical, optical, superconducting and magnetic properties and classification. **Prerequisites:** Phys. 2A or 4A, Chem. 6A, Math. 21C or 20D (or concurrent registration).

MAE 87. Freshman Seminar (1)

The Freshman Seminar program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges. Topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen. **Prerequisite:** none.

MAE 92A. Design Competition—Design, Build, and Fly Aircraft (1)

(Cross-listed with SE 10A.) Student teams design, build, and fly unmanned aircraft for a national student competition. Students concentrate on vehicle system design including aerodynamics, structures, propulsion, and performance. Teams engineer, fabricate the aircraft, submit a design report, and prep aircraft for competition. **Prerequisites:** consent of instructor.

MAE 93. Design Competition—Design, Build, and Test Race Car (1)

Student teams design, build, and test a formula-style racing car for an international student competition. Students concentrate on vehicle system analysis and design, manufacturability, and performance. Teams engineer, fabricate car, submit a design report, and prep car for competition. **Prerequisite:** department stamp.

MAE 99R. Independent Study (1)

Independent study or research under direction of a member of the faculty. **Prerequisites:** student must be of first-year standing and a Regent's Scholar; approved Special Studies form.

UPPER-DIVISION

MAE 101A. Introductory Fluid Mechanics (4)

Fluid statics; fluid kinematics; integral and differential forms of the conservation laws for mass, momentum and energy; Bernoulli equation; potential flows; dimensional analysis and similitude. **Prerequisites:** admission to an engineering major and grades of C- or better in Phys. 2A, Math. 20D, 20E, or consent of instructor.

MAE 101B. Advanced Fluid Mechanics (4)

Laminar and turbulent flow. Pipe flow including friction factor. Boundary layers, separation, drag, and lift. Compressible flow including shock waves. **Prerequisites:** grade of C- or better in MAE 101A, or CENG 101A or CENG 103A, and MAE 110A or CENG 102 or consent of instructor.

MAE 101C. Heat Transfer (4)

Extension of fluid mechanics in MAE 101A-B to viscous, heat-conducting flows. Application of the energy conservation equation to heat transfer in ducts and external boundary layers. Heat conduction and radiation transfer. Heat transfer coefficients in forced and free convection. Design applications. **Prerequisites:** MAE 101A or CENG 101A, MAE 101B, and MAE 105, or consent of instructor.

MAE 102. Fluid Mechanics for Structural Engineers (4)

(Cross-listed with SE 112.) Fluid statics, hydrostatic forces; integral and differential forms of conservation equations for mass, momentum, and energy; Bernoulli equation; dimensional analysis; viscous pipe flow; external flow, boundary layers; open channel flow. **Prerequisites:** grade of C- or better in Phys. 2A, Math. 20D, and Math. 20E or consent of instructor.

MAE 104. Aerodynamics (4)

Basic relations describing flow field around wings and bodies at subsonic and supersonic speed. Thin-wing theory. Slender-body theory. Formulation of theories for evaluating forces and moments on airplane geometries. Application to the design of high-speed airplanes. **Prerequisites:** open to MC 25, MC 27, MC 28 and SE 27 only and grade of C- or better in MAE 101A-B, or consent of the instructor.

MAE 105. Introduction to Mathematical Physics (4)

Fourier series, Sturm Liouville theory, elementary partial differential equations, integral transforms with applications to problems in vibration, wave motion, and heat conduction. **Prerequisites:** admission to engineering major or and grades of C- or better in Phys. 2A-B and Math. 20D or Math. 21D.

MAE 107. Computational Methods in Engineering (4)

Introduction to scientific computing and algorithms; iterative methods, systems of linear equations with applications; nonlinear algebraic equations; function interpolation and differentiation and optimal procedures; data fitting and least-squares; numerical solution of ordinary differential equations. **Prerequisites:** engineering majors only and grades of C- or better in MAE 9 or MAE 10 and Math. 20F.

MAE 108. Probability and Statistical Methods for Mechanical and Environmental Engineering (4)

Probability theory, conditional probability, Bayes theorem, random variables, densities, expected values, characteristic functions, central limit theorem. Engineering reliability, elements of estimation, random sampling, sampling distributions, hypothesis testing, confidence intervals. Curve fitting and data analysis. **Prerequisite:** Math. 20F.

MAE 110A. Thermodynamics (4)

Fundamentals of engineering thermodynamics: energy, work, heat, properties of pure substances, first and second laws for closed systems and control volumes, gas mixtures. Application to engineering systems, power and refrigeration cycles, combustion. **Prerequisites:** grades of C- or better in Phys. 2C and Chem. 6A. Enrollment restricted to engineering majors only.

MAE 110B. Thermodynamic Systems (4)

Thermodynamic analysis of power cycles with application to combustion driven engines: internal combustion, diesel, and gas turbines. Thermodynamics of mixtures and chemical and phase equilibrium. Computational methods for calculating chemical equilibrium. **Prerequisite:** grade of C- or better in MAE 110A.

MAE 113. Fundamentals of Propulsion (4)

Compressible flow, thermodynamics, and combustion relevant to aircraft and space vehicle propulsion. Analysis and design of components for gas turbines, including turbines, inlets, combustion chambers and nozzles. Fundamentals of rocket propulsion. **Prerequisites:** engineering majors MC 25, MC 27 and MC 28 only and grades of C- or better in MAE 110A or CENG 102 and MAE 101A-B or CENG 101A and 101C (or CENG 103A-B).

MAE 117A. Elementary Plasma Physics (4)

(Cross-listed with Physics 151.) Particle motions, plasmas as fluids, waves, diffusion, equilibrium and stability, nonlinear effects, controlled fusion. **Prerequisites:** Math. 21D or consent of instructor. Phys. 100B-C or ECE 107 are recommended.

MAE 117B. Industrial Plasma Applications (4)

Charged particle motion in DC and RF electro-magnetic; atomic processes in plasmas; ionization, excitation, dissociation, rate constants, electron energy balance electric breakdown of the gases; debye length, plasmas quasi-neutrality, sheath; DC, capacitive, inductive, and wave-heated discharges; etching, deposition, and implantation. **Prerequisite:** Math. 20D or 21D, or consent of instructor.

MAE 117L. Elements of Experimental Plasma Physics (4)

Measurements of electron density and temperature with the langmuire probes, emission spectroscopy measurements of neutrals and ions in plasmas; electric breakdown of the gases; plasmas etching of materials. **Prerequisites:** none.

MAE 118A. Introduction to Energy Systems (4)

Overview of present-day primary energy sources and availability; stationary and mobile power plant technologies; air pollution and controls; introduction to climate change; overview of renewable energy resources and technologies. **Prerequisites:** MAE 101A or CENG 101A, or consent of instructor.

MAE 118B. Twenty-First Century Energy Technologies I (4)

A survey of projected energy demands and resources. Climate change physics and impacts on energy systems. Basic physics of photovoltaics, fuel cells, wind power, and other renewable and developing energy technologies. An exploration of the "Hydrogen Economy." **Prerequisites:** MAE 101A or CENG 101A, or consent of instructor.

MAE 118C. Twenty-First Century Energy Technologies II (4)

Overview of basic fission processes and fusion processes. Elementary fission reactor physics and engineering; environmental and waste disposal issues. Introduction to power producing fusion reactor physics. Survey of fusion technology issues, status and prospects for fusion energy. **Prerequisite:** MAE 101A or CENG 101A, or consent of instructor.

MAE 124. Environmental Challenges: Science and Solutions (4)

(Cross-listed with ESYS 103.) This course explores the impacts of human social, economic, and industrial activity on the environment. It highlights the central roles in ensuring sustainable development played by market forces, technological innovation and governmental regulation on local, national, and global scales. **Prerequisites:** grade of C- or better in Math. 20B or Math. 10A-C, or consent of instructor.

MAE 125A. Flow and Transport in the Environment (4)

Study of river flow and hydraulic control; surface waves; applications to reservoirs and estuaries. Introduction to stratification and buoyancy; applications to atmospheric surface layer and the ocean mixed layer. Ideas behind turbulent dispersion. Turbulent and scaling laws. Gravity currents and katabatic flows. **Prerequisites:** engineering majors and students receiving a grade of C- or better in MAE 101A or CENG 103A or CENG 101A.

MAE 125B. Fluid-Solid Interactions in Environment Engineering (4)

Introduction to groundwater flow. Pollution transport through the water table. Chemical processes in ozone hole. Fundamentals of flow. Darcy flow. Diffusion and dispersion. Gravity currents and plumes in porous media. Mushy layers. Chemistry of fluid-solid interactions. Fundamentals of adsorption and surface reactions. **Prerequisites:** engineering majors and students receiving a grade of C- or better in MAE 125A.

MAE 125C. Case Studies In Environmental Engineering (4)

This course is project-oriented. Students will conduct research in small groups, give oral presentations and write

reports. Topics reflect material in MAE 125A and MAE 125B. Possible topics: air pollution modeling, building ventilation, wetland preservation. **Prerequisites:** engineering majors and students receiving a grade of C– or better in MAE 125A–B.

MAE 126A. Environmental Engineering Laboratory I (4)

Design and analysis of experiments in environmental engineering. Experiments in wind tunnel, water tunnel, and other equipment. Use of instrumentation. Laboratory report writing; error analysis; engineering ethics. **Prerequisites:** grade of C– or better in MAE 101A or CENG 101A, MAE 125A.

MAE 126B. Environmental Engineering Laboratory II (4)

Design and analysis of original studies in environmental engineering. Students work on environmental projects and use computational and laboratory facilities. Students propose and design studies, collect and analyze data, and prepare a major report. **Prerequisite:** grade of C– or better in MAE 126A.

MAE 127. Statistical Methods for Environmental Sciences and Engineering (4)

Methods for evaluating environmental data including probability distributions, confidence intervals, functional fitting, spectral analysis, and programming methods for data analysis. **Prerequisite:** grade of C– or better in Math. 20C.

MAE 130A. Mechanics I: Statics (4)

(Cross-listed with SE 101A.) Statics of particles and rigid bodies in two and three dimensions. Free body diagrams. Internal forces. Static analysis of trusses, frames, and machines. Shear force and bending moment diagrams in beams. Equilibrium problems with friction. **Prerequisites:** Math. 20C and Phys. 2A with grades of C– or better. Students cannot also receive credit for SE 101A.

MAE 130B. Mechanics II: Dynamics (4)

(Cross-listed with SE101B.) Kinematics and kinetics of particles in 2-D and 3-D motion. Newton's equations of motion. Impulsive motion and impact. Energy and momentum methods. Systems of particles. Kinematics and kinetics of rigid bodies in 2-D. Introduction to 3-D dynamics of rigid bodies. **Prerequisites:** Math. 20D, MAE 130A, or SE 101A with grades of C– or better.

MAE 130C. Mechanics III: Vibrations (4)

(Cross-listed with SE 101C.) Free and forced vibrations of undamped and damped single degree of freedom systems. Harmonically excited vibrations. Vibrations under general loading conditions. Vibrating systems with multiple degrees of freedom. Modal analysis with application to realistic engineering problems. Vibration of continuous systems. **Prerequisites:** grades of C– or better in Math. 20F and MAE 130B or SE 101B.

MAE 131A. Solid Mechanics I (4)

(Cross-listed with SE 110A.) Students may not receive credit for SE 110A or MAE 131A and SE 110A/MAE 131A. Concepts of stress and strain. Hooke's Law. Axial loading of bars. Torsion of circular shafts. Shearing and normal stresses in beam bending. Deflections in beams. Statically determinate and indeterminate problems. Combined loading. Principal stresses and design criteria. Buckling of columns. **Prerequisites:** grades of C– or better in Math. 20F and MAE 130A or SE 101A.

MAE 131B. Fundamentals of Solid Mechanics II (4)

Continuous mechanics of solids and its application to the mechanical response of machine and structural elements. Stress and strain in indicial notation; field equations and constitutive relations. Linear elastic stress analysis in torsion, plane stress and plane strain; stress concentrations; fracture mechanics. Extremum principles and structural stability. Viscoelasticity, plasticity, and failure criteria. Theorems of plastic limit analysis. **Prerequisites:** grades of C– or better in MAE 131A and MAE 105 (or concurrent) and admission to engineering major.

MAE 131C. Solid Mechanics III (4)

Small deflection of plate bending. Solutions for rectangular and circular plates. Buckling of plates. Membrane and bending stresses in cylindrical shells. Pressure vessels.

Energy methods and finite element analysis. **Prerequisite:** grade of C– or better in MAE 131A or SE 110A.

MAE 132. Intermediate Dynamics (4)

Kinematics and kinetics of 3-D rigid body motion. Angular momentum and its rate of change. Euler's and general equations of motion. Rotation about a fixed axis and a fixed point. Gyroscopic motion. Dynamic reactions. Lagrange's equations of motion with applications. **Prerequisite:** grade of C– or better in MAE 130B or SE 101B.

MAE 133. Finite Element Methods in Mechanical and Aerospace Engineering (4)

Development of stiffness and mass matrices based upon variational principles and application to static, dynamic, and stability design problems in structural and solid mechanics. Architecture of computer codes for linear and nonlinear finite element analysis and basic computer implementation. The use of general purpose finite element structural analysis computer codes. **Prerequisites:** grade of C– or better in MAE 131A or SE 110A.

MAE 135. Computational Mechanics (4)

Mathematical modeling in terms of systems of algebraic and differential equations. Overview of numerical methods. Problem statement, boundary, and initial conditions. Overview of commercial packages for solving the equations of Mathematical and Engineering Physics. Numerical solutions of selected examples drawn from real-life applications of fluid flow, solid mechanics, and heat transfer with emphasis on design. **Prerequisite:** consent of instructor.

MAE 140. Linear Circuits (4)

Steady-state and dynamic behavior of linear, lumped-parameter electrical circuits. Kirchoff's laws. RLC circuits. Node and mesh analysis. Operational amplifiers. Signal acquisition and conditioning. Electric motors. Design applications in engineering. **Prerequisites:** admission to the engineering major and grades of C– or better in Math. 20D, 20F, and Phys. 2B.

MAE 142. Dynamics and Control of Aerospace Vehicles (4)

The dynamics of vehicles in space or air are derived for analysis of the stability properties of spacecraft and aircraft. The theory of flight, lift, drag, dutch roll and phugoid modes of aircraft are discussed. Optimal state space control theory for the design of analog and digital controllers (autopilots). **Prerequisites:** admission to the engineering major and grades of C– or better in MAE 104 and MAE 143B or ECE 171A, or consent of instructor.

MAE 143A. Signals and Systems (4)

Dynamic modeling and vector differential equations. Concepts of state, input, output. Linearization around equilibria. Laplace transform, solutions to ODEs. Transfer functions and convolution representation of dynamic systems. Discrete signals, difference equations, z-transform. Continuous and discrete Fourier transform. **Prerequisites:** grades of C– or better in Math. 20D, 20E, and 20F and MAE 105, or consent of instructor.

MAE 143B. Linear Control (4)

Analysis and design of feedback systems in the frequency domain. Transfer functions. Time response specifications. PID controllers and Ziegler-Nichols tuning. Stability via Routh-Hurwitz test. Root locus method. Frequency response: Bode and Nyquist diagrams. Dynamic compensators, phase-lead and phase-lag. Actuator saturation and integrator wind-up. **Prerequisite:** grade of C– or better in MAE 143A or CENG 100, or consent of instructor.

MAE 143C. Digital Control Systems (4)

Discrete time systems: sampling, aliasing, stability, Z-transform, discrete time signals, state space models; state equations, canonical forms, observability, controllability. Pole placement design, observer design, output feedback, linear quadratic regulator design. Implementation: digital approximation, computational and numerical issues. **Prerequisite:** grade of C– or better in MAE 143B.

MAE 149. Sensor Networks (4)

(Cross-listed with ECE 156 and SIO 238) Characteristics of chemical, biological, seismic and other physical sensors; signal processing techniques supporting distributed detection of salient events; wireless communication and networking protocols supporting formation of robust

sensor fabrics; current experience with low power, low-cost sensor deployments. **Prerequisites:** upper-division standing and consent of instructor, or graduate student in science or engineering.

MAE 150. Computer-Aided Design (4)

Computer-Aided Analysis and Design. Design methodology, tolerance analysis, Monte Carlo analysis, kinematics and computer-aided design of linkages, numerical calculations of moments of inertia, design of cams and cam dynamics; finite element analysis, design using Pro-E, Mechanica Motion and Mechanica Structures. **Prerequisites:** grade of C– or better in MAE 130A or SE 101A or BENG 110, MAE 107 or SE 121, and MAE 3, senior standing in engineering major, or consent of instructor.

MAE 152. Computer Graphics for Engineers and Scientists (4)

Computer graphics algorithms using C programming and Ironcad. Applications in engineering and science. Line-drawing algorithms. Area fill algorithms, color, CAD user interface, spline curves and surfaces, 2-D and 3-D transformations, wireframe and solid models. Hidden-surface elimination. **Prerequisites:** grade of C– or better in MAE 3 and MAE 9 or 10. Not offered every year.

MAE 155A. Aerospace Engineering Design I (4)

Fundamental principles of aerospace vehicle design including the conceptual, preliminary, and detailed design phases. Aeronautical or astronautical design project that integrates all appropriate engineering disciplines as well as issues associated with optimization, teamwork, manufacturability, reporting, and professionalism. **Prerequisites:** grade of C– or better in MAE 2, 104, 113, 130C, 142, 150, SE 2 and SE 160B or consent of instructor. Students may enroll concurrently with MAE 113, 142, and 150.

MAE 155B. Aerospace Engineering Design II (4)

Fundamental principles of aerospace vehicle design including the conceptual, preliminary, and detailed design phases. Aeronautical or astronautical design project that integrates all appropriate engineering disciplines as well as issues associated with optimization, teamwork, manufacturability, reporting, and professionalism. **Prerequisites:** grade of C– or better in MAE 113, 142, 150, 155A or consent of instructor.

MAE 156A. Fundamental Principles of Mechanical Design I (4)

Fundamental principles of mechanical design and the design process. Application of engineering science to the design and analysis of mechanical components. Initiation of team design projects that culminate in MAE 156B with a working prototype designed for a real engineering application. Professional ethics discussed. Course material fee may apply. **Prerequisites:** grades of C– or better in MAE 3, MAE 130C, MAE 131A, MAE 160, or MAE 131B, and MAE 170 or consent of instructor.

MAE 156B. Fundamental Principles of Mechanical Design II (4)

Fundamental principles of mechanical design and the design process. Culmination of a team design project initiated in MAE 156A which results in a working prototype designed for a real engineering application. **Prerequisite:** grade of C– or better in 156A in the immediately preceding quarter, MAE 101C, MAE 150 or consent of instructor.

MAE 160. Mechanical Behavior of Materials (4)

Elasticity and anelasticity, dislocations and plasticity of crystals, creep, and strengthening mechanisms. Mechanical behavior of ceramics, composites, and polymers. Fracture: mechanical and microstructural. Fatigue. Laboratory demonstrations of selected topics. **Prerequisites:** grade of C– or better in MAE 20, MAE 130A (or SE 101A) and MAE 131A, or consent of instructor.

MAE 161. Electronic, Magnetic, and Photonic Materials (4)

Introduction to the worlds of electronic, magnetic/photonic materials, the unique properties of advance engineering materials in relation to processing, fabrication, and microstructure. Semiconductors, metals, alloys, ceramics, polymers, and composite materials and their practical applications. **Prerequisite:** consent of instructor. Not offered every year.

MAE 165. Fatigue and Failure Analysis of Engineering Components (4)

The engineering and scientific aspects of crack nucleation, slow crack growth, and unstable fracture in crystalline and amorphous solids. Microstructural effects on crack initiation, fatigue crack growth and fracture toughness. Methods of fatigue testing and fracture toughness testing. Fractography and microfractography. Design safe methodologies and failure prevention. Failure analysis of real engineering structures. **Prerequisite:** consent of instructor. Not offered every year.

MAE 166. Nanomaterials (4)

Basic principles of synthesis techniques, processing, microstructural control and unique physical properties of materials in nano-dimensions. Nanowires, quantum dots, thin films, electrical transport, optical behavior, mechanical behavior, and technical applications of nanomaterials. **Prerequisite:** consent of instructor. Not offered every year.

MAE 167. Wave Dynamics in Materials (4)

Pressure and shear waves in infinite solids. Reflection and diffraction. Rayleigh and Love waves in semi-infinite space. Impulse load on a half space. Waveguides and group velocity. **Prerequisite:** consent of instructor. Not offered every year.

MAE 168. MEME Materials, Fabrication, and Applications (4)

The principles of micro-electro-mechanical systems (MEMS) fabrication, materials involved, actuation principles utilized, and the fundamentals of MEMS operation in relation to stresses and deformation. Novel device applications, future trends, and nano-electro-mechanical (NEMS) systems. **Prerequisite:** consent of instructor. Not offered every year.

MAE 170. Experimental Techniques (4)

Principles and practice of measurement and control and the design and conduct of experiments. Technical report writing. Lectures relate to dimensional analysis, error analysis, signal-to-noise problems, filtering, data acquisition and data reduction, as well as background of experiments and statistical analysis. Experiments relate to the use of electronic devices and sensors. **Prerequisite:** Grade of C- or better in Phys. 2CL and admission to any engineering major.

MAE 171A. Mechanical Engineering Laboratory I (4)

Design and analysis of experiments in fluid mechanics, solid mechanics, and control engineering. Experiments in wind tunnel, water tunnel, vibration table and material testing machines, and refined electromechanical systems. Laboratory report writing; error analysis; engineering ethics. **Prerequisites:** grade of C- or better in MAE 101C or CENG 101B, MAE 130C or SE 101C, MAE 160 or MAE 131B or SE 110B, MAE 140, MAE 143B or CENG 120, MAE 170, and senior standing in engineering major or consent of instructor.

MAE 171B. Mechanical Engineering Laboratory II (4)

Design and analysis of original experiments in mechanical engineering. Students research projects using experimental facilities in undergraduate laboratories: wind tunnel, water channel, vibration table, and testing machine and control systems. Students propose and design experiments, obtain data, complete engineering analysis and write a major report. **Prerequisite:** requires a grade of C- or better in MAE 171A.

MAE 175A. Aerospace Engineering Laboratory I (4)

Analysis of aerospace engineering systems using experimental facilities in undergraduate laboratories: wind tunnel, water channel, vibration table, and testing machine. Students operate facilities, obtain data, complete engineering analysis and write major reports. **Prerequisites:** grade of C- or better in MAE 101C or CENG 103C or CENG 101C; MAE 143B, and MAE 170.

MAE 180A. Spacecraft Guidance I (4)

Astrodynamics, orbital motion, perturbations, coordinate systems and frames of reference. Geosynchronous orbits, stationkeeping. Orbital maneuvers, fuel consumption, guidance systems. Observation instrument point, tracking, control. Basic rocket dynamics. Navigation, telemetry, re-entry, and aero-assisted maneuvers. Mission design. Students perform analyses based on mission require-

ments. **Prerequisite:** upper-division standing in physics, mathematics, or engineering department.

MAE 181. Space Mission Analysis and Design (4)

Space mission concepts, architectures, and analysis. Mission geometry. Astrodynamics. Orbit and constellation design. Space environment. Payload and spacecraft design and sizing. Power sources and distribution. Thermal management. Structural design. Guidance and navigation. Space propulsion. Orbital debris and survivability. Cost modeling and risk analysis. **Prerequisite:** upper-division standing or consent of instructor.

MAE 192. Senior Seminar in Aerospace, Environmental or Mechanical Engineering (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in aerospace, environmental or mechanical engineering (at the upper-division level). Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic and permission from the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp or consent of instructor.

MAE 195. Teaching (2-4)

Teaching and tutorial assistance in an MAE course under supervision of instructor. Not more than four units may be used to satisfy graduation requirements. P/NP grades only. **Prerequisites:** junior status and a B average in major and consent of department chair.

MAE 197. Engineering Internship (1-4)

Students work in local industry or hospitals under faculty supervision. Units may not be applied toward graduation requirements. Salaried or unsalaried. Number of units determined by enrollment frequency. First quarter up to four units. Subsequent quarters cannot exceed one unit. **Prerequisites:** consent of instructor and department stamp, 2.50 overall GPA minimum, at least ninety units.

MAE 198. Directed Group Study (1-4)

Directed group study on a topic or in a field not included in the regular department curriculum, by special arrangement with a faculty member. May be taken P/NP only. **Prerequisite:** consent of instructor.

MAE 199. Independent Study for Undergraduates (4)

Independent reading or research on a problem by special arrangement with a faculty member. P/NP grades only. **Prerequisite:** consent of instructor.

GRADUATE COURSES

MAE 205. Graduate Seminar (1)

Each graduate student in MAE is expected to attend one seminar per quarter, of his or her choice, dealing with current topics in fluid mechanics, solid mechanics, applied plasma physics and fusion, chemical engineering, applied ocean sciences, energy and combustion, environmental engineering, or materials science, and dynamics and controls. Topics will vary. (S/U grades only)

MAE 207. Topics in Engineering Science (4)

A course to be given at the discretion of the faculty in which topics of current interest in engineering will be presented. **Prerequisite:** consent of instructor.

MAE 209. Continuum Mechanics Applied to Medicine/Biology (4)

(Cross-listed with BENG 209.) Introduction to the basic definitions of continuum mechanics and their mathematical formulation at the graduate level with applications to problems in medicine and biology. This course is intended for students with little or no background in mechanics; it is an introduction to the Biomechanics courses BENG 250 A-B in the Department of Bioengineering and to Solid and Fluid Mechanics courses MAE 210A and MAE 231A in the Department of Mechanical and Aerospace Engineering. This course should NOT be taken concurrently with MAE 210A or MAE 231A. **Prerequisite:** consent of instructor.

MAE 210A. Fluid Mechanics I (4)

(Cross-listed with CENG 210A.) Basic conservation laws. Flow kinematics. The Navier-Stokes equations and some

of its exact solutions. Non-dimensional parameters and different flow regimes, vorticity dynamics. **Prerequisites:** MAE 101A-B and MAE 110A, or consent of instructor.

MAE 210B. Fluid Mechanics II (4)

Potential flows, boundary layers, low-Reynolds number flows. **Prerequisites:** MAE 210A, MAE 101A-B, and MAE 110A, or consent of instructor.

MAE 210C. Fluid Mechanics III (4)

Flow instabilities, linear stability theory; introduction to turbulent flows. **Prerequisites:** MAE 210A-B, MAE 101A-B, and MAE 110A, or consent of instructor.

MAE 211. Introduction to Combustion (4)

Fundamental aspects of flows of reactive gases, with emphasis on processes of combustion, including the relevant thermodynamics, chemical kinetics, fluid mechanics, and transport processes. Topics may include deflagrations, detonations, diffusion flames, ignition, extinction, and propellant combustion. **Prerequisites:** MAE 101A-B-C or CENG 101A-B-C, MAE 110A, or consent of instructor.

MAE 212. Introductory Compressible Flow (4)

Equations of motion for compressible fluids; one-dimensional gas dynamics and wave motion, waves in supersonic flow, including oblique shock waves; flow in ducts, nozzles, and wind tunnels; methods of characteristics. **Prerequisites:** MAE 101A-B-C or CENG 101A-B-C, MAE 110A, or consent of instructor.

MAE 213. Mechanics of Propulsion (4)

Fluid mechanics, thermodynamics and combustion processes involved in propulsion of aircraft and rockets by air breathing engines, and solid and liquid propellant rocket engines characteristics and matching of engine components; diffusers, compressors, combustors, turbines, pumps, nozzles. **Prerequisites:** MAE 101A-B-C, MAE 110A, MAE 212, or consent of instructor.

MAE 214A. Introduction to Turbulence and Turbulent Mixing (4)

Basic features of turbulent flows. Analytical description of turbulence: random variables, correlations, spectra, Reynolds-averaging, coherent structures. Length and time scales. Kolomogorov similarity theory. Turbulence transport equations. Free shear flows. Homogeneous turbulence. Wall-bounded flows. Mixing of velocity and scalar fields. **Prerequisites:** MAE 210A, MAE 101A,B or equivalent or consent of instructor.

MAE 216. Ocean Turbulence and Mixing (4)

(Cross-listed with SIO 213.) Mixing mechanisms, their identification, description and modeling. Introduction to turbulence, semi-empirical theories, importance of coherent structures, effects of stratification and rotation on turbulent structure, entrainment and mixing. S/U grades permitted.

MAE 217A. Introduction to Gas Discharge Plasma Physics (4)

Charged particle motion in electromagnetic field, atomic processes in plasmas, electric breakdown of the gases, plasma quasi-neutrality, sheath, probes. Electron kinetics in low-temperature plasma, particle and energy fluxes, DC and RF driven discharges, instabilities of gas discharge plasmas. **Prerequisites:** Physics 100A-B-C or consent of instructor.

MAE 217B. Introduction to Non-Magnetized Hot Plasma Physics (4)

Coulomb collisions, collisionless approximation for hot plasma dynamics, Vlasov equation, waves in non-magnetized plasma, dispersion equation, WKB approximation, Landau damping, plasma instabilities, quasi-linear theory. **Prerequisite:** MAE 217A or consent of instructor.

MAE 217C. Introduction to Magnetized Hot Plasma Physics (4)

Drifts of magnetized charged particles, charged particle motion in different magnetic configurations, toroidal plasma equilibrium, Grad-Shafranov equation, neoclassical plasma transport in tokamak, waves in homogeneous magnetized plasma, waves in inhomogeneous magnetized plasma, instabilities of magnetized plasma. **Prerequisites:** MAE 217A-B or consent of instructor.

MAE 218A. Introduction to High Energy Density Physics (MHD and Pinches) (4)

Equation of state, Saha equilibrium. Shock rarefaction, and blast waves, self-equilibrating motion. Rayleigh-Taylor, Kelvin-Helmholtz, and Richtmyer-Meshkov instabilities. Z-pinch, Bennett equilibrium, radiation collapse, and radiation sources. **Prerequisites:** MAE 217A-B-C or consent of instructor.

MAE 218B. Introduction to High Energy Density Physics (Laser-Plasma Interactions) (4)

Propagation and absorption of laser beam in plasma, ablation pressure. Laser scattering and laser-plasma instabilities (stimulated Raman and Brillouin scattering, filamentation and decay instabilities). Electron heat transport, mechanisms of magnetic field generation. **Prerequisites:** MAE 217A-B-C or consent of instructor.

MAE 220A. Physics of Gases (4)

Thermodynamics of gases for use in gas dynamics. Derivation of thermodynamic functions from statistical mechanics. Applications of classical and quantum statistical mechanics to chemical, thermal, and radiative properties of gases. Equilibrium and nonequilibrium radiation, chemical equilibrium, and elements of chemical kinetics. Laser and reacting-flow applications. **Prerequisite:** MAE 110A or consent of instructor.

MAE 220B. Physical Gas Dynamics (4)

Velocity distribution functions, the Boltzmann equation, moment equations and the Navier-Stokes equations. The dynamics of molecular collisions. The Chapman-Enskog expansion and transport coefficients: shear and bulk viscosity, heat conduction, molecular and thermal diffusion. Linearizations about equilibrium: applications to acoustics and supersonic flows with relaxation. **Prerequisite:** MAE 101A-B-C or CENG 101A-B-C, MAE 220A, or consent of instructor.

MAE 220C. Nonequilibrium Gas Dynamics (4)

Applications of thermodynamics, statistical mechanics, kinetic theory of gases and fluid mechanics to nonequilibrium flow problems. Shock structure. Chemical relaxation. Chemically reacting boundary layers. Ionized gases. Radiative heat transfer. **Prerequisite:** MAE 220B or consent of instructor.

MAE 221A. Heat Transfer (4)

(Cross-listed with CENG 221A.) Conduction, convection, and radiation heat transfer. Development of energy conservation equations. Analytical and numerical solutions to transport problems. Specific topics and applications vary. **Prerequisite:** MAE 101A-B-C or CENG 101A-B-C, or consent of instructor.

MAE 221B. Mass Transfer (4)

(Cross-listed with CENG 221B.) Fundamentals of diffusive and convective mass transfer and mass transfer with chemical reaction. Development of mass conservation equations. Analytical and numerical solutions to mass transport problems. Specific topics and applications will vary. **Prerequisite:** MAE 101A-B-C or CENG 101A-B-C, or consent of instructor.

MAE 223. Computational Fluid Dynamics (4)

Numerical methods in fluid dynamics and convective transport processes. Numerical solution of the Euler and Navier-Stokes equation. Additional topics will vary according to instructor. Examples include eigenvalue problems in hydrodynamic stability, vortex methods, spectral and panel methods. **Prerequisite:** MAE 210A, 210B, 290A-B or equivalent.

MAE 224A. Environmental Fluid Dynamics I (4)

Basics of stratified flows. Linear waves: surface waves, internal gravity waves, dispersion, reflection, mountain waves. Ray tracing. Gravity currents and intrusions. Hydraulic control. Stability of and mixing in stratified shear flows. Recommended preparation: MAE 210A.

MAE 224B. Environmental Fluid Dynamics II (4)

Plumes and thermals. Application to building ventilation. Basics of rotating flows. Geostrophic flow. Thermal wind balance. Ekman boundary layer. Shallow water equations. Normal modes of a stratified fluid. Potential vorticity. Waves in a rotating fluid. Recommended preparation: MAE 210A. **Prerequisite:** MAE 224A.

MAE 225A. Nanoscale and Microscale Heat Transfer for Energy Conversion Applications I (4)

An advanced introduction to the principles underlying conduction, convection, and radiation phenomena at the atomic/molecular scale; overview of macroscopic thermal sciences, kinetic theory and fluidics, statistical thermodynamics and quantum theory, thermal properties as a function of dimensionality; experimental methods. **Prerequisites:** MAE 221A, MAE 101A-B-C, or consent of instructor.

MAE 225B. Nanoscale and Microscale Heat Transfer for Energy Conversion Applications II (4)

Energy conversion and coupled transport processes; electron and phonons, equilibrium and non-equilibrium energy transfer in nanostructures. Ballistic-diffusive treatment, thermal radiation issues in nanomaterials, near-field energy transfer, molecular dynamics, and experimental methods. **Prerequisites:** MAE 225A, MAE 221A, MAE 101A-B-C, or consent of instructor.

MAE 227A. Fundamentals of Modern Plasma Physics (Magnetized Plasma) (4)

Turbulence in magnetized plasma, statistical analysis of turbulent processes, magnetic reconnection, issues of plasma astrophysics and space plasmas, plasma based propulsion, edge plasma in fusion devices. **Prerequisites:** MAE 217A-B-C or consent of instructor.

MAE 227B. Fundamentals of Modern Plasma Physics (Laser-Plasma Interactions) (4)

Motion of charged particle in relativistic electromagnetic fields. Nonlinear laser absorption mechanisms, harmonic generation, Coulomb explosion. Relativistic self-focusing of laser beam. Generation of intense electron and ion beams, beam instabilities (Wiebel and thermal instabilities). Fast ignition concept. **Prerequisites:** MAE 217A-B-C or consent of instructor.

MAE 228. Selected Topics in Plasma Physics (4)

Collisionless magnetic reconnection, interactions of relativistic laser field with plasma, plasma in astrophysics, computational plasma physics. **Prerequisites:** MAE 217A-B-C or consent of instructor.

MAE 229A. Mechanical Properties (4)

(Cross-listed with MATS 211A.) Review of basic concepts in mechanics of deformation: elasticity, plasticity, viscoelasticity and creep; effects of temperature and strain-rate on inelastic flow; microstructure and mechanical properties; application of basic concepts to selected advanced materials. **Prerequisite:** consent of instructor.

MAE 231A. Foundations of Solid Mechanics (4)

Specification of stress and strain; infinitesimal and finite deformation; conservation equations; typical constitutive equations; minimum potential energy principle. **Prerequisite:** MAE 131B or consent of instructor.

MAE 231B. Elasticity (4)

Basic field equations. Typical boundary value problems of classical linear elasticity. Problems of plane stress and plane strain. Variational principles. **Prerequisite:** MAE 209/BENG 209 or MAE 231A or consent of instructor.

MAE 231C. Anelasticity (4)

Mechanical models of viscoelastic, plastic, and viscoplastic behavior in simple shear or uniaxial stress. Constitutive relations for three-dimensional states of stress and strain. Application to selected technological problems. **Prerequisites:** graduate standing and MAE 231A and 231B, or SE 271 and 272, or consent of instructor.

MAE 232A. Finite Element Methods in Solid Mechanics I (4)

(Cross-listed with SE 276A.) Finite element methods for linear problems in solid mechanics. Emphasis on the principle of virtual work, finite element stiffness matrices, various finite element formulations and their accuracy, and the numerical implementation required to solve problems in small strain, isotropic elasticity in solid mechanics. **Prerequisite:** graduate standing.

MAE 232B. Finite Element Methods in Solid Mechanics II (4)

(Cross-listed with SE 276B.) Finite element methods for linear problems in structural dynamics. Beam, plate, and

doubly curved shell elements are derived. Strategies for eliminating shear locking problems are introduced. Formulation and numerical solution of the equations of motion for structural dynamics are introduced and the effect of different mass matrix formulations on the solution accuracy is explored. **Prerequisites:** graduate standing and MAE 230 or MAE 232A.

MAE 232C. Finite Element Methods in Solid Mechanics III (4)

(Cross-listed with SE 276C.) Finite element methods for problems with both material and geometrical (large deformations) nonlinearities. The total LaGrangian and the updated LaGrangian formulations are introduced. Basic solution methods for the nonlinear equations are developed and applied to problems in plasticity and hyperelasticity. **Prerequisites:** graduate standing and MAE 232B or SE 276B.

MAE 233A. Fracture Mechanics (4)

Theoretical strength; stress concentration. Linear and nonlinear fracture mechanics: stress singularity, fracture modes, crack tip plastic zone, Dugdale model, the R-curve; power-law materials, the J-integral; fatigue; special topics. **Prerequisite:** MAE 231A, MAE 231B, or consent of instructor.

MAE 233B. Micromechanics (4)

General theory of transformation strains and corresponding elastic fields; Green's functions and other solution methods; dislocations; inclusions and inhomogeneities; micromechanics of plastic flow, microcracking, cavitation, and damage in crystalline and other solids. **Prerequisite:** MAE 231A-B-C or consent of instructor.

MAE 238. Stress Waves in Solids (4)

Linear wave propagation; plane waves; reflection and refraction; dispersion induced by geometry and by material properties. Application of integral transform methods. Selected topics in nonlinear elastic, anelastic, and anisotropic wave propagation. **Prerequisite:** MAE 231A-B-C or consent of instructor.

MAE 241. Advances in Control Applications (4)

Study of problems of control design, identification, and optimization for flexible and smart structures, fluid flows, propulsion, power generation, vehicle dynamics (aerospace, ocean, and automotive), magnetic recording, semiconductor manufacturing, biological systems, robot manipulators, and other applications. **Prerequisite:** MAE 143B or equivalent.

MAE 242. Robot Motion Planning (4)

Modeling, solving, and analyzing planning problems for single robots or agents. Configuration space for motion planning, sampling-based motion planning, combinatorial motion planning, feedback motion planning, differential models, and non-holonomic constraints. Basic decision-theory and dynamic programming, sensor and information spaces.

MAE 247. Cooperative Control of Multi-agent Systems (4)

Tools for the design of cooperative control strategies for multi-agent systems are presented. Topics include continuous and discrete-time evolution models, proximity graphs, performance measures, invariance principles, and coordination algorithms for rendezvous, deployment, flocking, formation of autonomous vehicles and consensus. **Prerequisites:** none.

MAE 251. Structure and Analysis of Solids (4)

(Cross-listed with MATS 227 and Chem. 222.) Key concepts in the atomic structure and bonding of solids. Symmetry operations, point groups, lattice types, space groups, inorganic compounds, structure/property comparisons, X-ray diffraction. Ionic, covalent, metallic bonding compared with physical properties. Atomic and molecular orbitals, bands vs. bonds, free electron theory. **Prerequisite:** consent of instructor.

MAE 252AB. Processing and Synthesis of Advanced Materials (4)

(Cross-listed with MATS 233A-B.) Introduction to various materials processing techniques used in fabricating dense bodies with optimal structure and properties. Solidification processing, chemical synthesis of ceramics, theory of

densification, composite fabrication, superconductor synthesis, electronic and optical materials processing, and techniques to generate amorphous solids. **Prerequisite:** consent of instructor.

MAE 253. Advanced Ceramics (4)

(Cross-listed with MATS 236.) Topics include phase equilibria and crystallography, defects and thermodynamics (Kröger-Vink notation), glass scone, electrical and ionic transport behavior, Bronner diagrams, powder synthesis and compaction, sintering theory and grain growth, mechanical optical, magnetic, electrical properties, fuel cells. **Prerequisite:** consent of instructor.

MAE 254. Energy Materials and Applications (4)

(Cross-listed with MATS 256.) This class will cover the fundamentals/engineering aspects of various energy materials based on metallic, ceramic, semiconductor, and chemical structures, and their applications related to solar cells, fuel cells, batteries, fusion energy, and hydrogen storage will be discussed. **Prerequisite:** consent of instructor or department stamp.

MAE 255. Boundary Layer and Renewable Energy Meteorology (4)

Radiative and convective heat transfer in the atmosphere. Surface energy balance and the urban heat island. Turbulence and dispersion in the atmospheric boundary layer. Solar and wind energy systems, resource assessment, and intermittency. **Prerequisite:** MAE 210A or consent of instructor.

MAE 261. Cardiovascular Fluid Mechanics (4)

Topics in the mechanics of blood flow including analytical solutions for flow in deformable vessels, one-dimensional equations, cardiovascular anatomy, lumped parameter models, vascular trees, scaling laws, and an introduction to the biomechanics and treatment of adult and congenital cardiovascular diseases. **Prerequisite:** MAE 210A, 290A, or consent of instructor.

MAE 262. Fluid Mechanics of the Cell (4)

Fluids phenomena relevant to the function, environment, and dynamics of biological cells. Topics include: low-Reynolds number flows, cell motility, internal cellular flows, development and morphogenesis, hydrodynamics of suspensions and polymers, rheology, diffusion, hydrodynamics of deformable bodies (vesicles, membranes, filaments), cells under shear flow. **Prerequisite:** MAE 209, MAE 210A, or consent of instructor.

MAE 263. Experimental Methods in Cell Mechanics (4)

Methods to measure mechanical aspects of cellular nature and behavior such as intracellular rheology, intracellular force distribution and propagation, cell adhesion strength, generation of propulsive forces during locomotion, interaction with the extracellular matrix, and response to external mechanical stimuli. **Prerequisites:** MAE 209 or MAE 210A, MAE 131A or equivalent, or consent of instructor.

MAE 265A. Electronic and Photonic Properties of Materials (4)

(Cross-listed with MATS 251A.) The electronic and optical properties of metals, semiconductors, and insulators. The concept of the band structure. Electronic and lattice conductivity. Type I and Type II superconductivity. Optical engineering using photonic band gap crystals in one-, two-, and three-dimensions. Current research frontiers. **Prerequisite:** consent of instructor.

MAE 265B. Magnetic Materials: Principles and Applications (4)

(Cross-listed with MATS 251B.) The basis of magnetism: Classical and quantum mechanical points of view. Different kinds of magnetic materials. Magnetic phenomena including anisotropy, magnetostriction, domains, and magnetization dynamics. Current frontiers of nano-magnetics research including thin films and particles. Optical, data storage, and biomedical engineering applications of soft and hard magnetic materials. **Prerequisite:** consent of instructor.

MAE 266. Biomaterials (4)

(Cross-listed with MATS 252.) This class will cover biomaterials and biomimetic materials. Metal, ceramic, and polymer biomaterials will be discussed. Emphasis will be on the

structure-property relationships, biocompatibility/degradation issues and tissue/material interactions. Synthesis and mechanical testing of biomimetic materials will also be discussed. **Prerequisite:** consent of instructor.

MAE 267. Nanomaterials and Properties (4)

(Cross-listed with MATS 253.) This course discusses synthesis techniques, processing, microstructural control and unique physical properties of materials in nano-dimensions. Topics include nanowires, quantum dots, thin films, electrical transport, electron emission properties, optical behavior, mechanical behavior, and technical applications of nanomaterials. **Prerequisite:** consent of instructor.

MAE 268. Frontier Micro-Electro-Mechanical Systems (MEMS) Materials and Devices (4)

(Cross-listed with MATS 254.) Fabrication of Micro-Electro Mechanical Systems (MEMS) by bulk and surface micro-machining of single crystal, polycrystal and amorphous silicon and other materials. Performance issues including electrostatic, magnetic, piezoelectric actuators, residual stresses, deformation. Novel device applications, future trends in smart materials and nano-electro-mechanical (NEMS) systems. **Prerequisite:** consent of instructor.

MAE 269. Presentations, Inventions and Patents (4)

(Cross-listed with MATS 255.) This course covers methodology and skills for oral and written presentations. Topics include preparation of presentation materials, presentation exercise, publication manuscripts, research work proposals, understanding and securing of inventions and intellectual properties, patent applications and licensing. **Prerequisite:** consent of instructor. Not offered in 2008–09.

MAE 271A. Thermodynamics of Solids (4)

(Cross-listed with MATS 201A and ECE 238A.) The thermodynamics and statistical mechanics of solids. Basic concepts, equilibrium properties of alloy systems, thermodynamic information from phase diagrams, surfaces and interfaces, crystalline defects. **Prerequisite:** consent of instructor.

MAE 271B. Solid State Diffusion and Reaction Kinetics (4)

(Cross-listed with MATS 201B and ECE 238B.) Thermally activated processes, Boltzmann factor, homogenous and heterogeneous reactions, solid state diffusion, Fick's laws, diffusion mechanisms, Kirkendall effect, Boltzmann-Matano analysis, high diffusivity paths. **Prerequisite:** consent of instructor.

MAE 271C. Phase Transformations (4)

(Cross-listed with MATS 201C and ECE 238C.) Classification of phase transformations; displacive and reconstructive transformations; classical and non-classical theories of nucleation; Becker-Doering, Volmer-Weber, lattice instabilities, spinodal decomposition. Growth theories; interface migration, stress effects, terrace-ledge mechanisms, epitaxial growth, kinetics and mechanics. Precipitation. Order-disorder transformations. Solidification. Amorphization. **Prerequisites:** consent of instructor.

MAE 272. Imperfections in Solids (4)

(Cross-listed with MATS 205A.) Point, line, and planar defects in crystalline solids, including vacancies, self interstitials, solute atoms, dislocations, stacking faults, and grain boundaries; effects of imperfections on mechanical properties; interactions of dislocations with point defects; strain hardening by micro-obstacles, precipitation, and alloying elements.

MAE 273A. Dynamic Behavior of Materials (4)

(Cross-listed with MATS 213A.) Elastic waves in continuum; longitudinal and shear waves. Surface waves. Plastic waves; shock waves, Rankine-Hugoniot relations. Method of characteristics, differential and difference form of conservation equations; dynamic plasticity and dynamic fracture. Shock wave reflection and interaction. **Prerequisite:** consent of instructor.

MAE 280A. Linear Systems Theory (4)

Linear algebra: inner products, outer products, vector norms, matrix norms, least squares problems, Jordan forms, coordinate transformations, positive definite matrices, etc. Properties of linear dynamic systems described by ODEs: observability, controllability, detectability, stabilizability, trackability, optimality. Control systems design: state

estimation, pole assignment, linear quadratic control. **Prerequisite:** MAE 143B or consent of instructor.

MAE 280B. Linear Control Design (4)

Parameterization of all stabilizing output feedback controllers, covariance controllers, H-infinity controllers, and L-2 to L-infinity controllers. Continuous and discrete-time treatment. Alternating projection algorithms for solving output feedback problems. Model reduction. All control design problems reduced to one critical theorem in linear algebra. **Prerequisite:** MAE 280A.

MAE 281A. Nonlinear Systems (4)

Existence and uniqueness of solutions of EDE's, sensitivity equations. Stability, direct and converse Lyapunov theorems, LaSalle's theorem, linearization, invariance theorems. Center manifold theorem. Stability of perturbed systems with vanishing and non-vanishing perturbations, input-to-state ability, comparison method. Input-output stability. Perturbation theory and averaging. Singular perturbations. Circle and Popov criteria. **Prerequisite:** MAE 280A.

MAE 281B. Nonlinear Control (4)

Small gain theorem, passivity. Describing functions. Nonlinear controllability, feedback linearization, input-state and input-output linearization, zero dynamics. Stabilization, Brockett's necessary conditions (local), control Lyapunov functions, Sontag's formula (global). Integrator back stepping, forwarding. Inverse optimality, stability margins. Disturbance attenuation, deterministic and stochastic, nonlinear H-infinity. Nonlinear observers. **Prerequisite:** MAE 281A.

MAE 282. Adaptive Control (4)

Parametric models. Parameter identifiers and algorithms, Spr-Lyapunov, gradient, least-squares, persistence of excitation, adaptive observers. Model reference adaptive control, certainty equivalence. Pole placement, polynomial, LQR, indirect. Robustification, parameter drift, leakage, projection, dead zone, dynamic normalization. Adaptive nonlinear control, tuning functions, modular design. Extremum seeking. **Prerequisites:** MAE 281A or consent of instructor.

MAE 283A. Parametric Identification: Theory and Methods (4)

Constructing dynamical models from experimental data. Deterministic and stochastic discrete time signals. Discrete time systems. Non-parametric identification: correlation and spectral analysis. Parametric identification: realization and prediction error methods, least squares estimation, approximate modeling. Experiment design. Frequency domain identification. **Prerequisite:** MAE 143C recommended.

MAE 283B. Approximate Identification and Control (4)

Identification for control: approximate identification, estimation of models via closed-loop experiments. Closed-loop identification techniques. Estimation of model uncertainty. Model invalidation techniques. Iterative techniques for model estimation and control design. **Prerequisite:** MAE 283A.

MAE 284. Robust and Multi-Variable Control (4)

Multivariable feedback systems: transfer function matrices, Smith-McMillan form, poles, zeros, principal gains, operator norms, limits on performance. Model uncertainties, stability and performance robustness. Design of robust controllers, H_{inf} and mu synthesis. Controller reduction. **Prerequisite:** MAE 143C or MAE 280A.

MAE 286. Hybrid Systems (4)

Definition of hybrid system. Examples in mechanics, vision, and multi-agent systems. Trajectories of hybrid systems. Chattering, Zeno phenomena. Stability analysis. Arbitrary switching: common Lyapunov functions. Slow switching: dwell time. State-dependent switching: multiple Lyapunov functions, Invariance Principle. Hybrid control design. Applications. **Prerequisite:** MAE 281A or consent of instructor.

MAE 287. Control of Distributed Parameter Systems (4)

Strongly continuous semigroups, infinitesimal generators, unbounded closed linear operators, Hille-Yosida theorem, Riesz-spectral operators. Existence and uniqueness of

solutions of abstract evolution equations, perturbation and composite systems. Boundary control systems. Controllability, exact and approximate, Hilbert uniqueness method, fixed point method. Input-output maps, transfer functions. Exponential stability, stabilizability, Lyapunov equation. Controllability via stabilizability. Compensator design. **Prerequisite:** MAE 280A or consent of instructor.

MAE 288A. Optimal Control (4)

Deterministic methods: Pontryagin's Maximum Principle, dynamic programming, calculus of variations. Stochastic methods: Gauss-Markov processes, Linear Quadratic control, Markov chains. Linear Quadratic Gaussian Control and the Separation Principle. **Prerequisite:** graduate standing or consent of instructor.

MAE 288B. Optimal Estimation (4)

Least Squares and Maximum Likelihood Estimation methods, Gauss-Markov models, State Estimation and Kalman Filtering, prediction and smoothing. The extended Kalman filter. **Prerequisite:** MAE 280A completed or concurrent.

MAE 289. Functional Analysis and Applications (4)

Functional analysis without measure theory. Banach spaces and Hilbert spaces. Spaces of continuous functions, L_p spaces and L_∞ spaces. Bounded linear functionals, dual spaces, reflexivity and linear operators. Strong and weak convergence. Hahn-Banach Theorem. Nonlinear functionals and differentials. Applications. **Prerequisites:** Math. 20A-B-C-D-E-F or consent of instructor.

MAE 290A. Efficient Numerical Methods for Simulation, Optimization, and Control (4)

Linear algebra, numerical methods, and numerical analysis. Direct and iterative methods for systems of linear and nonlinear equations, the fundamental matrix decompositions (eigenvector/SVD/Jordan), transform methods (Fourier/Laplace/Z), function approximation, differentiation, integration (quadrature/ODEs), and minimization. **Prerequisite:** MAE 107 or consent of instructor.

MAE 290B. Numerical Methods for Differential Equations (4)

Numerical solution of differential equations in mathematical physics and engineering, ordinary and partial differential equations. Linear and nonlinear hyperbolic parabolic, and elliptic equations, with emphasis on prototypical cases, the convection-diffusion equation, Laplace's and Poisson equation. Finite difference methods will be considered in depth, and additional topics. **Prerequisite:** MAE 290A or consent of instructor.

MAE 291. Design and Mechanics in Computer Technology (4)

Design and mechanics problems inherent in computer peripherals such as disk files, tape drives, and printers. Formulation and solution of problems involving mechanics, fluid mechanics, and materials; Reynolds equation, slider bearings; friction and wear; actuator design, impact printing; silicon fluid jets. **Prerequisite:** consent of instructor. Not offered every year.

MAE 292. Computer-Aided Design and Analysis (4)

Introduction to 2-D and 3-D computer-aided design. Design problems may include: ball bearing kinematics, Weibull statistics, non-repeatable spindle run-out, four bar linkages, beam deflection and vibration, design of magnetic head suspension, hydrodynamic theory of lubrication, air bearings, heat transfer, optical servo, design of ink jet print head. **Prerequisite:** consent of instructor. Not offered every year.

MAE 293. Advanced Computer Graphics for Engineers and Scientists (4)

Advanced topics used to enhance scientific and engineering visualization. C programming assignments and the use of advanced graphics software. Continuation of topics from MAE 152, including color, computational geometry, 3-D contouring, volume visualization, and hardware architectures. **Prerequisite:** MAE 152 or consent of instructor.

MAE 294A. Introduction to Applied Mathematics (4)

(Cross-listed with SIO 203A.) Review of exact methods for ordinary differential equations. Expansions about regular and irregular singular points. Introduction to asymptotic expansions. Approximate methods for nonlinear differential equations. Regular and singular perturbation theory.

Additional topics depending upon the interests of the instructor. **Prerequisites:** Math. 110, Math. 120A or consent of instructor.

MAE 294B. Introduction to Applied Mathematics II (4)

(Cross-listed with SIO 203B.) Asymptotic methods: method of steepest descent (if not covered in I) WKB, method of multiple scales, boundary layer theory. Elements of complex analysis. **Prerequisite:** MAE 294A or SIO 203A or consent of instructor.

MAE 294C. Introduction to Applied Mathematics III (4)

(Cross-listed with SIO 203C.) Partial differential equations: characteristics, similarity solutions, Green's functions, images, wave equation, diffusion equation, Laplace's equation. Applications to continuum mechanics, potential fields, and transport phenomena such as diffusion, linear and nonlinear waves, Burger's equation and shocks. Other topics according to the interests of the instructor. **Prerequisites:** MAE 294B or SIO 203B or consent of instructor.

MAE 295. Field Study (1-12)

Provides field study in industry with faculty supervision. Analysis and problem solving using real world applications. **Prerequisite:** consent of advisor and department; 3.0 GPA.

MAE 296. Independent Study (1-4)

Independent reading or research on a problem as arranged by a designated faculty member. Must be taken for a letter grade only. **Prerequisite:** consent of instructor.

MAE 298. Directed Group Study (1-4)

Directed group study on a topic or in a field not included in regular department curriculum, by special arrangement with a faculty member. **Prerequisite:** consent of instructor. (S/U grades permitted.)

MAE 299. Graduate Research (1-12)

Independent work by graduate students engaged in research and writing theses. MAE graduate students only. (S/U grades only.)

MAE 501. Teaching Experience (2)

Teaching experience in an appropriate MAE undergraduate course under direction of the faculty member in charge of the course. Lecturing one hour per week in either a problem-solving section or regular lecture. (S/U grade only.) **Prerequisites:** consent of instructor and the MAE department.

NanoEngineering (NANO)

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DEPARTMENTAL FOCUS

The Department of NanoEngineering focuses on nanoscale science, engineering, and technology that have the potential to make valuable advances in different areas that include, to name a few, new materials, biology and medicine, energy conversion, sensors, and environmental remediation. Nanoengineering is a highly diversified and multi-disciplinary field. The graduate research programs cover a broad range of topics, but focus particularly on biomedical nanotechnology, nanotechnologies for energy conversion and storage, computational

nanotechnology, and molecular and nanomaterials. Undergraduate degree programs focus on integrating the various science and engineering disciplines necessary for successful careers in the evolving nanotechnology industry.

DEGREE AND PROGRAM OPTIONS

The Department of NanoEngineering offers undergraduate programs leading to the **B.S. degrees in NanoEngineering and Chemical Engineering**. The Chemical Engineering Program is accredited by the Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology (ABET/EAC). The Nanoengineering Program is newly introduced, but the program is designed using ABET accreditation criteria; the department will apply for accreditation once there are graduates to measure the program outcomes. These two degree programs have very different requirements and are described in separate sections.

NANOENGINEERING PROGRAM (NANO)

PROGRAM MISSION AND OBJECTIVES

The mission of the Nanoengineering Program is to provide a multidisciplinary education in nanoscale science and technology. The primary goals are

- Prepare students for a career in nanotechnology by providing them with a sound grounding in multidisciplinary areas of nanoscale science and engineering.
- Increase students' understanding of materials and their properties at the atomic and nanometer scales, including an understanding of the intimate relationship between the scale and the properties of materials. This is referred to as the third dimension in the periodic table, where elements, and combinations thereof, have properties and functions that depend on the material dimension, spanning from the nanoscale to macroscale.
- Prepare graduates who, while skilled in nanoscale science and engineering, will be qualified for jobs in traditional science-based industries and government laboratories and, as nanotechnologies mature, well positioned for jobs in this applied area. This program will be anticipating trends and providing students with integrated, cross-disciplinary scientific knowledge and professional skills.
- Educate a new generation of engineers who can participate in, and indeed seed, new high-technology companies that will be the key to maintaining jobs, wealth, and educational infrastructures as nanotechnology results in a new industrial revolution.
- Enable students to develop a range of professional, scientific, and computational skills that will enhance employment opportunities in a wide range of industrial and governmental institutions.
- Prepare students for the workplace through developing their ability to have effective communication skills, modern science and engineering skills, and contribute constructively

to multidisciplinary teams.

- Form strong multidisciplinary educational links through joint team projects that cross the traditional areas of science and engineering.

THE UNDERGRADUATE PROGRAM

The B.S. program in NanoEngineering is tailored to provide breadth and flexibility by taking advantage of the strength of basic sciences and other engineering disciplines at UC San Diego. The intention is to graduate nanoengineers who are multidisciplinary and can work in a broad spectrum of industries.

All NANO courses are taught only once per year, and courses are scheduled to be consistent with the curriculum as shown in the tables below. Under normal circumstance, students must follow the prescribed curriculum. Unavoidable deviation from the curriculum, for example, to participate in the Education Abroad Program, must be approved by the Undergraduate Affairs Committee prior to taking alternative courses elsewhere. Approvals are also needed for engineering courses not listed under the current selections for different engineering focus areas. Courses such as NANO 195, 197, and 198 are not allowed as a NanoEngineering elective in meeting the upper-division major requirements. NANO 199 can be used as a technical elective only under restrictive conditions. Policy regarding these conditions may be obtained from the department's Student Affairs Office. All students are encouraged to visit the Student Affairs Office or visit the Department of NanoEngineering Web site for any clarification and updated information. To graduate, students must maintain an overall GPA of at least 2.0, and the department requires at least a C- grade in each course required for the major.

GENERAL-EDUCATION/COLLEGE REQUIREMENTS

For graduation each student must satisfy general-education course requirements determined by the student's college as well as the major requirements determined by the department. The six colleges at UCSD require widely different general-education courses, and the number of such courses differs from one college to another. Each student should choose his or her college carefully, considering the special nature of the college and the breadth of general education.

The NANO curriculum allows for forty-eight units of humanities and social science (HSS) courses, which are sufficient to fulfill most but not all college requirements. Regardless the specific college, students must develop a program that includes a total of at least forty-eight units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. Students must consult with their college to determine which HSS courses to take.

MAJOR REQUIREMENTS

To receive a B.S. in NanoEngineering, students must complete 192 units. The specific breakdown is as follows:

Humanities and social sciences (forty-eight units): This requirement is intended to fulfill the general-education requirements (GER) from respective colleges.

Basic sciences and mathematics (fifty-nine units): This lower-division requirement includes twenty-four units of mathematics (Math. 20A-F), sixteen units of physics (Phys. 2A-D), fifteen units of chemistry (Chem. 6A-C, 6BL), and four units of biology (BILD 1).

Engineering preparation (sixteen units): This requirement covers basics in computer programming, circuit analysis and circuits lab (ECE 15, 35, 45, 65).

Nanoengineering core (thirty-seven units): This requirement is constituted of a one-unit seminar (NANO 1) and nine core courses (NANO 101 to 104, 110 to 112, and 120A-B).

Nanoengineering electives (eight units): This requirement must be chosen from among the upper-division NANO courses offered by the department.

Engineering focus (twenty-four units): Students are recommended to select all six engineering electives from within one single major to constitute an engineering focus. However, to allow for unforeseen class scheduling conflicts and to comply with the prerequisites of some Bioengineering courses, students are required to take only four of the six courses in one major, with the other two outside their chosen engineering focus. Preapproved accepted courses of each of the four focuses are listed below.

- Bioengineering:**
BENG 100, 101, 103B*, 109, 110, 112A, 112B, 122A*, 130, 186A
*BENG 103B requires CENG 101A and 122A requires MAE 140. Both prerequisites are accepted as part of the twenty-four-unit bioengineering focus.
- Chemical engineering:**
CENG 100, 101A, 101B, 101C, 102, 113, 120.
- Electrical engineering:**
ECE 103, 107, 109, 134, 135A, 135B, 136, 136L, 138L, 139, 183, 187.
- Mechanical engineering:**
MAE 20, 101A, 101B, 101C, 105, 113, 110A, 130A, 130B, 131A, 143A, 143B, 160, 161, 166, 168.
- Materials science:**
NANO 108, 140, 148, 150, 156, 158, 161, 164, 168.

All students follow the same basic science preparation and core set of classes in NanoEngineering during the first two years.

Fall	Winter	Spring
Freshman Year		
Math. 20A	Math. 20B	Math. 20C
Chem. 6A	Chem. 6B	Chem 6C
ECE 15	BILD 1	Phys. 2A
HSS	HSS	HSS
	NANO 1	
Sophomore Year		
Math. 20D	Math. 20F	Math. 20E
Phys. 2B	Phys. 2C	Phys. 2D
Chem. 6BL	NANO 101	ECE 25
HSS	HSS	HSS

After the sophomore year, students must choose an engineering focus. Sample programs of the five choices are shown below. Students must keep in mind that the NANO courses are only offered once a year.

Recommended Course Sequence—Bioengineering Focus

Fall	Winter	Spring
Junior Year		
NANO 102	NANO 103	NANO 104
CENG 101A	BENG 130	BENG 100
ECE 35	ECE 65	NE Elective
HSS	HSS	HSS
Senior Year		
NANO 110	NANO 111	NANO 112
BENG 101	BENG 109	BENG 103B
NE Elective	NANO 120A	NANO 120B
HSS	HSS	HSS

Recommended Course Sequence—Chemical Engineering Focus

Fall	Winter	Spring
Junior Year		
NANO 102	NANO 103	NANO 110
CENG 100	CENG 102	CENG 113
ECE 35	ECE 65	NE Elective
HSS	HSS	HSS
Senior Year		
NANO 110	NANO 111	NANO 112
CENG 101A	CENG 101B	CENG 101C
NE Elective	NANO 120A	NANO 120B
HSS	HSS	HSS

Recommended Course Sequence—Electrical Engineering Focus

Fall	Winter	Spring
Junior Year		
NANO 102	NANO 103	NANO 104
ECE 35	ECE 65	ECE 134
ECE 103	NE Elective	ECE 136
HSS	HSS	HSS
Senior Year		
NANO 110	NANO 111	NANO 112
ECE 135A	ECE 135B	ECE 139
NE Elective	NANO 120A	NANO 120B
HSS	HSS	HSS

Recommended Course Sequence—Mechanical Engineering Focus

Fall	Winter	Spring
Junior Year		
NANO 102	NANO 103	NANO 104
NANO 108	MAE 130A	MAE 131A
ECE 35	ECE 65	MAE 130B
HSS	HSS	HSS
Senior Year		
NANO 110	NANO 111	NANO 112
CENG 101A	NANO 120A	NANO 120B
MAE 105	NE Elective	NE Elective
HSS	HSS	HSS

Recommended Course Sequence—Materials Science Focus

Fall	Winter	Spring
Junior Year		
NANO 102	NANO 103	NANO 104

ECE 35	ECE 65	NANO 148
NANO 108	NE Elective	NANO 150
HSS	HSS	HSS
Senior Year		
NANO 110	NANO 111	NANO 112
NANO 158	NANO 120A	NANO 120B
NANO 161	NE Elective	NANO 168
HSS	HSS	HSS

POLICIES AND PROCEDURES FOR UNDERGRADUATE STUDENTS

[In this policy section, much is in common with the Chemical Engineering major. Duplicate sections will be consolidated in the final catalog edition.]

Application for Admission to the Major

Admission to the department as a NANO major or minor, or to fulfill a major in another department that requires NANO courses, is in accordance with the general requirements established by the Jacobs School of Engineering. The admission requirements and procedures are described in detail in the section on "[Acceptance to Departmental Majors in the Jacobs School of Engineering](#)" in this catalog. Applicants who have demonstrated excellent academic performance prior to being admitted to UC San Diego will be admitted directly to the engineering major of their choice. These directly admitted students and all students are expected to complete lower- and upper-division courses, as suggested in the curriculum tables, in a timely fashion in the sequences outlined.

Academic Advising

Upon admission to the major, students should consult the catalog or NanoEngineering Web site (<http://nanoengineering.ucsd.edu>) for their program of study or their undergraduate advisor if they have questions. The program plan may be revised in subsequent years, but revisions involving curricular requirements require approval by the undergraduate advisor or the Undergraduate Affairs Committee. Because some course and/or curricular changes may be made every year, it is imperative that students consult with the department's undergraduate advisor on an annual basis.

As aforementioned, NANO and CENG courses are offered only once a year and therefore should be taken in the recommended sequence. If courses are taken out of sequence, it may not always be possible to enroll in courses as desired or needed. If this occurs, students should seek immediate departmental advice. When a student deviates from the sequence of courses specified for each curriculum in this catalog, it may be impossible to complete the major within the nominal four-year period.

In addition to the advising available through the Student Affairs Office, programmatic or technical advice may be obtained from faculty members. A specific faculty mentor is assigned to each student. All students are required to meet with their faculty mentor at least once a quarter.

Program Alterations/Exceptions to Requirements

Variations from or exceptions to any program or course requirements are possible only if the Undergraduate Affairs Committee approves a

petition before the courses in question are taken. Petition forms may be obtained from the Student Affairs Office and must be processed through this office.

Independent Study

Students may take NANO 199, Independent Study for Undergraduates, under the guidance of a NANO faculty member. This course is taken as an elective on a P/NP basis. Under very restrictive conditions, however, it may be used to satisfy upper-division technical elective course requirements for the major. Students interested in this alternative must identify a faculty member with whom they wish to work and propose a two-quarter research or study topic. After obtaining the faculty member's concurrence on the topic and scope of the study, the student must submit a Special Studies Course form (each quarter) and NANO 199 as Technical Elective Contract form to the Undergraduate Affairs Committee. These forms must be completed, approved, and processed prior to the add/drop deadline. Detailed policy in this regard and the requisite forms may be obtained from the Student Affairs Office.

Transfer Students

The undergraduate engineering curriculum is designed to integrate four years of college educational experience. It is not easy for transfer students to complete the major requirements in only two additional years beyond their junior college work. Students should consult their advisor for a transition program compatible with their junior college preparation.

Requirements for admission as a NANO major or into NANO courses are the same for transfer students as they are for continuing students (see section on "[Acceptance to Departmental Majors in the Jacobs School of Engineering](#)" in this catalog). Accordingly, when planning their program, transfer students should be mindful of lower-division prerequisite course requirements, as well as for meeting collegiate requirements.

Students who have taken equivalent courses elsewhere may request to have transfer credit apply toward the department's major requirements. To receive transfer credit, complete a Student Petition form and submit it to Student Affairs. For mathematics, chemistry, and physics, the respective department determines transfer equivalencies. An Undergraduate Student Petition must be submitted to each department from which you are requesting transfer credit.

The following courses are strongly recommended for all engineering transfer students for success in their major.

- Calculus I—for Science and Engineering (Math. 20A)
- Calculus II—for Science and Engineering (Math. 20B)
- Calculus and Analytic Geometry (Math. 20C)
- Differential Equations (Math. 20D)
- Linear Algebra (Math. 20F)
- Complete calculus-based physics series with lab

experience (Physics 2A-B-C)

- Chemistry 6A (except computer science and computer engineering majors)
- Highest level of introductory computer programming language course offerings at the community college*
- Community college equivalent courses can be found at: <http://www.assist.org>

*Refer to the *UC San Diego General Catalog* to select major prerequisite recommendations for computer language courses.

GRADUATE PROGRAM

DEGREE AND PROGRAM OPTIONS

Plans are currently underway to develop graduate curricula leading to the **M.S. and Ph.D. degrees in nanoengineering by 2011**. Until NanoEngineering graduate programs are in place, students wishing to pursue nanoengineering as a graduate focus are encouraged to apply to related graduate programs in bioengineering, chemical engineering, and mechanical and aerospace engineering. Transfer to NanoEngineering will be considered upon approval of its degree programs.

The Chemical Engineering Program offers graduate instruction leading to the **M.S. and Ph.D. degrees in chemical engineering**. Effective fall 2009, Chemical Engineering will offer a concentration in nanotechnology within the graduate program, which also will bridge with the future graduate degree program in nanoengineering.

CHEMICAL ENGINEERING PROGRAM (CENG)

Student Affairs: 2802 Atkinson Hall, Warren College

PROGRAM OBJECTIVES

The Chemical Engineering Program has affiliated faculty from the Department of NanoEngineering, Department of Mechanical and Aerospace Engineering, Department of Chemistry and Biochemistry, and the Department of Bioengineering. The curricula at both the undergraduate and graduate levels are designed to support and foster chemical engineering as a profession that interfaces engineering and all aspects of basic sciences (physics, chemistry, and biology).

The primary educational objectives of the Chemical Engineering Program are

- To provide chemical engineering students with a strong technical education and communication skills that will enable them to have successful careers in a wide range of industrial and professional environments.
- To prepare chemical engineering students for rapidly changing technological environments with the core knowledge central to multidisciplinary development and personal improvement throughout their professional careers.
- To instill in chemical engineering students a strong sense of humanistic values and professionalism such that they can conduct ethically and knowledgeably regarding technological

impact in societal issues.

The curriculum is designed to prepare chemical engineering graduates for further education and personal development through their entire professional career. We strive to accomplish these goals by providing a rigorous and demanding curriculum that incorporates lectures, discussions, laboratory and project development experiences in basic sciences, mathematics, engineering sciences, and design as well as the humanities and social sciences.

B.S./M.S. Contiguous Program

A contiguous program leading to a bachelor of science and a master of science degree in chemical engineering is offered to a student with junior standing who has an upper-division GPA of 3.5 or better and a 3.0 overall UCSD GPA. During the last quarter of their junior year (more specifically, the fourth quarter prior to the receipt of the B.S. degree), students interested in obtaining the M.S. degree within one year following receipt of the B.S. degree may apply to the department for admission to the program.

The M.S. program is intended to extend and broaden an undergraduate background and/or equip practicing engineers with fundamental knowledge in their particular fields. The degree is offered under both the Thesis Plan I and the Comprehensive Examination Plan II.

Integrated B.S./M.S. Requirements

An integrated co-terminal program leading to a bachelor of science and a master of science degree in chemical engineering is offered to a student with junior standing who has an upper-division GPA of 3.5 or better and a 3.0 overall UCSD GPA. Details of the program are available from the Student Affairs Office.

Program Accreditation

The B.S. Program in chemical engineering is accredited by the Accreditation Board of Engineering and Technology (ABET/EAC).

GRADUATE PROGRAM

The Chemical Engineering Program offers graduate instruction leading to the M.S. and Ph.D. degrees in chemical engineering. The nanotechnology concentration signifies that four elective courses are chosen from the approved courses in this area.

Admission is in accordance with the general requirements of the graduate division, which requires at least a B.S. in some branch of engineering, sciences, or mathematics; an overall GPA of 3.0, and three letters of recommendation from individuals who can attest to the academic or professional competence and to the depth of their interest in pursuing graduate study.

In addition, all applicants are required to submit GRE General Test Scores. A minimum score of 550 on the Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English. Students who score below 600 on the TOEFL are strongly encouraged to enroll in an English as a second language program before beginning graduate work. UC San Diego Extension

offers an excellent English language program during the summers as well as the academic year.

Applicants are judged competitively. Based on the candidate's background, qualifications, and goals, admission to the program is in one of three categories: M.S. only, MS, or Ph.D. Admission to the M.S. only category is reserved for students for whom the M.S. degree is likely to be the terminal graduate degree. The M.S. designation is reserved for students currently interested in obtaining an M.S. degree but who at a later time may wish to continue in the doctoral degree program. Admission to the Ph.D. Program is reserved for qualified students whose final aim is a doctoral degree.

Non-matriculated students are welcome to seek enrollment in graduate-level courses via UC Extension's concurrent registration program, but an extension student's enrollment in a graduate course must be approved by the instructor.

MASTER'S DEGREE PROGRAM

The M.S. Program is intended to extend and broaden an undergraduate education with fundamental knowledge in different fields. The degree may be terminal, or obtained on the way to the Ph.D. The degree is offered under both the Thesis Plan I and the Comprehensive Examination Plan II.

M.S. Time Limit Policy: Full-time M.S. students are permitted seven quarters in which to complete all requirements. While there is no written time limit for part-time students, the department has the right to intervene and set individual deadlines if it becomes necessary.

Course requirements: All M.S. students must complete a total of forty-eight units, which include a core of five courses (twenty units) chosen among fluid dynamics (CENG 210A, MAE 210B), heat and mass transfer (CENG 221AB), kinetics (CENG 252), and mathematics. To maintain a certain balance in the core, no more than two mathematics courses should be chosen among the choices of applied mathematics (MAE 294AB or Math. 210AB) and numerical mathematics (MAE 290AB or Math. 270AB).

No more than three courses (twelve units) of upper-division courses may be applied toward the total course work requirement. No more than a total of eight units of CENG 296 and 298 may be applied toward the course work requirement. Units in seminars (CENG 259) may not be applied toward the degree requirement.

Thesis Plan I: Completion of the research thesis (CENG 299) fulfills twelve units toward the total graduation requirement. The balance is made up of the five core courses (twenty units) and additional four elective courses (sixteen units) subject to the restrictions described above. The nanotechnology concentration signifies that four elective courses are chosen from the approved courses in this area.

Comprehensive Examination Plan II: This plan involves course work only and culminates in an oral comprehensive examination based on topics selected from the core courses. In addition to the five core courses (twenty units), one must choose an additional seven electives (twenty-eight units) subject to the restrictions of CENG 259, 296, and 298 described above. Sample electives are listed in the table below. A student should consult his or her academic advisor to choose an appropriate course

schedule, including alternatives in bioengineering, electrical and computer engineering, materials science, basic sciences, and mathematics. The nanotechnology concentration signifies that four elective courses are chosen from the approved courses in this area.

Fall	Winter	Spring
Core selections		
CENG 210A	CENG 221A	CENG 221B
MAE 290A or 294A	MAE 210B	CENG 252
	MAE 290B or 294B	
Suggested electives		
MS 201A	MS 201B	MS 201C
MAE 211	MAE 212	MAE 213
Math. 270A	Math. 270B	Math. 270C
Chem. 211	Chem. 212	Chem. 213
Nanotechnology concentration		
CENG 211	CENG 213	
CENG 212	CENG 214	CENG 215

Change of Degree: Upon completion of the requirements for the M.S. degree, students admitted as M.S. only or M.S. candidates are not automatically eligible for admission to the Ph.D. Program.

M.S. only and M.S. candidates who subsequently wish to pursue a doctorate must submit an application for a change in status to their examining committee. The application, if approved by the committee, must be signed by a faculty member who expects to serve as the student's Ph.D. advisor. The student must also submit a general petition for graduate students to effect the change of status. If the student elects the comprehensive examination plan for the M.S. degree, the examining committee may recommend that the comprehensive examination may replace the preliminary qualifying examination expected of Ph.D. students.

DOCTORAL DEGREE PROGRAM

The Ph.D. Program is intended to prepare students for a variety of careers in research and teaching. The emphasis is on research. In general, there are no formal course requirements. All students, in consultation with their advisors, develop appropriate course programs that will prepare them for the Preliminary Qualifying Examination and for their dissertation research. These programs must be planned to meet the time limits established to advance to candidacy and to complete the requirements of the degree.

All Ph.D. students are required to pass three examinations. The first is a Preliminary Qualifying Examination, which should be taken within three to four quarters of full-time graduate study. The second is the Ph.D. Qualifying Examination. The last is the Dissertation Defense.

Preliminary Qualifying Examination: The examination is intended to determine a candidate's basic understanding of engineering fundamentals and the candidate's ability to pursue successfully a research project at a level appropriate for the doctorate. The scope of the examination is based on topics selected from the core curriculum as listed under the M.S. degree program. A candidate is expected to demonstrate knowledge equivalent to these courses and formal enrollment record is not a prerequisite. The format is an oral examination administered by a committee of three faculty members in the Chemical

Engineering Program. The candidate should present to the committee, prior to the examination, the five core courses that will constitute the basis of the examination.

Depth Requirement: A candidate must have the ability to perform in-depth analysis in the dissertation topic. A candidate should consult with the thesis advisor to develop a proper course program if it is deemed necessary. Depending on an individual's background and the nature of the research problem, a candidate should either complete a set of a minimum of four courses or demonstrate to the thesis advisor the equivalent knowledge and ability.

Ph.D. Qualifying Examination: Prior to taking this examination, the candidate must have completed the departmental qualifying examination, obtained a faculty research advisor, and must have made initial progress on a chosen dissertation project. At the time of application for advancement to candidacy, a doctoral committee responsible for the remainder of the student's graduate program is appointed by the Graduate Council under the policy listed in the "Graduate Studies" section of the *UC San Diego General Catalog*. The committee conducts the Ph.D. Qualifying Examination, during which the student must demonstrate the ability to engage in thesis research. The process involves the presentation of a plan for the thesis research project. The committee may ask questions directly or indirectly related to the project and general questions that it determines to be relevant. Upon successful completion of the examination, subject to the UCSD time limit policy, the student is advanced to candidacy and is awarded the candidate in philosophy degree (see "Graduate Studies" section in this catalog).

Teaching Experience: Prior to the dissertation defense, the candidate must serve at least once as a teaching assistant with the responsibility to hold a problem-solving section one hour a week.

Dissertation Defense: This is the final Ph.D. examination. Upon completion of the dissertation research project, the candidate writes a dissertation that must be successfully defended in an oral examination and public presentation conducted by the doctoral committee. A complete copy of the student's dissertation must be submitted to each member of the doctoral committee four weeks before the defense. It is understood that this copy of the dissertation given to committee members will not be the final copy, and that the committee members may request changes in the text at the time of the defense. This examination may not be conducted earlier than three quarters after the date of advancement to doctoral candidacy. Acceptance of the dissertation by the Office of Graduate Studies and the University Librarian represents the final step in completion of all requirements for the Ph.D. degree.

Ph.D. Time Limit Policy: Pre-candidacy status is limited to four years. Doctoral students are eligible for university support for six years. The defense and submission of the doctoral dissertation must be within seven years.

Annual Evaluation: In the spring of each year, the faculty advisor evaluates each doctoral student's overall performance in course work, research, and prospects for financial support for future years. A written assessment is given to the student after the

evaluation. If a student's work is found to be inadequate, the faculty may determine that the student cannot continue in the graduate department.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

COURSES IN CHEMICAL ENGINEERING (CENG)

All undergraduate students enrolled in CENG courses or admitted to the CENG program are expected to meet prerequisite and performance standards, i.e., students may not enroll in any CENG courses or courses in another department which are required for the major prior to having satisfied prerequisite courses with a C– or better. (The program does not consider D or F grades as adequate preparation for subsequent material.) Additional details are given under the program outline, course descriptions, and admission procedures for the Jacobs School of Engineering in this catalog.

LOWER-DIVISION

CENG 1. The Scope of Chemical Engineering (1)

Demonstrations and discussions of basic knowledge and the opportunities in chemical engineering for professional development. Introduction to campus library and computer resources. Use of personal software tools such as spread-sheeting and student edition of MATLAB. **Prerequisites:** none. (P/NP grading only.)

UPPER-DIVISION

CENG 100. Process Modeling and Computation in Chemical Engineering (4)

Introduction to elementary numerical methods with applications to chemical engineering problems using a variety of problem solving strategies. Error analysis. Concepts of mathematical modeling, material and energy balances, and probability and statistics with applications to design problems. **Prerequisites:** admission to the chemical engineering major only and grades of C– or better in MAE 9 or 10, and Chem. 6C or consent of instructor.

CENG 101A. Introductory Fluid Mechanics (4)

Kinematics and equation of motion; hydrostatics; Bernoulli's equation; viscous flows; turbulence, pipe flow; boundary layers and drag in external flows; applications to chemical, structural, and bioengineering. Students may not receive credit for both MAE 101A and CENG 101A. **Prerequisites:** admission to the major and grades of C– or better in Phys. 2A and Math. 21D or 20D, and 20E or consent of instructor.

CENG 101B. Heat Transfer (4)

Conduction, convection, radiation heat transfer; design of heat exchangers. Students may not receive credit for both MAE 101C and CENG 101B. **Prerequisites:** admission to the major and a grade of C– or better in CENG 101A.

CENG 101C. Mass Transfer (4)

Diffusive and convective mass transfer in solids, liquids, and gases; steady and unsteady state; mass transfer coefficients; applications to chemical engineering and bioengineering. **Prerequisites:** admission to the major and grade of C– or better in CENG 101A.

CENG 102. Chemical Engineering Thermodynamics (4)

Thermodynamic behavior of pure substances and mixtures. Properties of solutions, phase equilibria. Thermodynamic cycles. Chemical equilibria for homogeneous and heterogeneous systems. **Prerequisites:** CENG 100 and Math. 20D or consent of instructor.

CENG 113. Chemical Reaction Engineering (4)

Principles of chemical reactor analysis and design. Experimental determination of rate equations, design of batch and continuous reactors, optimization of selectivity in multiple reactions, consideration of thermal effects and residence time distribution. Introduction to multi-phase reactors. **Prerequisites:** grade of C– or better in CENG 100 or consent of instructor and Math. 20D.

CENG 120. Chemical Process Dynamics and Control (4)

Examination of dynamic linear and linearized models of chemical processes. Stability analysis. Design of PID controllers. Selection of control and manipulated variables. Root locus, Bode and Nyquist plots. Cascade, feed-forward and ratio controls. **Prerequisites:** admission to the major and grades of C– or better in Math. 21D or Math. 20D. (Students may not receive credit for both MAE 141A or MAE 143B and CENG 120.)

CENG 122. Separation Processes (4)

Principles of analysis and design of systems for separation of components from a mixture. Topics will include staged operations (distillation, liquid-liquid extraction), and continuous operations (gas absorption, membrane separation) under equilibrium and nonequilibrium conditions. **Prerequisites:** admission to the major and grades of C– or better in CENG 100, CENG 102, and CENG 101C.

CENG 124A. Chemical Plant and Process Design I (4)

Principles of chemical process design and economics. Process flow diagrams and cost estimation. Computer-aided design and analysis. Representation of the structure of complex, interconnected chemical processes with recycle streams. Ethics and professionalism. Health, safety, and the environmental issues. **Prerequisites:** admission to chemical engineering major and grades of C– or better in CENG 113 and CENG 122 or consent of instructor.

CENG 124B Chemical Plant and Process Design II (4)

Engineering and economic analysis of integrated chemical processes, equipment, and systems. Cost estimation, heat and mass transfer equipment design and costs. Comprehensive integrated plant design. Optimal design. Profitability. **Prerequisites:** admission to chemical engineering major and grade of C– or better in CENG 124A.

CENG 176A. Chemical Engineering Process Laboratory I (4)

Laboratory projects in the areas of applied chemical research and unit operations. Emphasis on applications of engineering concepts and fundamentals to solution of practical and research problems. **Prerequisites:** admission to the major and grades of C– or better in CENG 113, CENG 122, and MAE 170 or consent of instructor and departmental approval.

CENG 176B. Chemical Engineering Process Laboratory II (4)

Training in planning research projects, execution of experimental work, and articulation (both oral and written) of the research plan and results in the areas of applied chemical technology and engineering operations related to mass, momentum, and heat transfer. **Prerequisites:** admission to the major and grade of C– or better in CENG 176A.

CENG 192. Senior Seminar in Chemical Engineering (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in chemical engineering (at the upper division level). Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students with preference given to seniors. **Prerequisite:** department stamp or consent of the instructor.

CENG 199. Independent Study for Undergraduates (4–4)

Independent reading or research on a problem by special arrangement with a faculty member. **Prerequisite:** consent of instructor. (P/NP only.)

CHEMICAL ENGINEERING GRADUATE COURSES

CENG 205. Graduate Seminar in Chemical Engineering (1)

Each graduate student in CENG is expected to attend one seminar per quarter, of his or her choice, dealing with current topics in chemical engineering. Topics will vary. **Prerequisites:** none.

CENG 207. Nanomedicine (4)

Introduction to nanomedicine; diffusion and drug dispersion; diffusion in biological systems; drug permeation through biological barriers; drug transport by fluid motion; pharmacokinetics of drug distribution; drug delivery systems; nanomedicine in practice: cancers, cardiovascular diseases, immune diseases, and skin diseases. **Prerequisites:** none.

CENG 208. Nanofabrication (4)

Basic engineering principles of nanofabrication. Topics include: photo-, electron beam and nanoimprint lithography, block copolymers and self-assembled monolayers, colloidal assembly, biological nanofabrication. **Prerequisites:** none.

CENG 210A. Fluid Mechanics I (4)

(Cross-listed with MAE 210A.) Basic conservation laws, flow kinematics. The Navier-Stokes equations and some of its exact solutions, non-dimensional parameters and different flow regimes, vorticity dynamics. **Prerequisites:** MAE 101A-B and MAE 110A or consent of instructor.

CENG 211. Introduction to Nanoengineering (4)

Understanding nanotechnology, broad implications; miniaturization: scaling laws; nanoscale physics; types and properties of nanomaterials; nanomechanical oscillators, nano(bio)electronics, nanoscale heat transfer; fluids at nanoscale; machinery cell; applications of nanobiotechnology and nanobiotechnology. **Prerequisites:** none.

CENG 212. Intermolecular and Surface Forces (4)

Development of quantitative understanding of the different intermolecular forces between atoms and molecules and how these forces give rise to interesting phenomena at the nanoscale, such as flocculation, wetting, and self-assembly in biological (natural) and synthetic systems. **Prerequisites:** none.

CENG 213. Nanoscale Synthesis and Characterization (4)

Examination of nanoscale synthesis—top-down and bottom-up; physical deposition; chemical vapor deposition; plasma processes; sol-gel processing; soft-lithography; self-assembly and layer-by-layer; molecular synthesis. Nanoscale characterization; microscopy (optical and electron: SEM, TEM); scanning probe microscopes (SEM, AFM); profilometry; reflectometry, and ellipsometry; x-ray diffraction; spectroscopies (EDX, SIMS, Mass spec, Raman, XPS); particle size analysis; electrical, optical, magnetic, mechanical, thermal. **Prerequisites:** none.

CENG 214. Nanoscale Physics and Modeling (4)

Expanded mathematical analysis of topics introduced in CENG 212. Introduction of both analytical and numerical methods through application to problems in nanoengineering. Nanoscale systems of interest include colloidal systems, block-copolymer based self-assembled materials, molecular motors made out of DNA, RNA, or proteins, etc. Nanoscale phenomena including self-assembly at the nanoscale, phase separation within confined spaces, diffusion through nanopores and nanoslits, etc. Modeling techniques include quantum mechanics, diffusion and kinetics theories, molecular dynamics, etc. **Prerequisite:** CENG 212 or consent of the instructor.

CENG 215. Nanosystems Integration (4)

Discussion of scaling issues and how to carry out the effective hierarchical assembly of diverse molecular and nanoscale components into higher order structures that retain the desired electronic/photonics, structural, mechanical, or catalytic properties at the microscale and macroscale levels. Novel ways to combine the best aspects of both top-down and bottom-up processes to create a totally unique paradigm change for the integration of heterogeneous molecules and nanocomponents into higher order structures. **Prerequisites:** none.

CENG 221A Heat Transfer (4)

(Cross-listed with MAE 221A.) Conduction, convection, and radiation heat transfer development of energy conservation equations. Analytical and numerical solutions to heat transport problems. Specific topics and applications vary. **Prerequisites:** MAE 101A-B-C or CENG 101A-B-C or consent of instructor.

CENG 221B Mass Transfer (4)

(Cross-listed with MAE 221B.) Fundamentals of diffusive and convective mass transfer and mass transfer with chemical reaction. Development of mass conservation equations. Analytical and numerical solutions to mass transport problems. Specific topics and applications will vary. **Prerequisites:** MAE 101A-B-C or CENG 101A-B-C or consent of instructor.

CENG 251. Thermodynamics (4)

Principles of thermodynamics of single and multi-component systems. Phase equilibria. Estimation, calculation, and correlation of properties of liquids and gases. **Prerequisite:** consent of instructor.

CENG 252. Chemical Reaction Engineering (4)

Analysis of chemical rate processes; complex kinetic systems. Chemical reactor properties in steady state and transient operations; optimal design policies. The interaction of chemical and physical transport processes in affecting reactor design and operating characteristics. Uniqueness/multiplicity and stability in reactor systems. Applications of the heterogeneous reactor systems. **Prerequisite:** consent of instructor.

CENG 253. Heterogeneous Catalysis (4)

Physics and chemistry of heterogeneous catalysis. Adsorption/desorption kinetics, chemical bonding, isotherms, kinetic models, selection of catalysts, poisoning, experimental techniques. **Prerequisite:** consent of instructor.

CENG 254. Biochemical Engineering Fundamentals (4)

Introduction to microbiology as relevant to the main topic, biological reactor analysis. Fermentation and enzyme technology. **Prerequisite:** consent of instructor.

CENG 255. Electrochemical Engineering (4)

Fundamentals of electrochemistry and electrochemical engineering. Structure of the double layer, cell potential and electrochemical thermodynamics, charge transfer kinetics, electrochemical transport phenomena, and introduction to colloidal chemistry. Applications such as corrosion prevention, electroplating, reactor design, batteries and fuel cells. **Prerequisite:** consent of instructor.

CENG 259. Seminar in Chemical Engineering (4)

Presentations on research progress by graduate students and by visitors from industrial and academic research laboratories. (May be repeated for credit. S/U grades only.) **Prerequisite:** consent of instructor.

CENG 296. Independent Study in Chemical Engineering (4)

Independent reading or research on a problem as arranged by a faculty member. Must be taken for a letter grade only. **Prerequisite:** consent of instructor.

CENG 299. Graduate Research in Chemical Engineering (1-12)

S/U grades only. **Prerequisite:** consent of instructor.

CENG 501. Teaching Experience (2)

Teaching experience in an appropriate CENG undergraduate course under the direction of the faculty member in charge of the course. Lecturing one hour per week in either a problem-solving section or regular lecture. (S/U grades only) **Prerequisites:** consent of instructor and departmental stamp.

COURSES IN NANOENGINEERING (NANO)

All students enrolled in NANO courses or admitted to the NANO major are expected to meet prerequisite and performance standards, i.e., students may not enroll in any NANO courses or courses in

another department that are required for the major prior to having satisfied prerequisite courses with a C- or better. (The department does not consider D or F grades as adequate preparation for subsequent material.) Additional details are given under the program outline, course descriptions, and admission procedures for the Jacobs School of Engineering in this catalog.

LOWER-DIVISION

NANO 1. Nanoengineering Seminar (1)

Overview of nanoengineering. Presentations and discussions of basic knowledge and career opportunities in nanotechnology for professional development. Introduction to campus library resources. **Prerequisites:** none. (P/NP grading only.)

NANO 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

UPPER-DIVISION

NANO 101. Introduction to Nanoengineering (4)

Introduction to nanoengineering; nanoscale fabrication: nanolithography and self-assembly; characterization tools; nanomaterials and nanostructures: nanotubes, nanowires, nanoparticles, and nanocomposites; nanoscale and molecular electronics; nanotechnology in magnetic systems; nanotechnology in integrative systems; nanoscale optoelectronics; nanobiotechnology; biomimetic systems, nanomotors, nanofluidics, and nanomedicine. **Prerequisites:** grade of C- or better in Chem. 6B, Phys. 2B, Math. 20C.

NANO 102. Foundations in Nanoengineering: Chemical Principles (4)

Chemical principles involved in synthesis, assembly, and performance of nanostructured materials and devices. Chemical interactions, classical and statistical thermodynamics of small systems, diffusion, carbon-based nanomaterials, supramolecular chemistry, liquid crystals, colloid and polymer chemistry, lipid vesicles, surface modification, surface functionalization, catalysis. **Prerequisites:** grade of C- or better in Chem. 6C, Math. 20D, NANO 101, or at least concurrent enrollment.

NANO 103. Foundations in Nanoengineering: Biochemical Principles (4)

Principles of biochemistry tailored to nanotechnologies. The structure and function of biomolecules and their specific roles in molecular interactions and signal pathways. Nanoscale detection methods. **Prerequisites:** grade of C- or better in BILD 1, Chem. 6C, NANO 101, or at least concurrent enrollment.

NANO 104. Foundations in Nanoengineering: Physical Principles (4)

Introduction to quantum mechanics and nanoelectronics. Wave mechanics, the Schrodinger equation, free and confined electrons, band theory of solids. Nanosolids in 0D, 1D, and 2D. Application to nanoelectronic devices. **Prerequisites:** Grade of C- or better in Phys. 2D or Chem. 133, Math. 20D, NANO 102 or at least concurrent enrollment.

NANO 110. Modeling of Nanoengineering Systems (4)

Engineering computation applied to nanotechnology including linear systems, nonlinear equations, optimization, solution of ordinary and partial differential equations, microfluidics simulation, quantum mechanical methods, Monte Carlo and molecular dynamics methods. Students will write programs and use open-source and commercial software. **Prerequisites:** grade of C- or better in Math. 20F, ECE 15, NANO 101.

NANO 111. Characterization of Nanoengineering Systems (4)

Fundamentals and practice of methods to image, measure, and analyze materials and devices that are structured at the nanometer scale. Optical and electron microscopy; scanning probe methods; photon-, ion-, electron-probe methods, spectroscopic, magnetic, electrochemical, and thermal methods. **Prerequisites:** grade of C- or better in NANO 104.

NANO 112. Synthesis and Fabrication of Nanoengineering Systems (4)

Introduction to methods for fabricating materials and devices in nanoengineering. Nano-particle, -vesicle, -tube, and -wire synthesis. Top-down methods including chemical vapor deposition, conventional and advanced lithography, doping, and etching. Bottom-up methods including self-assembly. Integration of heterogeneous structures into functioning devices. **Prerequisites:** grade of C- or better in NANO 102 and 103.

NANO 120A. Nanoengineering System Design I (4)

Principles of product design and the design process. Application and integration of technologies in the design and production of nanoscale components. Engineering economics. Initiation of team design projects to be completed in NANO 120B. **Prerequisites:** grade of C- or better in NANO 110, 111, and 112.

NANO 120B. Nanoengineering System Design II (4)

Principles of product quality assurance in design and production. Professional ethics. Safety and design for the environment. Culmination of team design projects initiated in NANO 120A with a working prototype designed for a real engineering application. **Prerequisites:** grade of C- or better in NANO 120A.

NANO 140. Introduction to Molecular Simulations (4)

Principles of molecular simulations. The students will gain hands-on experience with development of a molecular dynamics and Monte Carlo codes, performing simulations, and analyzing simulation results. The students will also learn to apply molecular simulation techniques for solving nanoengineering problems. **Prerequisite:** NANO 110.

NANO 143. Nanomedicine (4)

History of nanomedicine; length scale; main topics of nanomedicine: drug delivery, drugs and therapy, in vivo imaging, in vitro diagnosis, biomaterials, and active implants; nanomedicine in practice for disease treatment and diagnostics: cancers, cardiovascular diseases, immune diseases, and skin diseases. **Prerequisites:** NANO 101, 102, 103, 104, or consent of instructor.

NANO 145. Introduction to Nanomachines (4)

Understanding nanoscale motion, scaling laws, motion control at the nanoscale, biological nanomotors, molecular nanomachines, design of artificial nanomotors, propulsion mechanisms of artificial nanomotors, applications, and future opportunities and challenges. **Prerequisites:** NANO 101, 102, 103, 104, or consent of instructor.

NANO 146. Nanoscale Optical Microscopy and Spectroscopy (4)

Fundamentals in optical imaging and spectroscopy at the nanometer scale. Diffraction-limited techniques, near-field methods, multiphoton imaging and spectroscopy, Raman techniques, plasmon-enhanced methods, scan-probe techniques, novel sub-diffraction-limit imaging techniques, and energy transfer methods. **Prerequisite:** consent of instructor.

NANO 147. BioNanotechnology (4)

Introduction to biofabrication and bioengineering as applied to nanoscience and nanoengineering. Biological nanostructures, bioelectronics, and biophysics. Basic biochemistry, genetic engineering, and library screening techniques. Bioconjugation and characterization of biological systems on surfaces and nanoscale materials. Biological synthesis of inorganic nanocrystals. **Prerequisite:** NANO 101, 102, 103, 104, or consent of instructor.

NANO 148. Thermodynamics of Materials (4)

Fundamental laws of thermodynamics for simple substances; application to flow processes and to nonreacting mixtures; statistical thermodynamics of ideal gases and crystalline solids; chemical and materials thermodynamics;

multiphase and multicomponent equilibria in reacting systems; electrochemistry. **Prerequisite:** NANO 20.

NANO 150. Mechanics of Nanomaterials (4)

Continuum, quantum and, statistical mechanics, interatomic forces and intermolecular interactions, nanomechanics of self-assembly, pattern formation, hierarchical ordering, defects, surfaces, and interfaces, plasticity, creep, fracture and fatigue, adhesion, friction and wear, nanorheology, nanotribology, composite materials, carbon nanomaterials, biological materials. **Prerequisite:** NANO 20.

NANO 156. Nanomaterials (4)

Basic principles of synthesis techniques, processing, microstructural control and unique physical properties of materials in nanodimensions. Nanowires, quantum dots, thin films, electrical transport, optical behavior, functional behavior, and technical applications of nanomaterial. **Prerequisite:** NANO 20.

NANO 158. Phase Transformations and Kinetics (4)

Materials and microstructures changes. Understanding of diffusion to venable changes in the chemical distribution and microstructure of materials, rates of diffusion. Phase transformations, effects of temperature and driving force on transformations and microstructure. **Prerequisite:** NANO 20.

NANO 161. Material Selection in Engineering Design (4)

Selection of materials for engineering systems, based on constitutive analyses of functional requirements and material properties. The role and implications of processing on material selection. Optimizing material selection in a quantitative methodology. **Prerequisite:** NANO 20.

NANO 162. Nanosensors: Principles, Design, and Applications (4)

Why nanosensors? Nanosensors based on different nanomaterials, fabrication of nanosensors, large-scale integration of nanosensor arrays, common recognition elements, surface chemistry and functionalization, signal transduction, practical applications. **Prerequisite:** consent of instructor.

NANO 164. Advanced Micro- and Nanomaterials for Energy Storage and Conversion (4)

Materials for energy storage and conversion in existing and future power systems, including fuel cells and batteries, photovoltaic cells, thermoelectric cells, and hybrids. **Prerequisite:** consent of instructor.

NANO 168. Electrical, Dielectric, and Magnetic Properties of Engineering Materials (4)

Introduction to physical principles of electrical, dielectric, and magnetic properties. Semiconductors, control of defects, thin film, and nanocrystal growth, electronic and optoelectronic devices. Processing-microstructure-property relations of dielectric materials, including piezoelectric, pyroelectric and ferroelectric, and magnetic materials. **Prerequisite:** NANO 20.

NANO 192. Senior Seminar in NanoEngineering (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in chemical engineering (at the upper-division level). Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students with preference given to seniors. **Prerequisite:** department stamp or consent of the instructor.

NANO 195. Teaching (2-4)

Teaching and tutorial assistance in a NANO course under supervision of instructor. Not more than four units may be used to satisfy graduation requirements. **Prerequisites:** junior status with a B average in major and consent of instructor. (P/NP only.)

NANO 197. Engineering Internship (1-4)

Coordinated through the UCSD Academic Internship Program, this course provides work experience through industry, government offices, hospitals, and their practices. Students work in local industry or hospitals under faculty supervision. Units may not be applied toward major graduation requirements. Internship is unsalaried. **Prerequisites:**

completion of ninety units with 2.5 GPA and consent of instructor.

NANO 198. Directed Group Study (1-4)

Directed group study on a topic or in a field not included in the regular department curriculum, by special arrangement with a faculty member. **Prerequisite:** consent of instructor. (P/NP only.)

NANO 199. Independent Study for Undergraduates (4)

Independent reading or research on a problem by special arrangement with a faculty member. **Prerequisite:** consent of instructor. (P/NP only.)

Structural Engineering

PROFESSORS

R. J. Asaro, Ph.D.
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J. P. Conte, Ph.D.
A. W. Elgamal, Ph.D.
P. J. Fox, Ph.D.
G. A. Hegemier, Ph.D., *Chair*
J. B. Kosmatka, Ph.D.
F. Lanza di Scalea, Ph.D.
J. E. Luco, Ph.D.
J. Restrepo, Ph.D.
F. Seible, Ph.D., P.E., *Dean, Jacobs School of Engineering*
P. B. Shing, Ph.D., *Vice Chair*
C. M. Uang, Ph.D.

ASSOCIATE PROFESSORS

T. Hutchinson, Ph.D., P.E.
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F. Kuester, Ph.D.
Y. Qiao, Ph.D.
M. Todd, Ph.D., *Vice Chair*

ASSISTANT PROFESSORS

Y. Bazilevs, Ph.D.
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LECTURER WITH POTENTIAL FOR SECURITY OF EMPLOYMENT

Y. Van Den Einde, Ph.D.

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PROFESSIONAL RESEARCH STAFF

I. Bartoli, Ph.D., *Assistant Project Scientist*
G. Benzoni, Ph.D., *Research Scientist*
S. Coccia, Ph.D., *Assistant Project Scientist*
B. Kad, Ph.D., *Research Scientist*
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STUDENT AFFAIRS: 240-1 Science and Engineering Research Facility (SERF), University Center
<http://www.structures.ucsd.edu>

Structural Engineering is the branch of engineering concerned with the design and analysis of civil, mechanical, aerospace, marine, naval and offshore structures. It requires knowledge and competence in the areas of materials, response of individual structural components and the behavior of entire structural systems.

DEPARTMENT FOCUS

The instructional and research programs of the department are grouped into four programmatic focus areas: civil structures, aerospace and composite structures, renewal of structures, and earthquake engineering. Both the undergraduate and graduate programs are characterized by strong interdisciplinary relationships with the Departments of Mechanical and Aerospace Engineering, Physics, Mathematics, Bioengineering, Chemistry, Electrical and Computer Engineering, Computer Science and Engineering, the Materials Science Program, and associated campus institutes such as the Institute of Geophysics and Planetary Physics, Institute for Pure and Applied Physical Sciences, Institute for Biomedical Engineering, Center of Excellence for Advanced Materials, California Space Institute, Calit2, and Scripps Institution of Oceanography.

The programs and curricula of the Department of Structural Engineering will educate and train engineers in a holistic approach to structural systems engineering by emphasizing and building on the commonality of engineering structures in materials, mechanics, analysis and design across the engineering disciplines of civil, aerospace, marine and mechanical engineering.

Although structural engineering is traditionally viewed as an activity within civil engineering, in actuality many other engineering disciplines such as aerospace, marine (naval, offshore), and mechanical engineering contain well established discipline-specific structural systems and components. In all of the various engineering disciplines there exists a large commonality in the structural materials used, in the general principles of structural mechanics, in the overall design philosophy and criteria, and in the modeling and analysis tools employed for the numerical quantification and visualization of structural response. Particularly, small disciplinary differences in materials and computational tools are rapidly disappearing with the civil engineering community opening up to new structural materials developed and used to date primarily in the aerospace industry, and with computational developments which are less product specific but more geared towards a holistic structural systems design approach with interactive graphics, object-oriented database management and concurrent visualization and data processing. Developments in overall structural systems design are increasingly cross-disciplinary over many traditional engineering areas.

THE UNDERGRADUATE PROGRAM

DEGREE AND PROGRAM OPTIONS

The Department of Structural Engineering offers a unique engineering program leading to the B.S. degree in structural engineering which is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). The Department of Structural Engineering also offers a nonaccredited B.S. degree in engineering sciences. The B.S. programs require a minimum of 148 units, plus college requirements in humanities and social sciences.

All Structural Engineering programs of study have strong components in laboratory experimentation,

numerical computation, and engineering design. Design is emphasized throughout the curricula by open-ended homework problems, by laboratory and computer courses which include student-initiated projects, and finally, by senior design project courses which involve teams of students working to solve engineering design problems brought in from industry. The Structural Engineering programs are designed to prepare students receiving bachelor's degrees for professional careers or for graduate education in their area of specialization. In addition, the programs can also be taken by students who intend to use their undergraduate engineering education as preparation for postgraduate professional training in non-technical fields such as business administration, law or medicine.

Structural Engineering is concerned with the design and analysis of civil, mechanical, aerospace, marine, naval, and offshore structures. Examples include bridges, dams, buildings, aircraft, spacecraft, ships, oil platforms, automobiles, and other transportation vehicles. This field requires a thorough knowledge of the behavior of solids (concrete, soils, rock, metals, plastics, and composite materials), fluid mechanics as it relates to structural loads, dynamics as it relates to structural response, mathematics for the generation of theoretical structural models and numerical analysis, and computer science for simulation purposes associated with computer-aided design, response analyses, and data acquisition. Basic understanding of materials behavior and structural performance is enhanced by laboratory courses involving static and dynamic stress failure tests of structural models, and response of structural systems. Within this area, students can specialize in (a) civil structures, (b) aerospace structures, (c) renewal of structures, or (d) earthquake engineering.

The **engineering sciences** program follows the overall Structural Engineering program except that the number of required design courses is reduced. In addition to core courses in dynamics, vibrations, structures, fluid mechanics, thermodynamics, heat transfer, and laboratory experimentation, a large number of technical electives are scheduled. This aspect of the curriculum allows flexibility by permitting specialization and in-depth study in one area of the engineering sciences or through a sequence of courses on various emerging technologies. Students must consult their advisors to develop a sound course of study to fulfill the technical elective requirements of this program.

MAJOR REQUIREMENTS

Specific course requirements for the major are outlined in a table herein. In addition to the required technical courses specifically indicated, a suggested scheduling of humanities and social science courses (HSS) are distributed in the curricula for students to use to meet college general-education requirements. To graduate, students must maintain an overall GPA of at least 2.0, and the department requires at least a C- grade in each course required for the major.

Deviations from the program of study must be approved by the Undergraduate Affairs Committee prior to taking alternative courses. In cases where a student needs to take a course outside UC San Diego, prior departmental approval is essential. In

addition, technical elective (TE) course selections must have departmental approval prior to taking the courses. In the accredited program, TE courses are restricted to meet ABET standards. Courses such as SE 195, SE 197 and SE 198 are not allowed as technical electives in meeting the upper-division major requirements. SE 199 can be used as a technical elective only under restrictive conditions. Policies regarding these conditions may be obtained from the department's Student Affairs Office. Graduate level courses may be petitioned for technical elective credit.

Students with different academic preparations may vary the scheduling of lower-division courses such as math, physics and chemistry, but should consult the department prior to doing so. Deviations in scheduling lower-division Structural Engineering courses are discouraged due to scheduling constraints. A tentative schedule of course offerings is available from the department each spring quarter for the following academic year.

GENERAL-EDUCATION/COLLEGE REQUIREMENT

For graduation, each student must satisfy general-education course requirements determined by the student's college, as well as the major requirements determined by the department. The six colleges at UCSD require widely different general-education courses, and the number of such courses differs from one college to another. Each student should choose his or her college carefully, considering the special nature of the college and the breadth of general education.

The Structural Engineering program allows for twelve humanities and social science (HSS) courses so that students can fulfill their college requirements. In the ABET accredited programs, students must develop a program that includes a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. It should be noted, however, that some colleges may require more than twelve HSS courses indicated in the curriculum tables. Accordingly, students in these colleges may take longer to graduate than the indicated four-year schedule. Students must consult with their college to determine which HSS courses to take.

PROFESSIONAL LICENSING

All students are encouraged to take the Engineering-in-Training (EIT) examination as the first step in becoming licensed as a professional engineer (PE). Students graduating from an accredited program can take the PE examination after EIT certification and two years of work experience; students graduating from a nonaccredited program can take the PE examination after EIT certification and four years of work experience.

For further information please contact your local Board of Registration for Professional Engineers and Land Surveyors or visit <http://www.dca.ca.gov/pels>.

STRUCTURAL ENGINEERING (ABET ACCREDITED PROGRAM)

Program Mission and Objectives

The B.S. Structural Engineering program is accredited by the ABET Inc. Engineering Accreditation Commission (Accreditation Board for Engineering and Technology). Accreditation is an assurance that the program meets established quality standards.

B.S. Structural Engineering Mission

To provide a comprehensive education and training to engineers using a holistic approach to structural systems engineering by emphasizing and building on the commonality of engineering structures at the levels of materials, mechanics, analysis, and design.

B.S. Structural Engineering Objectives

Program objectives represent graduates' performance three to five years after completing the B.S. program:

1. To provide our students receiving bachelor's degrees with a strong technical education that will prepare them for successful professional careers in industry, or for continued graduate education in their area of specialization
2. To provide our students with fundamental structural engineering principles that can be applied across multiple engineering applications (such as aerospace, civil, marine, and mechanical).
3. To provide our students with broad multidisciplinary skills necessary to accomplish professional objectives in a rapidly changing technological world.
4. To provide our students with the ethical standards, communication and collaboration skills essential for professional practice and career advancement.

B.S. Structural Engineering Outcomes

Program outcomes are the expected knowledge, skills, attitudes, and behaviors of students at the time of completing the B.S. program:

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as being able to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs
4. An ability to function in multidisciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively with written, oral, and visual means
8. The broad education necessary to understand the impact of engineering solutions in a global and societal context

9. A recognition of the need for and an ability to engage in lifelong learning
10. A knowledge of contemporary issues
11. An ability to use modern engineering techniques, skills, and computing tools necessary for engineering practice

	FALL	WINTER	SPRING
FRESHMAN YEAR			
Math. 20A	Math. 20B	Math. 20C	
SE 1	HSS	SE 2	
Chem. 6A	Phys. 2A	Phys. 2B/2BL	
HSS ¹	HSS	HSS	
SOPHOMORE YEAR			
Math. 20D	Math. 20F	Math. 20E	
Phys. 2C/2CL	SE 110A	SE 102	
SE 101A	SE 101B	SE 110B	
HSS	SE 9 ²	SE 101C	
JUNIOR YEAR			
SE 121	SE 130A	MAE 170	
SE 103	SE 115	TE ³	
HSS	HSS	SE 130B	
HSS	HSS	HSS	
SENIOR YEAR			
SE 125	SE 131	SE 140	
TE	SE 120	FS	
FS ⁴	FS	FS	
HSS	HSS	TE	

¹In fulfilling the humanities and social science requirements (HSS), students must take a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. Twelve HSS courses are listed here; individual college requirements may be higher.

²Transfer students admitted to the university prior to fall 2010 who have completed MAE 9 are not required to take SE 9. Freshman students admitted to the university prior to fall 2007 who have completed MAE 9 are not required to take SE 9.

³Technical elective (TE) course must be an upper-division or graduate course in the engineering sciences, natural sciences or mathematics, selected with prior approval of the department to meet ABET standards.

⁴Students must take one full-focus sequence (FS) in: (a) Civil Structures, (b) Aerospace Structures, (c) Renewal of Structures, or (d) Geotechnical Engineering. Students should note that not all focus sequence classes will be offered every year. Students admitted to the university prior to fall 2010 will be allowed to use the courses outlined in past focus sequences from the catalog year in which they entered the university.

Engineering Sciences (Nonaccredited Program)

	FALL	WINTER	SPRING
FRESHMAN YEAR			
Math. 20A	Math. 20B	Math. 20C	
SE 1	HSS	SE 2	
Chem. 6A	Phys. 2A	Phys. 2B/2BL	
HSS ¹	HSS	HSS	
SOPHOMORE YEAR			
Math. 20D	Math. 20F	Math. 20E	
Phys. 2C/2CL	SE 110A	SE 102	
SE 101A	SE 101B	SE 110B	
HSS	SE 9 ²	SE 101C	
JUNIOR YEAR			
SE 121	SE 130A	MAE 170	
SE 103	SE 115	TE ³	
HSS	HSS	SE 130B	
HSS	HSS	HSS	
SENIOR YEAR			
SE 125	SE 131	SE 140	
TE	SE 120	TE	
TE	TE	TE	
HSS	HSS	TE	

¹In fulfilling the humanities and social science requirements (HSS), students must take a total of at least twenty-four units in the arts, humanities, and social sciences, not including subjects such as accounting, industrial management, finance, or personnel administration. Twelve HSS courses are listed here; individual college requirements may be higher.

²Transfer students admitted to the university prior to fall 2010 who have completed MAE 9 are not required to take SE 9. Freshman students admitted to the university prior to fall 2007 who have completed MAE 9 are not required to take SE 9.

³Technical elective (TE) course must be an upper-division or graduate course in the engineering sciences, natural sciences or mathematics, selected with prior approval of the department to meet ABET standards.

POLICIES AND PROCEDURES FOR STRUCTURAL ENGINEERING UNDERGRADUATE STUDENTS

ADMISSION TO THE MAJOR

Students who declare a Structural Engineering major will be directly admitted to the major. All students are expected to complete lower- and upper-division courses, as suggested in the curriculum tables, in a timely fashion in the sequences outlined.

TRANSFER STUDENTS

Requirements for a Structural Engineering major, or into Structural Engineering courses, are the same for transfer students as they are for continuing students. Accordingly, when planning their program, transfer students should be mindful of lower-division prerequisite course requirements, as well as for meeting collegiate requirements.

Students who have taken equivalent courses elsewhere may request to have transfer credits apply toward the department's major requirements. This is accomplished by submitting a petition for transfer credits together with a transcript and catalog course description from the institution where the course(s) were taken. These documents are reviewed for approval by the Structural Engineering Undergraduate Affairs Committee.

No transfer credit will be given for courses similar to SE 1, SE 2, SE 9. SE 1, SE 2, and SE 9 must be taken by all students majoring in structural engineering.

Transfer petitions are available from the Structural Engineering Student Affairs Office.

ACADEMIC ADVISING

Upon arrival, students must make an appointment with the undergraduate advisor in the Structural Engineering Student Affairs Office to plan a program of study. The program plan may be revised in subsequent years, but revisions involving curricular requirements require approval by the undergraduate advisor or the Undergraduate Affairs Committee. Because some courses and/or curricular changes may be made every year, it is imperative that students consult with the department's undergraduate advisor and their assigned faculty advisor on an annual basis.

Many Structural Engineering courses are offered only once a year and therefore should be taken in the recommended sequence. If courses are taken out of sequence, it may not always be possible to enroll in subsequent courses as desired or needed. If this occurs, students should seek immediate department advice. When a student deviates from the sequence of courses specified for the curriculum

in this catalog, it may be impossible to complete the Structural Engineering major within the normal four-year period. Students should refer to the four-year plan and course prerequisite map on the department Web site at <http://www.structures.ucsd.edu>.

In addition to the advising available through the Structural Engineering Student Affairs Office, programmatic or technical advice may be obtained from Structural Engineering faculty members. A specific Structural Engineering faculty advisor is assigned to each Structural Engineering student. All Structural Engineering students are required to meet with their faculty advisor at least once a year, preferably before the beginning of fall quarter.

PROGRAM ALTERATIONS/EXCEPTIONS TO REQUIREMENTS

Variations from, or exceptions to, any program or course requirements are possible only if a petition is approved by the Structural Engineering Undergraduate Affairs Committee before the courses in question are taken. Petition forms may be obtained from the Structural Engineering Student Affairs Office and must be processed through this office.

INDEPENDENT STUDY

Structural Engineering students may take SE 199, Independent Study for Undergraduates, under the guidance of a Structural Engineering faculty member. Normally, this course is taken as an elective on a P/NP basis. Under restrictive conditions, however, it may be used to satisfy upper-division technical elective course requirements for the major. Students interested in taking an SE 199 course must identify a faculty member with whom they wish to work and propose a research or study topic. After obtaining the faculty member's concurrence on the topic and scope of the study, the student must submit a Special Studies Course form to the Structural Engineering Undergraduate Affairs Committee. Students who are interested in having the course count as a technical elective requirement must take the course(s) for a total of four units and must also submit an Undergraduate Petition form. The forms must be completed, approved, and processed prior to the beginning of the quarter in which the course is to be taken. This should not be done during the add/drop period. Detailed policy in this regard and the requisite forms may be obtained from the Student Affairs Office.

GRADUATE PROGRAM

The Department of Structural Engineering offers instruction leading to the degrees of master of science (M.S.) and doctor of philosophy (Ph.D.) in structural engineering (SE). In addition, an M.S. degree in structural health monitoring, prognosis, and validated simulations has been activated. The graduate program is aimed at training a select number of highly skilled professionals in structural engineering with the academic and engineering credentials to assume leadership roles in industry and academia.

The M.S. degree program is intended to provide students with additional fundamental knowledge as well as specialized advanced knowledge in selected

structural engineering aspects over and above the undergraduate degree course work.

The doctor of philosophy (Ph.D.) degree program is intended to prepare students for careers in teaching, research, and/or in their chosen professional specialties. The Ph.D. program requires a departmental comprehensive examination, a Ph.D. candidacy examination, a Ph.D. dissertation based on new and unique research, and a dissertation defense.

Both degrees offer opportunities for training in one or more of the four primary research focus areas within the SE department: (1) Earthquake Engineering, (2) Advanced Composites and Aerospace Structural Systems, (3) Renewal Engineering, and (4) Structural Health Monitoring, Prognosis, and Validated Simulations.

Admission to the UC San Diego graduate program in Structural Engineering requires at least a B.S. degree in engineering, physical sciences, or mathematics with an overall upper-division GPA of 3.0. Applicants must provide three letters of recommendation and recent GRE general test scores. International applicants whose native language is not English are required to demonstrate proficiency in English by taking the TOEFL test. The minimum TOEFL score required is 550 (paper-based), 213 (computer-based), and 80 (Internet-based text [iBt]). Based on the candidate's choice, qualifications, and career objectives, admission to the program is in one of two categories: M.S. or Ph.D.

Applicants seeking enrollment in SE courses via UC Extension's concurrent registration program are advised to refer to the "[Graduate Studies Transferring Credit](#)" section of the *UC San Diego General Catalog* for clarification.

BACHELOR'S/MASTER'S PROGRAM

The department offers a bachelor's/master's degree program to enable students to complete both the B.S. and M.S. degrees in an accelerated timeframe. Undergraduate students in the Department of Structural Engineering who have at least 148 quarter units with a cumulative GPA of 3.5 or higher are eligible to apply. Admission to the bachelor's/master's degree program is not automatic. Student applications are reviewed and the final decision is made by the Department of Structural Engineering. Acceptance into this program is an honor that carries with it practical benefits—the graduate application process is simplified (no GREs required) and advanced students are given access to graduate level courses. Upon acceptance as an undergraduate into the program, a faculty member will be assigned who will serve as the student's advisor. Interested students should contact the Structural Engineering Student Affairs Office. Students must fulfill all requirements for the B.S. degree prior to being formally admitted to graduate status.

MASTER'S DEGREE PROGRAM

The M.S. degree program is intended to provide the student with additional fundamental knowledge as well as specialized advanced knowledge in selected structural engineering aspects over and above the undergraduate degree course work. Two plans, the M.S. Thesis Plan and the M.S. Comprehensive Examination Plan, are offered.

The M.S. Thesis Plan is designed for those students with an interest in research prior to entering the structural engineering profession or prior to entering a doctoral degree program. The M.S. Thesis Plan involves course work leading to the completion and defense of a master's thesis. The M.S. Comprehensive Examination Plan involves course work and requires the completion of a written comprehensive examination covering multiple courses that the student has taken. The M.S. Comprehensive examination will be comprehensive and cover two focus sequences and at least one additional technical elective that the student has taken. The examination must be completed no later than the end of the eighth week of the quarter the student intends to graduate.

Master students will be required to complete three core courses before they can graduate with their master's degree. The courses are SE 200 Applied Mathematics in Structural Engineering (or one of the following two similar courses: MAE294A and Math. 210A), SE 201 Advanced Structural Analysis, and SE 271 Solid Mechanics for Structural and Aerospace Engineering.

M.S. students must complete forty-eight units of credit for graduation. For the M.S. Comprehensive Examination Plan all forty-eight units of credit must consist of regular courses (twelve courses). For the M.S. Thesis Plan, thirty-six units (nine courses) from regular courses are required, in addition to twelve units of graduate research for the master's thesis. For both M.S. plans, students are required to complete a minimum of two sequences from the following focus areas:

1. Structural Analysis
2. Structural Design
3. Computational Mechanics
4. Earthquake Engineering
5. Geotechnical Engineering
6. Advanced Composites
7. Solid Mechanics
8. Advanced Structural Behavior

A sequence is composed of three regular courses from the same focus area. The courses comprising the focus sequences are listed in the table in this section. To meet the specific needs of some students, other focus areas may be developed by a student in consultation with his or her advisor, but these must be pre-approved by the SE Graduate Affairs Committee. To allow for greater flexibility in the program, the remaining credits required from courses may be earned by completing additional focus sequences, parts of focus sequences, or other appropriate courses. Students may elect to take other appropriate technical electives (with the approval of their advisor and the SE Graduate Affairs Committee). In general, no undergraduate courses are allowed for the M.S. degree. In special cases where an undergraduate course may be used, the arrangement must be preapproved by both the academic advisor and the Graduate Affairs Committee.

Units obtained in SE 290 and 298 may not be applied towards course work requirements. No more than four units of SE 296 may be applied toward

course work requirements and only with prior approval of the SE Graduate Affairs Committee.

The department also offers a seminar course each quarter dealing with current research topics in Structural Engineering (SE 290). Students must take SE 290 every quarter in the first year, and are strongly recommended to take it for at least one quarter in every subsequent year.

FOCUS SEQUENCES

Structural Analysis

- SE 201. Advanced Structural Analysis
- SE 202. Structural Stability
- SE 203. Structural Dynamics
- SE 204. Advanced Structural Dynamics
- SE 205. Nonlinear Mechanical Vibrations
- SE 206. Random Vibrations

Structural Design

- SE 211. Advanced RC/PC Design
- SE 212. Advanced Structural Steel Design
- SE 213. Bridge Design
- SE 223. Advanced Seismic Design of Structures
- SE 254. FRP Rehabilitation of Civil Structures

Computational Mechanics

- SE 233. Computational Techniques in Finite Elements
- SE 276A. Finite Element Methods in Solid Mechanics I
- SE 276B. Finite Element Methods in Solid Mechanics II
- SE 277. Error Control in Finite Element Analysis
- SE 278A. Finite Element Methods for Computational Fluid Dynamics

Earthquake Engineering

- SE 203. Structural Dynamics
- SE 206. Random Vibrations
- SE 221. Earthquake Engineering
- SE 222. Geotechnical Earthquake Engineering
- SE 223. Advanced Seismic Design of Structures
- SE 243. Soil Structure Interaction

Geotechnical Engineering

- SE 222. Geotechnical Earthquake Engineering
- SE 241. Advanced Soil Mechanics
- SE 242. Advanced Foundation Engineering
- SE 243. Soil Structure Interaction

Advanced Composites

- SE 253A. Mechanics of Laminated Composite Structures I
- SE 253B. Mechanics of Laminated Composite Structures II
- SE 253C. Mechanics of Laminated Anisotropy Plates and Shells
- SE 252. Experimental Mechanics and NDE
- SE 251A. Processing Science of Composites
- SE 251B. Mechanical Behaviors of Polymers and Composites
- SE 254. FRP Rehabilitation of Civil Structures

Solid Mechanics

- SE 234. Plates and Shells
- SE 235. Wave Propagation in Elastic Media
- SE 252. Experimental Mechanics and NDE
- SE 271. Solid Mechanics for Structural and Aerospace Engineering

SE 272. Theory of Elasticity

SE 273. Anelasticity

Advanced Structural Behavior

- SE 205. Nonlinear Mechanical Vibrations
- SE 224. Structural Reliability and Risk Analysis
- SE 206. Random Vibrations
- SE 252. Experimental Mechanics and NDE
- SE 265. Structural Health Monitoring Principles

Students taking the Solid Mechanics focus sequence are required to take SE 271, SE 272, and one of these courses: SE 273, SE 252 or SE 235.

SE 207 Topics in Structural Engineering will be acceptable to use towards a focus sequence requirement pending petition and approval of the Graduate Affairs Committee (GAC).

Students taking the Advanced Composites focus sequence have the opportunity of taking either one or both of the following sequences:

Suggested Sequence A

- SE 253A. Mechanics of Laminated Composite Structures I
- SE 253B. Mechanics of Laminated Composite Structures II
- SE 253C or other class approved by advisor

Suggested Sequence B

- SE 253B. Mechanics of Laminated Composite Structures II
- SE 251A. Processing Science of Composites
- SE 251B or other class approved by advisor

Note: Students who have previously taken an equivalent course must choose suggested Sequence B.

The thesis defense is the final examination for students enrolled in the M.S. thesis plan and must be conducted after completion of all course work. Upon completion of the research project, the student writes a thesis that must be successfully defended in an oral examination and public presentation conducted by a committee composed of three faculty. A complete copy of the student's thesis must be submitted to each member of the M.S. thesis committee (comprised of a minimum of three faculty) at least two weeks before the defense.

M.S. DEGREE IN STRUCTURAL ENGINEERING WITH SPECIALIZATION IN HEALTH MONITORING, PROGNOSIS, AND VALIDATED SIMULATIONS (SHMP&VS)

The M.S. degree in SHMP&VS provides specialized multidisciplinary knowledge in the three technology areas of (1) sensing technology, (2) data interrogation, and (3) predictive modeling. Many courses currently offered within the Jacobs School of Engineering may be grouped into numerous focus sequences within each technology area, as shown in the following list:

A. SENSING TECHNOLOGY AREA

Sensing Methodologies

- SE 252. Experimental Mechanics and NDE

MAE 261. Sensors and Measurements
MAE 268. MEMS Materials, Fabrication, and Applications

Data Acquisition Systems

ECE 257B. Principles of Wireless Networks
ECE 258A-B. Digital Communications
ECE 259CN. Advanced Coding and Modulation for Digital Communications
MAE 261. Sensors and Measurements
CSE 237A. Introduction to Embedded Computing
CSE 237B. Software for Embedded Computing
CSE 237C. Validation/Testing of Embedded Systems
CSE 237D. Design Automation and Prototyping for Embedded Systems

Controls

MAE 280A. Linear Systems Theory
MAE 280B. Linear Control Design
MAE 282. Adaptive Control
MAE 284. Robust and Multi-Variable Control
MAE 285. Optimal Control and Estimation

B. DATA INTERROGATION TECHNOLOGY AREA

Signal Processing

ECE 161A/SIO 207A. Introduction to Digital Signal Processing
ECE 251AN/SIO 207B. Digital Signal Processing I
ECE 251BN/SIO 207C. Digital Signal Processing II
ECE 251CN. Filter Banks and Wavelets
ECE 251DN or SIO 207D. Array Processing
ECE 253A. Fundamentals of Digital Image Processing
ECE 253B. Digital Image Analysis
ECE 254. Detection Theory
ECE 255AN. Information Theory

System Identification

MAE 283A. Parameter Identification: Theory and Methods
MAE 283B. Approximate Identification and Control
ECE 256A-B. Time Series Analysis and Applications
ECE 275A. Parameter Estimation I
ECE 275B. Parameter Estimation II

Pattern Recognition

CSE 250A. Artificial Intelligence: Search and Reasoning
CSE 250B. Artificial Intelligence: Learning
CSE 253. Neural Networks for Pattern Recognition
CSE 254. Statistical Learning
CSE 255. Data Mining and Artificial Intelligence Applications
ECE 270A-B-C. Neurocomputing

Statistical/Probabilistic Methods

MTH 281A-B-C. Mathematical Statistics
CSE 254. Statistical Learning
SE 206. Random Vibrations
SE 224. Structural Reliability and Risk Analysis

C. PREDICTIVE MODELING TECHNOLOGY AREA

Structural Analysis

SE 201. Advanced Structural Analysis
SE 202. Structural Stability
SE 203. Structural Dynamics

SE 204. Structural Reliability and Risk Analysis
Finite Element

MAE 232A. Finite Element Methods in Solid Mechanics I

MAE 232B. Finite Element Methods in Solid Mechanics II

MAE 232C. Advances in Materials Computations
SE 274. Nonlinear Finite Element Methods
Solid Mechanics

SE 271. Solid Mechanics for Structural and Aerospace Engineering

SE 272. Theory of Elasticity

SE 273. Theory of Plasticity and Viscoelasticity

SE 252. Experimental Mechanics and NDE

SE 235. Wave Propagation in Elastic Media

Material Behavior/Modeling

MAE 233B. Micromechanics

MAE 233C. Advanced Mechanics of Composite Materials

MAE 232C. Advances in Materials Computations

MAE 250. Fatigue, Fracture, and Failure Analysis in Engineering Materials

MAE 273A. Dynamic Behavior of Materials

SE 245. Constitutive Modeling and Numerical Implementation

Advanced Structural Behavior

SE 205. Nonlinear Mechanical Vibrations

SE 206. Random Vibrations

SE 224. Structural Reliability and Risk Analysis

SE 252. Experimental Mechanics and NDE

SE 265. Structural Health Monitoring Principles

Earthquake Engineering

SE 203. Structural Dynamics

SE 206. Random Vibrations

SE 221. Earthquake Engineering

SE 222. Geotechnical Earthquake Engineering

SE 223. Advanced Seismic Design of Structures

Advanced Composites

SE 142. Design of Composite Structures

SE 251. Processing Science of Composites

SE 253. Mechanics of Laminated Composite Structures

MAE 233C. Advanced Mechanics of Composite Materials

SE 254. FRP Rehabilitation of Civil Structures

Two degree plans in SHMP&VS will be offered: M.S. Thesis Plan and M.S. Comprehensive Examination Plan. Students in both plans must complete forty-eight units of credit for graduation. For both plans, students must complete thirty-six units of course work consisting of one focus sequence from each of the three technology areas A, B, and C listed above. Any three of the courses listed under a specific topic area constitute a focus sequence. Courses must be chosen in consultation with the student's advisor. The remaining twelve units must be completed as graduate research SE 299.

For the M.S. SHMP&VS Comprehensive Examination Plan, the twelve-unit graduate research SE 299 must be conducted as a mentored research project. This project is intended to provide a mentored practicum whereby students integrate knowledge learned from their technology areas into

comprehensively solving a problem from structural health monitoring/prognosis or model validation and uncertainty quantification, at their discretion. This project will emphasize professional practice, with both oral and written communication of technical data, and will include a strong design component. The project will be presented to a committee of two faculty members in Structural Engineering and one from another department within the Jacobs School of Engineering or an adjunct faculty member in an appropriate area of focus.

For the M.S. SHMP&VS Thesis Plan, the twelve-unit graduate research SE 299 culminates with the preparation of a research thesis. The thesis must be successfully defended in an oral examination and public presentation conducted by a committee composed of three faculty members. The committee will consist of two faculty members in Structural Engineering and one from another department within the Jacobs School of Engineering or an adjunct faculty member in an appropriate area of focus. A complete copy of the student's thesis must be submitted to each member of the M.S. thesis committee at least two weeks prior to the defense.

Because of the inherent multidisciplinary nature of the M.S. SHMP&VS degree, research within SE 299 can be conducted at outside locations (industry or government facilities). In this case a scientist on location, with an adjunct faculty appointment at UCSD, will be part of the student's committee.

All students in the M.S. SHMP&VS program are required to take a seminar course (SE 290) each quarter they are registered.

DOCTORAL DEGREE PROGRAM

The Ph.D. program is intended to prepare students for a variety of careers in research, teaching and advanced professional practice in the broad sense of structural engineering, encompassing civil and aerospace structures, earthquake and geotechnical engineering, composites, and engineering mechanics. Depending on the student's background and ability, research is initiated as soon as possible. All students, in consultation with their advisors, develop course programs that will prepare them for the Departmental Comprehensive Examination and for their dissertation research. However, these programs of study and research must be planned to meet the time limits established to advance to candidacy and to complete the requirements for the degree. Doctoral students who have passed the Departmental Comprehensive Examination may take any course for an S/U grade, with the exception of any course that the student's Departmental Comprehensive or Ph.D. Candidacy Examination Committee stipulates must be taken in order to remove a deficiency. It is strongly recommended that all Structural Engineering graduate students take a minimum of two courses (other than research) per academic year after passing the Departmental Comprehensive Examination.

The department also offers a seminar course each quarter dealing with current research topics in Earthquake Engineering (SE 290). Students must take SE 290 every quarter in the first year of graduate study, and it is strongly recommended to take it for at least one quarter in every subsequent year.

All doctoral students will be required to take SE 200, Applied Mathematics in Structural Engineering, prior to taking the departmental comprehensive exam.

Doctoral Examinations: A Structural Engineering Ph.D. student is required to pass three examinations. The first is a **Departmental Comprehensive Examination** which should be taken within three to six quarters of full-time graduate study and requires a 3.5 GPA. This examination is intended to determine the student's ability to successfully pursue a research project at a level appropriate for the doctoral degree. It is administered by at least four faculty, three of whom must be in Structural Engineering. The student is responsible for material pertaining to four focus areas. One focus area can be satisfied by course work, provided that all courses in that area have been taken at UCSD, the grade in each course is B or better, and the overall GPA in that area is at least 3.5. In order to insure appropriate breadth, the focus areas should consist of the following: (a) two focus areas within Structural Engineering which are closely related to the student's research interests, (b) one focus area within Structural Engineering that is not directly related to the student's area of research, and (c) one minor focus area outside the Department of Structural Engineering. An update list of sample focus areas for Ph.D. students is available in the Structural Engineering Graduate Handbook. Minor areas too closely related to the major areas will not be approved by the SE Graduate Affairs Committee. The Solid Mechanics Focus Sequence, which is jointly taught by the Department of Structural Engineering and the Department of Mechanical and Aerospace Engineering, cannot be used to satisfy the outside Structural Engineering requirement. Students intending to specialize in the emerging areas of structural health monitoring, damage prognosis, and validated simulations are advised to take courses in the focus areas of Advanced Structural Behavior and elective courses MAE 283, MAE 261, ECE 251AN, ECE 251BN, ECE 254, and CSE 291 which can be used to satisfy the outside Structural Engineering requirement.

Since the examination areas must be approved by the Structural Engineering Graduate Affairs Committee, students are advised to seek such approval well before their expected examination date, preferably while planning their graduate studies. Although students are not required to take particular courses in preparation for the Departmental Comprehensive Examination, the scope of the examination in each area is associated with a set of three graduate courses, generally in focus areas offered or approved by the department. A list of focus areas is available in the Structural Engineering Graduate Handbook. A candidate can develop a sense of the level of knowledge expected to be demonstrated during the examination by studying the appropriate syllabi and/or discussing the course content with faculty experienced in teaching the courses involved. The Departmental Comprehensive Examination may be a written or an oral examination, at the discretion of the committee.

Teaching experience is required of all Structural Engineering Ph.D. students prior to taking the Ph.D. Candidacy Examination. Teaching experience is

defined as lecturing one hour per week in either a problem-solving section or laboratory session, for one quarter in an undergraduate course designated by the department. The requirement can be fulfilled by serving as a teaching assistant or by taking SE 501 for academic credit. Students must contact the Student Affairs Office to plan for completion of this requirement.

The **Ph.D. Candidacy Examination** is the second examination required of Structural Engineering doctoral students. In preparation for the Ph.D. Candidacy Examination, students must have completed the Departmental Comprehensive Examination and the Departmental Teaching Experience requirement, obtained a faculty research advisor, have identified a topic for their dissertation research, and have made initial progress in that research. At the time of application for advancement to candidacy, a doctoral committee responsible for the remainder of the student's graduate program is appointed by the Graduate Council. In accordance with Academic Senate Regulations 715(D): "A doctoral committee of five or more members shall be appointed by the dean of Graduate Studies under the authority of the Graduate Council. The committee members shall be chosen from at least two departments, and at least two members shall represent academic specialties that differ from the student's chosen specialty. In all cases, each committee must include one tenured UCSD faculty member from outside the student's major department." The committee conducts the Ph.D. Candidacy Examination, during which students must demonstrate the ability to engage in dissertation research. This involves the presentation of a plan for the dissertation research project. A short written document describing the research plan must be submitted to each member of the committee at least two weeks before the Ph.D. Candidacy Examination. The committee may ask questions directly or indirectly related to the research project and general questions that it determines to be relevant. Upon successful completion of this examination, students are advanced to candidacy and are awarded the candidate of philosophy degree. The Ph.D. Candidacy Examination is an oral examination.

The Dissertation Defense is the final Ph.D. examination. Upon completion of the dissertation research project, the student writes a dissertation that must then be successfully defended in an oral examination and public presentation conducted by the doctoral committee. A complete copy of the student's dissertation must be submitted to each member of the doctoral committee at least four weeks before the defense. While the copy of the dissertation handed to the committee is expected to be complete and in final form, it should be noted that students are expected to make changes in the text per direction of the committee as a result of the defense. This examination cannot be conducted earlier than three quarters after the date of advancement to doctoral candidacy. Acceptance of the dissertation by the Office of Graduate Studies and the university librarian represents the final step in completion of all requirements for the Ph.D.

Ph.D. Time Limit Policy. Pre-candidacy status is limited to four years. Doctoral students are eligible for university support for six years. The defense and

submission of the doctoral dissertation must be within seven years.

Evaluations. In the spring of each year, the department faculty members evaluate each doctoral student's overall performance in course work, research, and prospects for financial support for future years. A written assessment is given to the student after the evaluation. If a student's work is found to be inadequate, the faculty may determine that the student cannot continue in the graduate program.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

All undergraduate students enrolled in Structural Engineering courses or admitted into a Structural Engineering program are expected to meet prerequisite and performance standards, i.e., students may not enroll in any SE courses or courses in another department which are required for the major prior to having satisfied prerequisite courses with a C– or better. (The department does not consider D or F grades as adequate preparation for subsequent material.) Additional details are given under the various program outlines, course descriptions, and admission procedures for the School of Engineering in this catalog. Furthermore, the majority of SE courses have enrollment restrictions which give priority to, or are open only to, structural engineering students. Where these restrictions apply, the registrar will not enroll other students except by department stamp on class enrollment cards. The department expects that students will adhere to these policies on their own volition and enroll in courses accordingly. Students are advised that they may be dropped at any time from course rosters if prerequisites and/or performance standards have not been met.

While some courses may be offered more than once each year, most SE courses are taught only once per year, and courses are scheduled to be consistent with the curricula as shown in the tables. When possible, SE does offer selected large-enrollment courses more than once each year. A tentative schedule of course offerings is available from the department each spring for the following academic year.

Program and or materials fees may apply to those courses with large lab components.

LOWER-DIVISION

SE 1. Introduction to Structures and Design (4)

Introduction to structural components, systems from aerospace, civil, mechanical, marine and offshore areas. Structural action, the design process. History of structural engineering. Role and responsibility of structural engineers in society. Engineering economics, costs-benefits analysis. Implications on safety. Professional ethics. Priority enrollment given to structural engineering majors.

SE 2. Structural Materials (4)

Structure of engineering materials (metals, ceramics, concrete, composites) tailoring to produce desired properties and response in structural components and systems. Mechanical tests, elasticity, plastic deformation, fracture, toughness, creep and fatigue. Selection based on performance requirements/application. Laboratory demonstrations and tests. **Prerequisites:** Chem. 6A, Phys.

2A. Priority enrollment given to structural engineering majors and mechanical and aerospace engineering majors.

SE 9. Algorithms and Programming for Structural Engineering (4)

Introduction to the Matlab environment. Variables and types, statements, functions, blocks, loops, and branches. Algorithm development. Functions, function handles, input and output arguments. Data encapsulation and object-oriented programming. Toolboxes and libraries. Models from physics (mechanics and thermodynamics) are used in exercises and projects. **Prerequisites:** grade of C– or better in Math. 20D and Math. 20F (20F may be concurrent).

SE 10A. Design Competition—Design, Build, and Fly Aircraft (1)

Student teams design, build, and fly unmanned aircraft for a national student competition. Students concentrate on vehicle system design including aerodynamics, structures, propulsion, and performance. Teams engineer and fabricate the aircraft, submit a design report, and prep aircraft for competition. **Prerequisite:** consent of instructor.

SE 87. Freshman Seminar (1)

The freshman seminar program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. **Prerequisite:** open to freshmen only.

UPPER-DIVISION

SE 101A. Mechanics I: Statics (4)

Principles of statics using vectors. Two- and three-dimensional equilibrium of statically determinate structures under discrete and distributed loading including hydrostatics; internal forces and concept of stress; free body diagrams; moment, product of inertia; analysis of trusses and beams. **Prerequisites:** grade of C– or better in Math. 20C and Phys. 2A.

SE 101B. Mechanics II: Dynamics (4)

Kinematics and kinetics of particles in two- and three-dimensional motion. Newton's equations of motion. Energy and momentum methods. Impulsive motion and impact. Systems of particles. Kinetics and kinematics of rigid bodies in 2-D. Introduction to 3-D dynamics of rigid bodies. **Prerequisites:** grades of C– or better in SE 101A (or MAE 130A).

SE 101C. Structural Mechanics III: Structural Dynamics (4)

Free and forced vibrations of damped 1-DOF systems; vibrations isolation, impact and packaging problems. Analysis of discrete MDOF systems using matrix representation; normal mode of frequencies and modal matrix formulation. Lagrange's equations. Modal superposition for analysis of continuous vibrating systems. **Prerequisites:** grade of C– or better in Math. 20F and SE 101B (or MAE 130B).

SE 102. Numerical, Computational, and Graphical Tools for Structural Engineering I (4)

Numerical methods for initial value problems. Errors, Taylor series. Convergence. Solutions of linear equations. Gaussian elimination, multiplicative decomposition. Matlab is used for programming exercises and projects. **Prerequisites:** grade of C– or better in SE 1, SE 9, and SE 101A (or MAE 130A).

SE 103. Conceptual Structural Design (4)

Introduction to design principles and structural action. Development of design theories, approaches and methodology. Concepts of load and resistance factors, factors of safety, limit and ultimate states, design allowables. Simple design examples from aerospace, civil, marine, offshore and mechanical structural systems. **Prerequisites:** grade of C– or better in SE 2, SE 9, and SE 101A (or MAE 130A).

SE 110A. Solid Mechanics I (4)

Concepts of stress and strain. Hooke's law. Axial loading of bars. Torsion of circular shafts. Shearing and normal stresses in beam bending. Deflections in beams. Statically determinate and indeterminate problems. Combined loading. Principal stresses and design criteria. Buckling of columns. Students may not receive credit for SE 110A or MAE 131A

and SE 110A/MAE 131A. **Prerequisites:** grade of C– or better in Math. 20D and SE 101A (or MAE 130A).

SE 110B. Solid Mechanics II (4)

Advanced concepts in the mechanics of deformable bodies. Unsymmetrical bending of symmetrical and unsymmetrical sections. Bending of curved beams. Shear center and torsional analysis of open and closed sections. Stability analysis of columns, lateral buckling. Application of the theory of elasticity in rectangular coordinates. **Prerequisites:** grade of C– or better in SE 110A (or MAE 131A), SE majors.

SE 111A–B. Steel Bridge Design Competition (2-2)

Student teams design, test, and build a steel bridge for regional and national ASCE design competition. Students focus on learning ASCE guidelines, rules, and constraints for adherence to national competition policy. **Prerequisites:** grade of C– or better in SE 103 and SE 110A (or MAE 131A), SE 111A for SE 111B.

SE 112A–B. Concrete Canoe Design Competition (2-2)

Student teams design, test, and build a concrete canoe for regional and national ASCE design competition. Students focus on learning and applying specific fundamental ASCE competition rules, guidelines, and constraints into design. **Prerequisites:** grade of C– or better in SE 110A (or MAE 131A), SE 112A for SE 112B.

SE 115. Fluid Mechanics for Structural Engineering (4)

Fluid statics, hydrostatics; integral and differential forms of conservation equations for mass, momentum, and energy; Bernoulli equation; dimensional analysis; viscous pipe flow; external flow, boundary layers; open channel flow. **Prerequisites:** grade of C– or better in Phys. 2A, Math. 20D, and Math. 20E.

SE 120. Engineering Graphics & Computer Aided Structural Design (4)

Engineering graphics, solid modeling, CAD applications including 2-D and 3-D transformations, 3-D viewing, wire frame and solid models, Hidden surface elimination. **Prerequisite:** grade of C– or better in SE 102 and SE 103, SE majors.

SE 121. Numerical Methods in Engineering (4)

Advanced numerical methods for applications for engineering problems. Solution of systems of linear and nonlinear equations, function interpolation and curve fitting, function approximation, computation of integrals, numerical differentiation, and solution of systems of ordinary differential equations. **Prerequisites:** grade of C– or better in SE 102, SE major.

SE 125. Statistics, Probability and Reliability (4)

Probability theory. Statistics, data analysis and inferential statistics, distributions, confidence intervals. Introduction to structural reliability and random phenomena. Applications to components and systems. **Prerequisites:** SE majors.

SE 130A–B. Structural Analysis (4)

Classical methods of analysis for statically indeterminate structures. Development of computer codes for the analysis of civil, mechanical, and aerospace structures from the matrix formulation of the classical structural theory, through the direct stiffness formulation, to production-type structural analysis programs. **Prerequisites:** grades of C– or better in SE 110A (or MAE 131A), SE 130A for SE 130B. Priority enrollment given to structural engineering majors.

SE 131. Finite Element Analysis (4)

Development of stiffness and mass matrices based upon variational principles. Application to static and dynamic problems in structural and solid mechanics. The use of general purpose finite element structural analysis codes. **Prerequisites:** grade of C– or better in SE 121, SE 130B, and SE major.

SE 140. Structures and Materials Laboratory (4)

Introduction to instrumentation and testing techniques. Discussion of standard tension and compression tests. Similitude relationships for structural models. Term project in model structure including complete engineering report on theory, design and results of the term project. Program and or materials fee may apply. **Prerequisites:** grade of C– or better in SE 103, SE 130B, MAE 170, and senior standing in the major.

SE 142. Design of Composite Structures (4)

Design and analysis of lightweight structures composed of laminated composite materials. Stiffness, strength, failure mechanisms, micromechanics, and hygrothermal behavior. Fabrication and experimental testing. Design projects that involve computer implementation. **Prerequisites:** SE 110A (or MAE 131A) and SE 110B.

SE 150. Design of Steel Structures (4)

Design concepts and loadings for structural systems. Working stress and ultimate strength design theories. Properties of structural steel. Elastic design of tension members, beams, and columns. Design of bolted and welded concentric and eccentric connections. Design of composite floors. Introduction to plastic design. **Prerequisites:** grade of C– or better in SE 103, and SE 130A. Priority enrollment given to structural engineering majors.

SE 151A. Design of Reinforced Concrete (4)

Concrete and reinforcement properties. Service and ultimate limit state analysis and design. Design and detailing of structural components. **Prerequisites:** grade of C– or better in SE 103 and SE 130A.

SE 151B. Design of Prestressed Concrete (4)

Time-dependent and independent properties of concrete and reinforcing material. Concept and application of prestressed concrete. Service and ultimate limit state analysis and design of prestressed concrete structures and components. Detailing of components. Calculation of deflection and prestress losses. **Prerequisite:** grade of C– or better in SE 151A.

SE 152. Seismic Design of Structures (4)

Seismic design philosophy. Ductility concepts. Lateral force resisting systems. Mechanisms of nonlinear deformation. Methods of analysis. Detailing of structural steel and reinforced concrete elements. Lessons learned from past earthquakes. Multistory building design project. **Prerequisites:** grade of C– or better in SE 103, SE 130A, SE 150, and SE 151A; concurrent enrollment in SE 151B.

SE 154. Design of Timber Structures (4)

Properties of wood and lumber grades. Beam design. Design of axially loaded members. Design of beam-column. Properties of plywood and structural-use panels. Design of horizontal diaphragms. Design of shear walls. Design of nailed and bolted connections. **Prerequisites:** grade of C– or better in SE 103 and SE 130A; SE major.

SE 160A. Aerospace Structural Mechanics I (4)

Aircraft and spacecraft flight load definition and operational envelopes, metallic and composite material selection and comparison, applied elasticity, failure theories, stiffened shear panels, thin-wall open and closed-cell torsion pressure vessels, unsymmetrical beam bending, shear center, and bending of plates. **Prerequisites:** grade of C– or better in SE 2, SE 101B (or MAE 130B), and SE 110A (or MAE 131A). Priority enrollment given to engineering majors.

SE 160B. Aerospace Structural Mechanics II (4)

Work-energy principles, matrix models, bending of plates and shells, structural stability of beams and plates, tension field beams, wing divergence and control reversal, vibration damping and flutter, fasteners and structural joints, structural test methods. **Prerequisites:** grade of C– or better in SE 160A. Priority enrollment given to engineering majors.

SE 163. Nondestructive Evaluation (4)

Damage detection, materials characterization. Introduction to nondestructive evaluation. Impedance-based methods, ultrasonics, acoustic, thermography, shearography, liquid penetrant, proof testing, stress coatings, vibrational techniques. **Prerequisites:** grade of C– or better in SE 110A and SE 110B or consent of instructor; SE major.

SE 168. Structural System Testing and Model Correlation (4)

Dynamic/model testing of structures: test planning/execution, actuation, sensing, and data acquisition, signal processing, data conditioning, test troubleshooting. Methods of updating finite element structural models to correlate with dynamic test results. Model/test correlation assessment in industrial practice. Knowledge of MATLAB strongly encouraged. **Prerequisites:** grade of C– or better in SE 101C (or MAE 130C) and SE 131.

SE 170. Civil Structures Rehabilitation (4)

Identification of structural distress, lessons from past history, materials and structural concepts related to rehabilitation, seismic retrofit. Strengthening of beams, slabs and walls, design detailing, safety factors, fabrication/installation methods. **Prerequisites:** grade of C– or better in SE 103, SE 130A-B, SE 151A.

SE 171. Aerospace Structures Repair (4)

Identification of structural distress, corrosion/stress corrosion cracking, fatigue cracking, damage tolerance, integrity and durability of built-up members, patching, health monitoring. **Prerequisites:** grade of C– or better in SE 130B or SE 160B.

SE 180. Earthquake Engineering (4)

Elements of seismicity and seismology. Seismic hazards. Dynamic analysis of structures underground motion. Elastic and inelastic response spectra. Modal analysis, nonlinear time-history analysis. Earthquake resistant design. Seismic detailing. **Prerequisites:** grade of C– or better in SE 110A, and SE 130A. Priority enrollment given to structural engineering majors.

SE 181. Geotechnical Engineering (4)

General introduction to physical and engineering properties of soils. Soil classification and identification methods. Compaction and construction control. Total and effective stress. Permeability, seepage, and consolidation phenomena. Shear strength of sand and clay. **Prerequisites:** grade of C– or better in SE 110A or MAE 131A; SE major.

SE 182. Foundation Engineering (4)

Application of soil mechanics to the analysis, design, and construction of foundations for structures. Soil exploration, sampling, and in-situ testing techniques. Stress distribution and settlement of structures. Bearing capacities of shallow foundations. Axial and lateral capacity of deep foundations, earth pressures on retaining walls. **Prerequisites:** grade of C– or better in SE 181; SE major.

SE 183/246. Engineering Geology (4)

Influence of geology on design of engineering works. Mineral and rock identification and their engineering behavior. Geologic mapping. Rock mechanics, rock slope stability, and tunnel engineering. Local field trips. **Prerequisites:** senior standing; priority enrollment is given to structural engineering majors; graduate standing required for SE 246.

SE 192. Senior Seminar (1)

The Senior Seminar is designed to allow senior undergraduates to meet with faculty members to explore an intellectual topic in structural engineering. Topics will vary from quarter to quarter. Enrollment is limited to twenty students with preference given to seniors. **Prerequisites:** SE major. Department stamp and/or consent of instructor.

SE 195. Teaching (2–4)

Teaching and tutorial assistance in a SE course under supervision of instructor. Not more than four units may be used to satisfy graduation requirements. (P/NP grades only.) **Prerequisites:** B average in major, upper-division standing and consent of department chair. Department stamp required.

SE 197. Engineering Internship (1–4)

An enrichment program, available to a limited number of undergraduate students, which provides work experience with industry, government offices, etc., under the supervision of a faculty member and industrial supervisor. Coordination of the Engineering Internship is conducted through UCSD's Academic Internship Program. **Prerequisites:** completion of ninety units with a 2.5 GPA and consent of department chair. Department stamp required.

SE 198. Directed Study Group (4)

Directed group study, on a topic or in a field not included in the regular department curriculum, by special arrangement with a faculty member. (P/NP grades only.) **Prerequisite:** consent of instructor or department stamp.

SE 199. Independent Study (1–4)

Independent reading or research on a problem by special arrangement with a faculty member. (P/NP grades only.) **Prerequisite:** consent of instructor or department stamp.

GRADUATE**SE 200. Applied Mathematics in Structural Engineering (4)**

This course is designed to give beginning graduate students the basic preparation in mathematical methods required for graduate Structural Engineering courses. Topics include systems of linear algebraic equations; ordinary differential equations; diffusion and wave propagation problems; and calculus variation. **Prerequisite:** graduate standing.

SE 201. Advanced Structural Analysis (4)

Applications of advanced analytical concepts to structural engineering problems. Effects of approximations in the discretization and the type of finite elements under consideration. An introduction is given to the nonlinear behavior of structural systems focusing on basic concepts and computational techniques. **Prerequisites:** SE 130A-B or equivalent, or consent of instructor.

SE 202. Structural Stability (4)

Static, dynamic, and energy-based techniques and predicting elastic stability. Linear and nonlinear analysis of classical and shear deformable beams and plates. Ritz, Galerkin, and finite element approaches for frames and reinforced shells. Nonconservative aerodynamic (divergence flutter) and follower forces. **Prerequisite:** SE 110B or consent of instructor.

SE 203. Structural Dynamics (4)

Response of the linear systems to harmonic, periodic and transient excitations. Duhamel's integral response spectra. Principles of dynamics, Lagrange's equations. Linearization of the equations of motion. Free and forced vibrations. Normal mode and frequency response method. **Prerequisite:** graduate standing or consent of instructor.

SE 204. Advanced Structural Dynamics (4)

Free- and forced-vibration response of continuous systems including axial and torsional vibrations of bars and transverse vibrations of beams, membranes and plates. Differential integral formulations of the eigenvalue problem. Perturbation and iteration methods. Introduction to nonlinear vibrations structural control. **Prerequisite:** graduate standing.

SE 205. Nonlinear Mechanical Vibrations (4)

Advanced analytical techniques to understand nonlinearity in mechanical vibration. Phase plane analysis instability, and bifurcations. Application in nonlinear structural resonance. Introduction to chaotic dynamics, advanced time series analysis, and using chaotic dynamics in applications such as structural damage assessment. **Prerequisite:** SE 206 or consent of instructor.

SE 206. Random Vibrations (4)

Introduction to probability theory and random processes. Correlation and power spectral density functions. Estimation of correlation functions, ergodicity. Stochastic dynamic analysis of structures subjected to stationary and non-stationary random excitations. Crossings, first-escursion probability, distributions of peaks and extremes.

SE 207. Topics in Structural Engineering (4)

A course to be given at the discretion of the faculty in which topics of current interest in structural engineering will be presented.

SE 211. Advanced Reinforced and Prestressed Concrete Design (4)

Advanced topics in concrete design, including frame and shear wall structures, design of connections. reinforced and prestressed concrete system evaluation for seismic resistance including confinement and ductility requirements. Upper and lower bound theories for slab design. **Prerequisite:** SE 151A, or equivalent background in basic RC/PC design, or consent of instructor.

SE 212. Advanced Structural Steel Design (4)

Load and Resistance Factor Design (LRFD) philosophy. Behavior and design of steel elements for global and local buckling. Background of seismic codes. Ductility requirements and capability design concept. Seismic design of steel moment frames and braced frames. **Prerequisites:** SE 201 and SE 150, or equivalent course, or consent of instructor.

SE 213. Bridge Design (4)

Design and analysis of bridge structures, construction methods, load conditions. Special problems in analysis—box girders, curved and skewed bridges, environmental and seismic loads. Bearings and expansion joints. Time-temperature-dependent superstructure deformations. Conceptual/preliminary bridge design project. **Prerequisites:** SE 201 and fundamental courses in RC and PC design, or consent of instructor.

SE 214. Masonry Structures (4)

Analysis and design of unreinforced and reinforced masonry structure using advanced analytical techniques and design philosophies. Material properties, stability, and buckling of unreinforced masonry. Flexural strength, shear strength, stiffness, and ductility of reinforced masonry elements. Design for seismic loads. **Prerequisites:** SE 151A, B, or equivalent basic reinforced concrete course, or consent of instructor; graduate standing.

SE 215. Cable Structures (4)

The course deals with cable structures from a structural mechanics point of view. The theoretical and practical aspects of the application of cables to moorings, guyed structures, suspension bridges, cable-stayed bridges, and suspended membranes are discussed. **Prerequisite:** graduate standing or consent of instructor.

SE 220. Seismic Isolation and Energy Dissipation (4)

Concepts, advantages and limitations of seismic isolation techniques; fundamentals of dynamic response under seismic excitation; spectral analysis; damping; energy approach; application to buildings and structures. **Prerequisite:** background in structural dynamics, or consent of instructor

SE 221. Earthquake Engineering (4)

Introduction to plate tectonics and seismology. Rupture mechanism, measures of magnitude and intensity, earthquake occurrence and relation to geologic, tectonic processes. Probabilistic seismic hazard analysis. Strong earthquake ground motion; site effects on ground motion; structural response; soil-structure interaction; design criteria; code requirements.

SE 222. Geotechnical Earthquake Engineering (4)

Influence of soil conditions on ground motion characteristics; dynamic behavior of soils, computation of ground response using wave propagation analysis and finite element analysis; evaluation and mitigation of soil liquefaction; soil-structure interaction; lateral pressures on earth retaining structures; analysis of slope stability.

SE 223. Advanced Seismic Design of Structures (4)

Fundamental concepts in seismic design. Innovative earthquake resistant system. Passive energy dissipation systems. Metallic friction, viscoelastic dampers. Self-centering devices. Tuned-mass dampers. Theory of seismic isolation. Metallic bearings. Lead-extrusion bearings. Sliding bearings. Laminated rubber bearings. Lead-rubber bearings. **Prerequisite:** graduate standing.

SE 224. Structural Reliability and Risk Analysis (4)

Probability theory and random processes; fundamentals of structural reliability theory. Modern methods of structural reliability analysis including computational aspects; structural component and system reliability. Reliability-based design codes; structural modeling for performance and safety. Risk analysis of structural systems. **Prerequisite:** basic knowledge of probability theory (e.g., SE 125)

SE 233. Computational Techniques in Finite Elements (4)

Practical application of the finite element method to problems in solid mechanics including basic preprocessing and postprocessing. Topics include element types, mesh refinement, boundary conditions, dynamics, eigenvalue problems, and linear and nonlinear solution methods.

SE 234. Plates and Shells (4)

General mathematical formulation of the theory of thin elastic shells; linear membrane and bending theories; finite strain and rotation theories; shell of revolution; shallow shells; selected static and dynamic problems; survey of recent advances. **Prerequisite:** graduate student standing.

SE 235. Wave Propagation in Elastic Media (4)

Wave propagation in elastic media with emphasis on waves in unbound media and on uniform and layered half-spaces. Fundamental aspects of elastodynamics. Application to strong-motion seismology, earthquake engineering, dynamics of foundations, computational wave propagation, and non-destructive evaluations. **Prerequisite:** graduate standing or consent of instructor.

SE 236. Wave Propagation in Continuous Structural Elements (4)

Propagation of elastic waves in thin structural elements such as strings, rods, beams, membranes, plates and shells. An approximate strength-of-materials approach is used to consider propagation of elastic waves in these elements and obtain the dynamic response to transient loads. **Prerequisite:** graduate standing or consent of instructor.

SE 241. Advanced Soil Mechanics (4)

Advanced treatment of topics in soil mechanics, including state of stress, pore pressure, consolidation and settlement analysis, shear strength of cohesionless and cohesive soils, mechanisms of ground improvement, and slope stability analysis. Concepts in course reinforced by laboratory experiments.

SE 242. Advanced Foundation Engineering (4)

Advanced treatment of topics in foundation engineering, including earth pressure theories, design of earth retaining structures, bearing capacity, ground improvement for foundation support, analysis and design of shallow and deep foundations, including drilled piers and driven piles.

SE 243. Soil-Structure Interaction (4)

Advanced treatment of soils interaction with structures, including shallow and deep foundations, bridge abutments, retaining walls, and buried structures subjected to static and dynamic loading. Elastic approximation. Linear and nonlinear Winkler models p-y and t-z curves.

SE 245. Constitutive Modeling and Numerical Implementation (4)

Development and numerical implementation of procedures to model the nonlinear behavior of engineering materials, including soil and concrete. Inelastic hyperbolic and elasto-plastic modeling of hysteretic response to cyclic loading. Behavior of soil-structure systems under transient loading, such as seismic earthquake excitation.

SE 246. Engineering Geology (4)

Influence of geology on design of engineering works. Mineral and rock identification and their engineering behavior. Geologic mapping. Rock mechanics, rock slope stability, and tunnel engineering. Local field trips. (Graduate students are required to submit a term project based on two extended weekend field trips and self-guided research.)

SE 251A. Processing Science of Composites (4)

Introduction to processing, fabrication methods; process models; materials-process-microstructure interaction; materials selection; form and quality control. Wet layup/sprayup, autoclave cure, SMC; injection molding, RTM; resin infusion; winding and fiber placement; pultrusion. Process induced defects, environmental considerations. **Prerequisite:** graduate standing.

SE 251B. Mechanical Behaviors of Polymers and Composites (4)

Material science oriented course on polymers and composites. Mechanical properties of polymers; micromechanisms of elastic and plastic deformations, fracture, and fatigue of polymers and composites. Graduate student standing required.

SE 252. Experimental Mechanics and NDE (4)

Theory of electrical resistance strain gages, full-field coherent optical methods including photoelasticity, moiré and speckle interferometry, ultrasonics, thermography and fiberoptic sensing. Applications to materials characterization, defect detection and health monitoring of structures with emphasis on fiber-reinforced composites. **Prerequisites:** SE 101A, SE 110A, and MAE 131B, or consent of instructor.

SE 253A. Mechanics of Laminated Composite Structures I (4)

Graduate-level introductory course on mechanics of composites and anisotropic materials. Overview of composite materials and processes, 3-D properties and stress-strain relationships, micromechanics, classical laminated plate theory, basic failure criteria, thermal/moisture/CTE. Students may not receive credit for both SE 253A and SE 250. **Prerequisite:** graduate standing.

SE 253B. Mechanics of Laminated Composite Structures II (4)

Advanced topics, with prerequisite being SE 253A, or equivalent. Macro- and micro-material modeling, classical and shear deformable laminate beam and plate theories developed via energy principles, Ritz, Galerkin, and Finite element based solutions, advanced failure theories, fracture, holes/notches and hole-size effect, interlaminar stresses, free-edge problems, impact, damage tolerance, fatigue, elastic tailoring, thermally stable/zero CTE structures, etc. **Prerequisites:** SE 253A or equivalent, graduate standing.

SE 253C. Mechanics of Laminated Anisotropy Plates and Shells (4)

Static, dynamic, and elastic stability of laminated anisotropic plates and cylindrical shells. Theories covered include thin-plate (classical lamination theory), first- and third-order shear-deformable (Reissner-Mindlin, and Reddy) thick plates, and refined layer-wise theories. Solution methods covered include exact, approximate (Ritz, Galerkin) and the finite element method. Additional topics include sandwich construction, elastic couplings, thermal response, shear factor determination, fiber and interlaminar stress recovery, strength, and safety considerations. **Prerequisites:** graduate student standing required; must have taken SE 253B or equivalent, or consent of instructor.

SE 254. FRPs in Civil Structures (4)

Strengthening of existing reinforced concrete structures with fiber reinforced composites. Mechanics of Fiber Reinforced Plastic lamina, bond strength of FRP-to-concrete joints, shear and flexural strengthening of beams and walls, increased strength and ductility of axially loaded columns, and seismic retrofit of columns. **Prerequisites:** SE 142 Design of Composite Structures or equivalent, SE 251A Processing Science of Composites.

SE 255. Textile Composite Structures (4)

Introduction to textile structure and behavior, mechanics of yarns and fabrics as relevant to structural composites and geotechnical applications. Mechanics of textiles and fabric-based composites. Applications in fiber reinforced composites, coated textile structures, geotextiles.

SE 261. Aerospace Engineering Design (4)

Advanced topics in the design of weight-critical aerospace structures. Topics include: static, dynamic and environmental load definitions; metallics and polymeric composite material selection; semi-monocoque analysis techniques, and bolted/bonded connections. Design procedures for sizing the structural components of aircraft and spacecraft will be reviewed.

SE 262. Aerospace Structures Repair (4)

Design and analysis for repairing weight-critical aerospace structures. Identification of primary and secondary structural components, review of NASA/FAA approved repair techniques for metallic and composite structural components.

SE 265. Structural Health Monitoring (4)

A modern paradigm of structural health monitoring as it applies to structural and mechanical systems is presented. Concepts in data acquisition, feature extraction, data normalization, and statistical modeling will be introduced in an integrated context. MATLAB-based exercises. Term project. **Prerequisites:** graduate student, undergraduate vibrations or structural dynamics course.

SE 271. Solid Mechanics for Structural and Aerospace Engineering (4)

Application of principles of solid mechanics to structural components and systems, description of stresses, strains, and deformation. Use of conservation equations and principle of minimum potential energy. Development

of constitutive equations for metallic cementitious and polymeric materials. **Prerequisite:** SE 110A or consent of instructor.

SE 272. Theory of Elasticity (4)

Development, formulation, and application of field equations of elasticity and variational principles for structural applications in civil and aerospace area. Use of plane stress and plane strain formulation, solution of typical boundary value problems. **Prerequisite:** SE 271 or consent of instructor.

SE 273. Anelasticity (4)

Mechanical models of viscoelastic, plastic, and viscoplastic behavior in simple shear or uniaxial stress. Constitutive relations for three-dimensional states of stress and strain. Application to selected technological problems. **Prerequisites:** graduate standing and SE 271 and SE 272, or MAE 231A and MAE 231B, or consent of instructor.

SE 274. Nonlinear Finite Element Methods for Solid Mechanics (4)

Modeling of mechanical deformation processes in solids and structures by the finite element method. PDE models of deformations in solids and structures. Weak form. Weighted residual method. Material models for 3D solids and rods, beams, shells: elasticity, plasticity, viscoplasticity. **Prerequisite:** graduate standing.

SE 275. Hydrodynamics in Marine Engineering (4)

Fluid dynamics equations; potential flow-theory; basic potential-flow solutions; added mass; 6-DOF hydrodynamic forces/moments on a body; water wave theory; irregular wave field; wave-body interactions; high/low-frequency responses; vortex-induced vibrations; galloping; numerical methods. **Prerequisite:** graduate standing.

SE 276A. Finite Element Methods in Solid Mechanics I (4)

Finite element methods for linear problems in solid mechanics. Emphasis on the principle of virtual work, finite element stiffness matrices, various finite element formulations and their accuracy and the numerical implementation required to solve problems in small strain, isotropic elasticity in solid mechanics.

SE 276B. Finite Element Methods in Solid Mechanics (4)

Finite element methods for linear problems in structural dynamics. Beam, plate, and doubly curved shell elements are derived. Strategies for eliminating shear locking problems are introduced. Formulation and numerical solution of the equations of motion for structural dynamics are introduced and the effect of different mass matrix formulations on the solution accuracy is explored.

SE 276C. Finite Element Methods in Solid Mechanics III (4)

Finite element methods for problems with both material and geometrical (large deformations) nonlinearities. The total LaGrangian and the updated LaGrangian formulations are introduced. Basic solution methods for the nonlinear equations are developed and applied to problems in plasticity and hyperelasticity. **Prerequisites:** graduate standing and SE 276A or MAE 232A and MAE 231A or SE 271.

SE 277. Error Control in Finite Element Analysis (4)

This course will provide an overview of the latest technology for evaluating and improving the accuracy and validity of linear and nonlinear finite element models, solution verification, finite element model validation, sensitivity analysis, uncertainty analysis, and test-analysis correlation. **Prerequisite:** SE 232B or MAE 232B.

SE 278A. Finite Element Methods for Computational Fluid Dynamics (4)

Development and application of advanced computational techniques for fluid flow. Stabilized and variational multiscale methods for finite element and related discretizations are stressed. Applications involve advection-diffusion equations and systems, and incompressible and compressible Navier-Stokes equations. Turbulence modeling will also be covered. **Prerequisite:** MAE 232A or SE 276A or consent of instructor.

SE 278B. Computational Fluid-Structure Interaction (4)

Conservation laws on general moving domains. Arbitrary Lagrange-Eulerian (ALE) and space-time approaches to fluid-structure interaction are covered. Suitable discretizations, mesh motion, and discrete solution strategies are discussed. **Prerequisite:** SE 278A.

SE 290. Seminar in Earthquake Engineering (2)

Weekly seminar and discussion by faculty, visitors, postdoctoral research fellows and graduate students concerning research topics in earthquake engineering and related subjects. May be repeated for credit. (S/U grades only.)

SE 296. Independent Study (4)

Prerequisite: consent of instructor.

SE 298. Directed Group Study (1-4)

Directed group study on a topic or in a field not included in regular department curriculum, by special arrangement with a faculty member. **Prerequisite:** consent of instructor.

SE 299. Graduate Research (1-12)

(S/U grades permitted.)

SE 501. Teaching Experience (2)

Teaching experience in an appropriate SE undergraduate course under direction of the faculty member in charge of the course. Lecturing one hour per week in either a problem-solving section or regular lecture. **Prerequisites:** consent of instructor and the department. (S/U grades permitted.)

English as a Second Language

OFFICE: 232 Literature Building, Warren College
<http://basicwriting.ucsd.edu>

The English as a Second Language Program (ESL) offers course work specific to the language needs of students for whom English is a second (or subsequent) language. This course is SDCC 4.

SDCC 4 is a required course for all undergraduates who have not satisfied the UC Entry Level Writing requirement and who have been designated as needing the course based on their UC Analytical Writing Placement Examination. A combination of instructor recommendation, Entry Level Writing Exit Exam result, and a possible portfolio review places students in SDCC 4 for another quarter, in SDCC 1, or in a college writing sequence. Like SDCC 1, SDCC 4 is taught through a cooperative agreement with the San Diego Community College District. Under Academic Senate regulations, SDCC 4 cannot be counted toward graduation requirements; however, the course units do count as workload credit toward the Minimum Progress requirement and toward eligibility for financial assistance.

For further information about the UC Entry Level Writing Requirement or the UC Analytical Writing Placement Exam, please visit the Basic Writing office, or call (858) 534-6177.

Entry Level Writing

OFFICE: 232 Literature Building

<http://basicwriting.ucsd.edu/>

For information about satisfying the University of California Entry Level Writing requirement, especially prior to enrollment, please refer to "[UC Entry Level Writing Requirement](#)" in the catalog section "[Academic Regulations](#)."

Students who have not satisfied the UC Entry Level Writing requirement before enrolling at UC San Diego must satisfy the requirement by achieving a grade of C or better in SDCC 1 (English Composition—Entry Level Writing) and by passing the Entry Level Writing Exit Examination given at the end of SDCC 1. That examination is administered by the Basic Writing Program office. Students must enroll in SDCC 1 or SDCC 4 during the first quarter of residence at UCSD. SDCC 1 and SDCC 4 are Mesa College courses taught at UCSD as part of a cooperative program with the San Diego Community College District.

Under Academic Senate regulations, SDCC 1 and SDCC 4 cannot be counted toward graduation requirements; however, the course units do count as workload credit toward the minimum progress requirement and toward eligibility for financial assistance.

For further information about the UC Entry Level Writing requirement or the UC Analytical Writing Placement Examination, please visit the Basic Writing office, 232 Literature Building, or call (858) 534-6177.

Environmental Studies

DIRECTOR

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OFFICE: 2113 Humanities and Social Sciences Building, Muir College
(858) 534-3589
<http://provost.ucsd.edu/muir/instructional/environmental-studies>

MINOR IN ENVIRONMENTAL STUDIES

The Environmental Studies minor offers students from every major a basic grounding in the scientific, technical, social, and cultural issues presented by the interaction of human beings with their environment and the need to build a more environmentally sustainable future.

The two required courses, ENVR30 and ENVR130, have no prerequisites. Some of the other courses related to the minor, particularly those in Group A, have significant prerequisites; students planning an Environmental Studies minor should check catalog course descriptions carefully. Some credit toward the minor may be gained through independent study, field research, study abroad, the Academic Internship Program, and others (prior approval strongly recommended). Petitions for petitionable courses, transfer courses, and individual additions to the courses listed below must be approved by the chair of the Environmental Studies Steering Committee. For updates, individual advising, and quarterly lists, please come to the Environmental Studies Office: Muir Interdisciplinary Studies, 2113 H&SS # 0106, phone (858) 534-3589.

APPLICABLE AND PETITIONABLE COURSES

Environmentally-based courses offered by UC San Diego departments fall into two categories: applicable and petitionable. Applicable courses are those which have been approved as always applying to the ENVR minor. Petitionable courses are either

new and therefore not yet approved as applicable or are “topics” courses which focus on environmental matters only in particular quarters. Petitionable courses may be approved by petition to the minor during the quarters in which they appear in the ENVR quarterly lists.

QUARTERLY LISTS

Each quarter, when the upcoming quarter’s *Schedule of Classes* is published, the Environmental Studies quarterly list is available in 2113 HSS and at the Web site. It is an important, comprehensive source of information about ENVR course offerings as well as those from departments throughout the campus. It identifies applicable as well as petitionable courses for a given quarter. For reference, the office and the Web site maintain archives of quarterly lists.

The minor is structured as follows:

- Required:
- Environmental Studies 30, usually offered in the fall quarter.
 - Environmental Studies 130, usually offered in the winter quarter (need not be taken consecutively).
- Required:
- Five additional courses, at least four in the upper-division, from the following two groups. At least one course must be taken from Group A and one from Group B.

Group A—Natural Sciences

Biology LD 3. Organismic and Evolutionary Biology
BIEB 121. General Ecology Laboratory
BIEB 131. Marine Invertebrate Ecology Laboratory
BIEB 132. Introduction to Marine Biology
BIEB 134. Introduction to Biological Oceanography
BIEB 140. Biodiversity
BIEB 165. Behavioral Ecology Laboratory
BIEB 166. Animal Behavior and Communication
BIEB 176. Conservation and the Human Predicament (cross-listed with ANBI 132)
Chemistry 15. Chemistry of the Universe
Chemistry 149A. Environmental Chemistry
Chemistry 149B. Environmental Chemistry
Chemistry 173. Atmospheric Chemistry
Environmental Studies 102. Selected Topics in Environmental Studies (when taught from a natural sciences perspective)
Environmental Systems 101. The Living Earth
Environmental Systems 103. The Human Earth
Environmental Systems 120. Science and Environmental Writing
MAE 118A. Energy: Non-Nuclear Energy Technologies
Physics 12. Energy and the Environment
Science, Technology, Public Affairs 35. Society and the Sea
SIO 10. The Earth
SIO 12. History of Earth and Evolution
SIO 15. Natural Disasters
SIO 16. Geology of National Parks
SIO 20. The Atmosphere
SIO 30. The Oceans
SIO 35. Water
SIO 110. Introduction to GIS and GPS for Scientists

Group B—Social Sciences/Humanities

ANAR 108. Archaeology of the UCSD Campus
ANAR 182. Origins of Agriculture and Sedentism
ANBI 132. Conservation and the Human Predicament (cross-listed with BIEB 176)
ANSC 160. Nature, Culture and Environmentalism Communication
CUL 148. Communication and the Environment
Economics 131. Economics of the Environment
Economics 132. Energy Economics
Economics 145. Economics of Ocean Resources
Environmental Studies 102. Selected Topics in Environmental Studies (when taught from a humanities/social sciences perspective)
Environmental Studies 110. Environmental Law
Environmental Studies 140. Wilderness and Human Values
Ethnic Studies 103. Environmental Racism
History US 154. Western Environmental History
IRPS GN 458. International Environmental Policy and Politics
IRPS GN 459. Conflict Resolution of Environmental Issues
Philosophy 148. Philosophy and the Environment
Philosophy 164. Technology and Human Values
Political Science 162. Environmental Policy
Soc/C 149. Sociology of the Environment
Urban Studies & Planning 2. Urban World System
Urban Studies & Planning 124. Land Use Planning
Urban Studies & Planning 144. Environmental and Preventive Health Issues
Urban Studies & Planning 171. Sustainable Development

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

30. Environmental Issues: Natural Sciences (4)

Examines global and regional environmental issues. The approach is to consider the scientific basis for policy options. Simple principles of chemistry and biology are introduced. The scope of problems include: air and water pollution, climate modification, solid-waste disposal, hazardous-waste treatment, and environmental impact assessment. **Prerequisite:** none.

87. Environmental Studies Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

102. Selected Topics in Environmental Studies (4)

An interdisciplinary course focusing on one of a variety of topics related to environmental studies such as environmental policy and politics, foreign study in environmental problems, environmental history, nature writers, ethics and the environment. May be repeated for credit as topics vary. **Prerequisite:** upper-division standing or consent of instructor.

110. Environmental Law (4)

Explores environmental policy in the United States and the ways in which it is reflected in law. The social and political issues addressed include environmental justice and environmental racism, as well as the role of government in implementing environmental law. **Prerequisite:** upper-division standing or consent of instructor.

120. Coastal Ecology (4)

Explores the diverse ecosystems of coastal San Diego County (salt marsh, rocky intertidal, sandy beach, etc.) in the classroom and in the field with attention to basic principles of field ecology, natural history, and techniques for collecting ecological data. Course and/or materials fee may apply. **Prerequisite:** upper-division standing or consent of instructor.

130. Environmental Issues: Social Sciences (4)

Explores contemporary environmental issues from the perspective of the social sciences. It includes the cultural framing of environmental issues and appropriate social action, the analysis of economic incentives and constraints, and a comparison of policy approaches. **Prerequisite:** upper-division standing or consent of instructor.

140. Wilderness and Human Values (4)

"Wilderness" plays a central role in the consciousness of American environmentalists and serves as focal point for public policies, recreation, and political activism. This course explores its evolving historical, philosophical, ecological, and aesthetic meanings and includes guest speakers and a field component. **Prerequisite:** upper-division standing or consent of instructor.

141. Wilderness and Human Values Workshop (2)

A course to prepare students to serve as discussion leaders for ENVR 140, Wilderness and Human Values. Includes reading, discussion, library and on-line research, and field trips. **Prerequisites:** consent of instructor and department stamp.

192. Senior Seminar in Environmental Studies (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in Environmental Studies (at the upper-division level). Topics will vary from quarter to quarter. Senior Seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** upper-division standing, department stamp and/or consent of instructor. (Not offered in 2009–10.)

195. Apprentice Teaching (0-4)

Instructor will define assistant's responsibilities in preparing class presentations, leading students' discussions, and evaluating students' work.

198. Directed Group Study (4)

Directed group research and study, normally with a focus on areas not otherwise covered in the curriculum. **Prerequisites:** upper-division standing or consent of instructor. Department stamp required.

199. Independent Study (4)

Independent study in a topic not generally covered in the regular curriculum.

500. Apprentice Teaching in Environmental Studies (4)

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty: handling of discussions, preparation and grading of examinations and other written exercises, and student relations. **Prerequisite:** graduate standing.

Environmental Systems

PROGRAM FACULTY

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There can be little doubt that in the twenty-first century the global human community is facing a substantial growth in the environmental consequences in providing food, energy, materials, and basic services to a population of almost 6.5 billion inhabitants. The Environmental Systems Program (ESYS) recognizes the growing demand for environmental specialists and is designed to prepare undergraduates to enter a broad spectrum of environmental careers and graduate programs in, for example, the natural sciences, the social sciences, public policy, law, and business.

This interdisciplinary program recognizes that local, national, regional, international, and global environmental problems do not fit neatly into traditional academic departments. A measurable part of society's inability to effectively manage complex environmental problems stems from the lack of specialists who can apply analytical tools that cross disciplinary boundaries. Many environmental specialists possess little training in the natural sciences including both the fundamental ideas and methodologies of the earth and environmental sciences. The environmental systems major was created to address both of these shortcomings.

To encourage and foster an interdisciplinary focus in the major, the Environmental Systems Program is supported by a wide range of UC San Diego faculty representing the natural sciences, the social sciences, the humanities, engineering, and medicine. The program includes a required lower-division core, an upper-division "integrating course sequence," two other upper-division courses and statistics, an advanced track, and a senior integrative project and seminar. There is a strong emphasis on a rigorous natural science foundation as well as an introduction to the policy sciences for all students enrolled in the major. The Environmental Systems Program places a significant value on interdisciplinary problem solving and all majors are expected to complete an integrative Senior Project in their final year. The Senior Project is designed by the student to focus on an interdisciplinary environmental problem or research topic. Appropriate topics for the Senior Project could conceivably include biodiversity conservation, coastal zone management, environmental health, climate change, environmental justice, and/or urban air quality. An important component of the Senior Project is an off-campus or laboratory internship where students might work on, for example, the development of a comprehensive management plan for a threatened ecosystem. The Senior Seminar provides a venue for the presentation and group evaluation of the ESYS Senior Projects.

THE ENVIRONMENTAL SYSTEMS MAJOR

The requirements for completion of the environmental systems major include a lower-division core, two upper-division courses, a three course upper-division integrating sequence (ESYS 101, ESYS 102, ESYS 103), an upper-division statistics course, advanced courses in one of four tracks, and the Senior Project (ESYS 190A) and Senior Seminar (ESYS 190B). It is suggested that the integrating sequence ESYS 101, 102, and 103 should be completed by sophomore year, if possible. Any questions concerning the requirements should be directed to the associate director or the program advisor. Students completing the advanced tracks in Earth Sciences, Ecology, Behavior, and Evolution, and Environmental Chemistry will be awarded a B.S. in environmental systems. The B.A. In environmental systems will be granted to students completing the Environmental Policy track within the major.

A grade-point average of 2.0 or higher in the upper-division major program is required for graduation. Students must receive a grade of C– or better in any course to be counted toward fulfillment of the major requirements. In exceptional cases, students with a grade-point average in the major of

2.5 or greater may petition to have one grade of D accepted.

All courses (lower- and upper-division) required for the major must be taken for a letter grade.

Lower-Division Core Requirements

(Should be completed early in student's degree program.)

Biology 3—BILD 3

Chemistry 6A-B, 6BL, 6C

Physics 1A, 1AL, 1B, 1BL, 1C, 1CL (Physics 2A-B-C recommended for Earth Sciences track.)

Mathematics 10A-B-C (Math. 20A-B-C recommended for Earth Sciences track.)

Economics 1

SIO 50—for Earth Sciences track only

Upper-Division Core Requirements

Economics 131. Economics of the Environment

Political Science 160AA. Introduction to Policy Analysis

Integrating Course Sequence

It is suggested that the Integrating Course Sequence of Esys 101, 102 and 103 be completed by the sophomore year, if possible.

Environmental Systems 101. Environmental Biology

Environmental Systems 102. The Solid and Fluid Earth

Environmental Systems 103. Environmental Challenges: Science and Solutions

Environmental Systems 190A. Senior Project (two quarters)

Environmental Systems 190B. Senior Seminar

ENVIRONMENTAL SYSTEMS MAJOR TRACKS

There are four advanced tracks in which students must complete a minimum of seven upper-division courses. Students will select courses following the requirements below in consultation with a faculty advisor.

Earth Sciences

Ecology, Behavior, and Evolution

Environmental Chemistry

Environmental Policy

It is possible to complete the requirements for any of the Environmental Systems tracks with five upper-division electives and a specialization that consists of two additional upper-division electives from any other track. For example, a student interested in the policy and scientific dimensions of habitat conservation planning for endangered species might plan a course of study to include five advanced courses from the Ecology, Behavior, and Evolution track and two advanced courses from the Environmental Policy track.

EARTH SCIENCES TRACK

Required lower-division course:

SIO 50. Introduction to Earth and Environmental Sciences

Required upper-division courses:

SIO 102. Introduction to Geochemistry
 MATH 183. Statistical Methods

Upper-division electives: Students complete a minimum of seven courses selected from the following list.

SIO 100. Introduction to Field Methods
 SIO 104/255. Paleobiology and History of Life
 SIO 105. Sedimentology and Stratigraphy
 SIO 110. Introduction to GIS and GPS for Scientists
 SIO 112. Urban Landscapes
 SIO 120. Introduction to Mineralogy
 SIO 144/252A. Introduction to Isotope Geochemistry
 SIO 160. Introduction to Tectonics
 SIO 162. Structural Geology
 SIO 199. Independent Study
 ESYs 120. Science and Environmental Writing
 ESYs 199. Independent Study
 BIEB 132. Introduction to Marine Biology
 BIEB 134. Introduction to Biological Oceanography
 SIO 210. Physical Oceanography
 SIO 240. Marine Geology
 SIO 260. Marine Chemistry
 SIO 263. Aqueous Chemistry
 SIO 280. Biological Oceanography
 Chemistry 149A. Environmental Chemistry
 Chemistry 173/273. Atmospheric Chemistry

Other courses may be substituted by petition.

Curriculum Guide Planning

FALL	WINTER	SPRING
Freshman		
Chem. 6A	Chem. 6B	Chem. 6C
Math. 20A or Math. 10A	Math. 20B or Math. 10B	Math. 20C or Math. 10C
SIO 50	BILD 3	Chem. 6BL
Sophomore		
Phys. 2A or 1A, 1AL	Phys. 2B or 1B, 1BL	Phys. 2C or 1C, 1CL
Poli. 160AA/USP 101	Econ. 1	ESYS 103/MAE 124
ESYS 101	ESYS 102	Econ. 131
Junior		
UD elective	SIO 102	UD elective
Math. 183	UD elective	UD elective
Senior		
ESYS 190A	ESYS 190A	ESYS 190B
UD ESYS elective	UD ESYS elective	UD ESYS elective

ECOLOGY, BEHAVIOR, AND EVOLUTION TRACK

Required upper-division courses:

BICD 100. Genetics
 BIEB 100. Biometry (satisfies upper-division statistics requirement)

Upper-division electives (a total of seven courses required, one of which must be a lab course, selected from the courses below):

BIBC 100. Structural Biochemistry
 BIBC 102. Metabolic Biochemistry
 BIBC 103. Biochemical Techniques
 BIBC 120. Nutrition
 BIBC 130/SIO 281. Marine Biochemistry
 BICD 110. Cell Biology

BICD 120. Fundamental of Plant Biology
 BICD 130. Embryos, Genes, and Development
 BICD 134. Human Reproduction and Development
 BIEB 102. Introductory Ecology—Organisms and Habitats
 BIEB 121. Ecology Laboratory
 BIEB 126. Plant Ecology
 BIEB 131. Marine Invertebrate Ecology Lab
 BIEB 132. Introduction to Marine Biology
 BIEB 134. Introduction to Biological Oceanography
 BIEB 140. Biodiversity
 BIEB 144. Quantitative Ecology
 BIEB 150. Evolution
 BIEB 156. Population Genetics
 BIEB 164. Behavioral Ecology
 BIEB 165. Behavioral Ecology Laboratory
 BIEB 166. Animal Communication
 BIEB 167. Animal Communication Lab
 BIEB 176/ANBI 132. Conservation and the Human Predicament

BIMM 100. Molecular Biology
 BIMM 110. Molecular Basis of Disease
 BIMM 114. Virology
 BIMM 120. Bacteriology
 BIMM 121. Laboratory in Microbiology
 BIMM 124. Medical Microbiology
 BIMM 126. Marine Microbiology
 BIMM 127/SIO 288. Marine Microbiology Laboratory
 BIPN 100. Mammalian Physiology I
 BIPN 102. Mammalian Physiology II
 BIPN 105. Animal Physiology Lab (6)
 BIPN 106. Comparative Physiology (4)
 ESYs 120. Science and Environmental Writing
 ESYs 150. Environmental Perils
 ESYs 199. Independent Study

Other courses may be substituted by petition.

Curriculum Guide Planning

FALL	WINTER	SPRING
Freshman		
Chem. 6A	Chem. 6B	Chem. 6C
Math. 10A	Chem. 6BL	Math. 10C
	Math. 10B	BILD 3
Sophomore		
Phys. 1A, 1AL	Phys. 1B, 1BL	Phys. 1C, 1CL
Econ. 1	UD elective	Econ. 131
Poli. 160AA/USP 101	BIEB 100 (statistics)	BICD 100
		ESYS 103/MAE 124
Junior		
ESYS 101	ESYS 102	
UD elective	UD elective	UD elective
UD lab		
Senior		
ESYS 190A	ESYS 190A	ESYS 190B
UD elective	UD elective	

ENVIRONMENTAL CHEMISTRY TRACK

Students must complete two of the following courses:

Chemistry 149A. Environmental Chemistry
 Chemistry 149B. Environmental Chemistry
 Chemistry 173/273. Atmospheric Chemistry
 SIO 141/Chem 174. Chemical Principles of Marine Systems

Students must complete:

Math. 183. Statistical Methods OR
 Math. 186. Probability Statistics for Bioinformatics
 Chemistry 100A. Analytical Chemistry Laboratory
 Chemistry 140A and B. Organic Chemistry I and II
 One upper-division lab from either:
 Chemistry 100B. Instrumental Analysis Laboratory
 Chemistry 143A. Organic Chemistry Laboratory

Two upper-division restricted electives from:
 Chemistry 124. Bioinorganic Chemistry
 Chemistry 126. Physical Chemistry or Chem. 133
 (Note: Chem. 126 and Chem. 133 both require Physics 2D and Math. 20D as prerequisites.)
 Chemistry 127. Physical Chemistry or Chem. 131, Chem. 132
 Chemistry 140C. Organic Chemistry III
 ESYs 199. Independent Study

Other courses may be substituted by petition.

Curriculum Guide Planning

FALL	WINTER	SPRING
Freshman		
Chem. 6A	Chem. 6B	Chem. 6BL
Math. 10A	Math. 10B	Math. 10C
Bild 3		Chem. 6C
Sophomore		
Phys. 1A, 1AL	Phys. 1B, BL	Phys. 1C, CL
Econ. 1	Chem. 140A	Chem. 140B
Chem. 100A	Math. 183 or Math. 186	Econ. 131
Junior		
*Chem. 149A	*Chem. 149B	*Chem. 173
ESYS 101	Chem. 100B or Chem. 143A	
Poli. 160AA/USP 101	ESYS 102	ESYS 103/MAE 124
Senior		
ESYS 190A	ESYS 190A	ESYS 190B
UD elective	UD elective	*SIO 141/Chem. 174

*Choose 2 out of 4

ENVIRONMENTAL POLICY TRACK

Required upper-division course

One upper-division Statistics course—Math 183
 Statistical Methods or Economics 120A Econometrics

Upper-division electives

Students complete a minimum of seven courses selected from the following:

Economics 116. Economic Development
 Economics 125. Economics of Population Growth
 Economics 130. Public Policy
 Economics 132. Energy Economics
 Environmental Systems 120. Science and Environmental Writing
 Environmental Systems 150. Environmental Perils
 Environmental Systems 199. Independent Study
 Political Science 102L. The Politics of Regulation
 Political Science 125. The Politics of Conservation in Developing Countries
 Political Science 125A. Communities and the Environment
 Political Science 150A. Politics of Immigration
 Political Science 160AB. Introduction to Policy Analysis

*IR-GN 457/257. Cost Benefit Analyses
 *IR-GN 459/259. Conflict Resolution of Environmental Issues
 *IR-GN 487/289. Applied Environmental Issues
 *IR-GN 488/206. Corporate Strategy and the Environment
 *IR-GN 490/290. Special Topics in Pacific International Affairs (petition only)
 *IR-GN 453/253. Sustainable Development
 *IR-GN 458/258. International Environmental Policy
 HISC 105. History of Environmentalism
 HIUS 154. Western Environmental History
 ANBI 132. Conservation and the Human Predicament
 Com/Cul 148. Communication and the Environment
 Env. Studies 102. Selected Topics in Environmental Studies
 Env. Studies 110. Environmental Law
 Env. Studies 130. Environmental Issues
 Philosophy 148. Philosophy and the Environment
 Philosophy 164. Technology and Human Values
 SIO 110. Introduction to GIS and GPS for Scientists
 SIO 112. Urban Landscapes
 USP 124. Land Use Planning
 USP 144. Environmental and Preventive Health Issues
 USP 170. Sustainability Planning
 USP 171. Sustainable Development

Other courses may be substituted by petition.

*These graduate courses are offered through the Graduate School of International Relations and Pacific Studies. Enrollment in these courses requires the permission of the instructor.

Curriculum Guide Planning

FALL	WINTER	SPRING
Freshman		
Chem. 6A	Chem. 6B	Chem. 6C
Math. 10A	Math. 10B	Math. 10C
	Bild 3	Chem. 6BL
Sophomore		
Phys. 1A, 1AL	Phys. 1B, 1BL	Phys. 1C, 1CL
Econ. 1	Math. 183 or Econ. 131	Econ. 120A
ESYS 101	ESYS 102	ESYS 103/MAE 124
Junior		
Poly 160AA/ USP 101	UD elective	
UD elective	UD elective	UD elective
Senior		
ESYS 190A	ESYS 190A	ESYS 190B
UD elective	UD elective	UD elective
		UD elective

ENVIRONMENTAL SYSTEMS MINOR

A minor in Environmental Systems will expose students to the interdisciplinary approach necessary to address environmental problems. The program places a strong emphasis on a rigorous natural science foundation. Thus, most of the courses related to the minor have significant prerequisites; students planning an Environmental Systems minor should check catalog course description carefully.

The minor consists of twenty-eight units, at least twenty of which must be upper-division. Any upper division course used to satisfy major requirements

may not be applied toward a minor. Up to two courses for the minor may be taken on a Pass/Not Pass basis, (upper or lower division). Students must earn at least a letter grade of C- in the remaining five or more courses used for the minor. Students considering the Environmental Systems minor are strongly advised to meet with the associate director or the program advisor.

The minor is structured as followed:

Lower-Division Courses

Any two of the following lower-division courses, if they are not lower-division requirements for the student's major, may be applied to satisfy eight of the total units necessary for the minor:

Biology 3
 Math. 10A-B-C
 Chemistry 6A-B-6BL-C
 Physics 1A-AL, 1B-BL, 1C-CL
 Economics 1
 Scripps Undergraduate Education (SIO): any lower-division course
 Environmental Systems 10
 Environmental Studies 30

Required Core Courses

Environmental Systems 101, offered every fall quarter
 Environmental Systems 102, offered every winter quarter
 Environmental Systems 103, offered every spring quarter

Note: ESYS 102 and ESYS 103 all have significant prerequisites; students planning an Environmental Systems minor should check course descriptions and prerequisites carefully.

Upper-Division Electives

At least two additional upper-division courses from the advanced tracks in the Environmental Systems major. The lists of upper-division electives are reviewed and updated each quarter. They are available in the Environmental Systems Office and on the program Web site (<http://esys.ucsd.edu>). Students are advised to consult with the Environmental Systems program advisors or associate director.

SPECIAL STUDIES COURSES

Special Studies in the environmental systems is offered as ESYS 199. This course is subject to consent of the instructor and approval by the Environmental Systems faculty advisor. This course is open to students who have accrued at least ninety quarter-units and have a GPA of least 3.0. No more than two quarters of environmental systems special studies may be counted toward the environmental systems major.

Study abroad through the Education Abroad Program or Opportunities Abroad Program can enhance a student's major, particularly as an opportunity for diverse field experiences. However, careful planning is important to meet all major requirements. Please contact the Environmental Systems Office as early as possible if you are planning to study abroad.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010-11, please contact the department for more information.

Many of the courses that are used to fulfill the requirements of the environmental systems major are offered by other departments and programs. Most of these courses are offered on a regular basis. Students should consult the Schedule or contact the Environmental Systems office in order to obtain current information. The courses below are offered directly through the Environmental Systems Program.

LOWER-DIVISION

ESYS 10. Introduction to Environmental Systems (4)
 This course explores the interdisciplinary character of environmental issues through an examination of a particular topic [climate change, for example] from numerous disciplinary perspectives [e.g., biology, chemistry, physics, political science, and economics]. **Prerequisite:** none. (F)

ESYS 87. Freshman Seminar (1)
 The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate college, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students with preference given to entering freshmen.

ESYS 90. Perspectives on Environmental Issues (1)
 Provides an introduction to environmental systems. Faculty members from departments in the natural sciences, geosciences, and social sciences will offer perspectives in these areas. (F)

UPPER-DIVISION

ESYS 101. Environmental Biology (4)
 This course surveys biochemical and physiological processes governing the relationship between organisms and their environments, such as those involved in element cycling and cellular homeostasis. The course introduces biological perspectives on human activities ranging from antibiotic use to genetic engineering. **Prerequisite:** BILD 1 or 2 or equivalent, or consent of instructor. (F)

ESYS 102. The Solid and Fluid Earth (4)
 Earth's dynamic physical systems interact in complex ways with profound impact on our environment. Processes such as volcanism and weathering enable geochemical exchange between solid and fluid (ocean and atmosphere) systems. Sea-level and climate changes interface with tectonic processes. **Prerequisites:** Math. 10A, Chem. 6A, Physics 1A or consent of instructor. (W)

ESYS 103/MAE 124. Environmental Challenges: Science and Solutions (4)
 This course explores the impacts of human, social, economic, and industrial activity on the environment. It highlights the central roles in ensuring sustainable development played by market forces, technological innovation, and government regulation on local, national, and global scales. **Prerequisite:** Math 10A-C or Math 20B or consent of instructor. (S)

ESYS 120. Science and Environmental Writing (4)
 Course designed to improve the written communication of science majors through frequent writing assignments that develop the practical skills needed to communicate science to lay audiences. Topics include news writing, news releases, grant writing, broadcast script writing, and editorial writing. **Prerequisites:** upper-division standing in

science or mathematics major and completion of college composition requirement (or consent of instructor). (W)

ESYS 150. Environmental Perils (4)

An advanced field-oriented course for engineering and science students stressing the geologic basis for environmental perils such as earthquakes, erosion, flooding, and waste disposal. Two one-hour lectures, and a two-hour lab/field trip each week. **Prerequisites:** Math. 10 A-B-C sequence and Physics 1A,AL; 1B,BL; 1C,1CL sequence or equivalent. (S)

ESYS 190A. Senior Project (8)

All majors are required to complete an integrative Senior Project in their senior year. The Senior Project is designed by the student to focus on an interdisciplinary environmental problem or research topic and is developed either individually or as part of a team over two quarters. Appropriate topics could include biodiversity conservation, environmental health, and/or global change. An important component of the Senior Project is an off-campus or laboratory internship. **Prerequisites:** ESYS 103 and upper-division standing, departmental approval, majors only. (F,W)

ESYS 190B. Environmental Systems

Senior Seminar (4)

The seminar provides a venue for the development, presentation, and evaluation of the Environmental Systems Integrative Project. The seminar will include work on research methods as well as paper presentation skills.

Prerequisites: Completion of ESYS 190A or ESYS 190A(W) sequence, senior standing and majors only. (S)

ESYS 199. Independent Study (2-4)

Individually guided readings or projects in the area of environmental systems.

Ethnic Studies

FACULTY

Robert R. Alvarez, Ph.D., *Professor and Director, California Cultures in Comparative Perspective*
Kirstie A. Dorr, Ph.D., *Assistant Professor*
Yen Le Espiritu, Ph.D., *Professor*
Ross H. Frank, Ph.D., *Associate Professor*
Adria L. Imada, Ph.D., *Assistant Professor*
Sara C. Kaplan, Ph.D., *Assistant Professor*
Roshanak Kheshti, Ph.D., *Assistant Professor*
Gabriel Mendes, Ph.D., *Assistant Professor*
Curtis F. Marez, Ph.D., *Associate Professor*
Natalia M. Molina, Ph.D., *Associate Professor*
Denise Ferreira da Silva, Ph.D., *Associate Professor*
Kalindi A. Vora, Ph.D., *Assistant Professor*
K. Wayne Yang, Ph.D., *Assistant Professor*

PROFESSOR EMERITA

Ana Celia Zentella, Ph.D.

ASSOCIATED FACULTY

Luis A. Alvarez, *Associate Professor, History*
Patrick W. Anderson, *Assistant Professor, Communication*
John D. Blanco, *Associate Professor, Literature*
David Borgo, *Associate Professor, Music*
Robert Cancel, *Associate Professor, Literature*
Matthew Chen, *Professor Emeritus, Linguistics*
Dennis Childs, *Assistant Professor, Literature*
Wayne Cornelius, *Director, Center for Comparative Immigration Studies and Professor, Political Science*
Anthony Davis, *Professor, Music*
Ricardo R. Dominguez, *Associate Professor, Visual Arts*
Gerald Doppelt, *Professor, Philosophy*
Steven Epstein, *Associate Professor, Sociology*
Steve Erie, *Director, Urban Studies and Planning Program and Professor, Political Science*
Ivan Evans, *Associate Professor, Sociology*
Claudio Fenner-Lopez, *Lecturer with Security of Employment Emeritus, Communication/Visual Arts*
Camille Forbes, *Assistant Professor, Literature*
Takashi Fujitani, *Professor, History*
Nadine A. George, *Associate Professor, Theatre and Dance*
Rosemary George, *Associate Professor, Critical Gender Studies Program and Literature*
Nora Gordon, *Assistant Professor, Economics*
David Gutiérrez, *Professor, History*
Michael Hardimon, *Associate Professor, Philosophy*
Louis Hock, *Professor, Visual Arts*
Jorge Huerta, *Professor, Theatre and Dance*
Sara Johnson, *Assistant Professor, Literature*
Bennetta Jules-Rosette, *Professor, Sociology*
Matha Lampland, *Associate Professor, Critical Gender Studies and Sociology*
Arend Lijphardt, *Professor Emeritus, Political Science*
James Lin, *Professor, Mathematics*
Lisa Lowe, *Professor, Literature*
Cecil Lytle, *Professor Emeritus, Music*
George Mariscal, *Professor, Literature*
Michael Meeker, *Professor Emeritus, Anthropology*
Masao Miyoshi, *Professor Emeritus, Literature*

John C. Moore, *Professor, Linguistics*
Elizabeth Newsome, *Associate Professor, Visual Arts*
Edward Reynolds, *Professor Emeritus, History*
Emily Roxworthy, *Assistant Professor, Theatre and Dance*

Ramón Eduardo Ruíz, *Professor Emeritus, History*
Marta Sánchez, *Professor Emerita, Literature*
Rosaura Sánchez, *Professor, Literature*
Gershon Shafir, *Professor, Sociology*
Nayan Shah, *Associate Professor, History*
Faustina Solís, *Professor Emerita, Urban Studies/Family and Preventive Medicine*
Roberto Tejada, *Associate Professor, Visual Arts*
Olga Vásquez, *Associate Professor, Communication*
Daniel Widener, *Associate Professor, History*
Lisa Yoneyama, *Associate Professor, Literature*
Elana Zilberg, *Associate Professor, Communication*

OFFICE: Social Science Building, Room 201
<http://www.ethnicstudies.ucsd.edu>

Ethnic studies is the study of the social, cultural, and historical forces that have shaped the development of America's diverse ethnic peoples over the last 500 years and which continue to shape our future. Focusing on immigration, slavery, and confinement, those three social processes that combined to create in the United States a nation of nations, ethnic studies intensively examines the histories, languages, and cultures of America's racial and ethnic minority groups in and of themselves, in their relationships to one another, and particularly, in structural contexts of power.

The curriculum of the Department of Ethnic Studies is designed (1) to study intensively the particular histories of different ethnic and racial groups in the United States, especially intragroup stratification; (2) to draw larger theoretical lessons from comparisons among these groups; (3) to articulate general principles that shape racial and ethnic relations both currently and historically; and (4) to explore how ethnic identity is constructed and reconstructed over time both internally and externally.

A degree in ethnic studies offers training of special interest to those considering admission to graduate or professional schools and careers in education, law, medicine, public health, social work, journalism, business, city planning, politics, psychology, international relations, or creative writing. A major in ethnic studies is designed to impart fundamental skills in critical thinking, comparative analysis, social theory and research analysis, and written expression. These skills will give students the opportunity to satisfy the increasingly rigorous expectations of graduate admissions committees and prospective employers for a broad liberal arts perspective.

THE MAJOR

To receive a B.A. degree with a major in ethnic studies, students must meet the following requirements:

1. A three-quarter course lower-division sequence (Ethnic Studies 1A-B-C). Ideally this sequence should be taken during the sophomore year as an intensive introduction to the history and theoretical dimensions of ethnic diversity in the United States. Ethnic Studies 1A-B-C, Introduction

to Ethnic Studies, will consist of the following three courses: Population Histories of the United States, Immigration and the Transformation of American Life, Race and Ethnic Relations in the United States.

2. A minimum of twelve four-unit upper-division courses in the Department of Ethnic Studies must be completed from the following five categories:

- a. One four-unit upper-division course that intensively explores the theory and comparative methods of ethnic studies (Ethnic Studies 100, Theories and Methods of Ethnic Studies). All ethnic studies majors should complete this course before proceeding with the other requirements listed below.
- b. Four upper-division ethnic studies history and social science courses from those listed below:
ETHN 103. Environmental Racism
ETHN 104. Race, Space, and Segregation
ETHN 105. Ethnic Diversity and the City
ETHN 107. Field Work in Racial and Ethnic Communities
ETHN 108. Race, Culture, and Social Change
ETHN 109. Race and Social Movements
ETHN 112A. History of Native Americans in the United States I
ETHN 112B. History of Native Americans in the United States II
ETHN 116. The United States-Mexico Border in Comparative Perspective
ETHN 117. Organic Social Movements
ETHN 118. Contemporary Immigration Issues
ETHN 119. Race in the Americas
ETHN 120. Race and Performance: The Politics of Popular Culture
ETHN 121. Contemporary Asian-American History
ETHN 123. Asian-American Politics
ETHN 125. Asian-American History
ETHN 126. Comparative Filipino- and Vietnamese-American Identities and Communities
ETHN 127. Sexuality and Nation
ETHN 129. Asian and Latina Immigrant Workers in the Global Economy
ETHN 130. Social and Economic History of the Southwest I
ETHN 131. Social and Economic History of the Southwest II
ETHN 134. Immigration and Ethnicity in Modern American Society
ETHN 149. African American History in the Twentieth Century
ETHN 151. Ethnic Politics in America
ETHN 152. Law and Civil Rights
ETHN 159. Topics in African American History
ETHN 161. Black Politics and Protest Since 1941
ETHN 165. Sex and Gender in African American Communities
ETHN 167. African-American History in War and Peace: 1917 to the Present
ETHN 170A. Origins of the Atlantic World, c. 1450-1650
ETHN 170B. Slavery and the Atlantic World
ETHN 183. Gender, Race, Ethnicity, and Class

ETHN 188. African Americans, Religion, and the City

*ETHN 197. Fieldwork in Racial and Ethnic Communities

*ETHN 198. Directed Group Studies

*ETHN 199. Supervised Independent Study and Research

*Only two will be counted in fulfillment of this requirement.

Colloquia

ETHN 180. Topics in Mexican-American History

ETHN 181. Topics in the Comparative History of Modern Slavery

ETHN 184. Black Intellectuals in the Twentieth Century

ETHN 187. Black Nationalism

ETHN 189. Special Topics in Ethnic Studies (students may repeat this course three times for credit toward major requirements)

- c. At least three upper-division courses that focus on language, ethnicity, and institutional discourses:

ETHN 120. Race and Performance: The Politics of Popular Culture

ETHN 140. Language and American Ethnicity

ETHN 141. Language, Culture, and Inequality

ETHN 142. Medicine, Race, and the Global Politics of Inequality

ETHN 144. Bilingual Communities in the U.S.A.

ETHN 145. Spanish Language in the United States

ETHN 164. African Americans and the Mass Media

ETHN 185. Discourse, Power, and Inequality

ETHN 186. The Ethnic Press in the United States

Students may petition to count one course on language, ethnicity, and institutional discourses offered by other departments. In addition, one course in foreign language at the upper-division level may be counted in partial fulfillment of this requirement, with the consent of the department. Students must seek faculty advice on which courses would best satisfy the requirement and yield the most rigorous training.

- d. At least three upper-division ethnic studies courses on the literature and cultural expressions of American racial and ethnic minorities.

ETHN 101. Ethnic Images in Film

ETHN 110. Cultural World Views of Native Americans

ETHN 111. Native American Literature

ETHN 120. Race and Performance: The Politics of Popular Culture

ETHN 122. Asian-American Culture and Identity

ETHN 123. Asian-American Politics

ETHN 124. Asian-American Literature

ETHN 126. Comparative Filipino- and Vietnamese-American Identities and Communities

ETHN 128. Hip Hop: The Politics of Culture

ETHN 132. Chicano Dramatic Literature

ETHN 133. Hispanic-American Dramatic Literature

ETHN 135A. Early Latino/a-Chicano/a Cultural Production: 1848 to 1960

ETHN 135B. Contemporary Latino/a-Chicano/a Cultural Production: 1960 to Present

ETHN 136. Topics in Chicano/a-Latino/a Cultures

ETHN 138. Chicano/a-Latino/a Poetry

ETHN 139. Chicano Literature in English

ETHN 146A. Theatrical Ensemble

ETHN 148. Latino/a and Chicano/a Literature

ETHN 168. Comparative Ethnic Literature

ETHN 172. Afro-American Prose

ETHN 174. Themes in Afro-American Literature

ETHN 175. Literature of the Harlem Renaissance

ETHN 176. Black Music/Black Texts: Communication and Cultural Expression

ETHN 178. Blues: An Oral Tradition

ETHN 179A. Jazz Roots and Early Development (1900–1943)

ETHN 179B. Jazz Since 1946: Freedom and Form

- e. One four-unit field methods course (Ethnic Studies 190, Research Methods: Studying Ethnic and Racial Communities).
3. Since the goal of the Department of Ethnic Studies is to intensively study both the particular histories of various ethnic and racial groups in the United States and to draw larger theoretical lessons from comparisons among and between groups, students may not fulfill requirements 2B and 2D by focusing all of the seven required courses on only one ethnic or racial group.
4. Ethnic studies majors, including students who are double majors, may petition up to four upper-division courses to fulfill major requirements as long as each of the following three conditions is met for each course: (1) the course is taken from another UC San Diego department, taken from a UCSD approved study abroad program, or taken at another UC campus; (2) the course work is appropriate to the ethnic studies major; and (3) the student completes at least one course offered by the UCSD ethnic studies department in each of the five upper-division categories.
5. To satisfy the requirements for the major, lower- and upper-division courses must be completed with a P, C–, or better grade.
6. Except for independent study course electives (ETHN 197, 198, or 199) which are always taken with a Pass/Not Pass grade option, students majoring in ethnic studies may take up to two courses, either lower- or upper-division, with a Pass/Not Pass option.

THE HONORS PROGRAM

Consistent with other research opportunities offered to undergraduates on the UCSD campus, the department offers the Honors Program to ethnic studies majors in their senior or junior year the opportunity to conduct original research using interdisciplinary methodologies in the comparative

study of race and ethnicity. To enroll in the Honors Program, an undergraduate must have a minimum grade-point average of 3.5 in ethnic studies classes counted toward the major. Students with a GPA lower than 3.5 in the major may be admitted by exception if they show promise of success in research.

The Honors Program will be an extension of current departmental offerings using existing faculty resources. Ethnic studies and affiliated faculty will choose to advise students who successfully complete ETHN 191A and continue in the Honors Program based on related research interests. The student will enroll in ETHN 191B and ETHN 191C and work with the appropriate faculty advisor. Students will present their research projects at the annual Ethnic Studies Honors Symposium in June. Students who complete the sequence ETHN 191A, ETHN 191B, and ETHN 191C will receive one credit toward the B (Social Studies/Humanities) requirements for the ethnic studies major. Students who complete their research project with a grade of B or better and maintain a minimum 3.25 GPA in the ethnic studies major will receive Distinction in the major upon graduation from UCSD. Ethnic Studies 191A, 191B, and 191C must be taken for letter grade only.

191A. Undergraduate Research in Ethnic Studies (4)

This course is designed to help students conduct their own research rather than merely read the research of others. The course will introduce students to research paradigms in ethnic studies, familiarize them with finding aids and other library resources, and involve them in the design of research plans.

191B. Honors Research in Ethnic Studies (4)

This course is a continuation of Ethnic Studies 191A, Undergraduate Research in Ethnic Studies. Students who have completed ETHN 191A and selected a faculty research advisor may enroll in this course. During the quarter the research for the honors project will be completed under the faculty advisor's supervision. Faculty advisors will meet weekly with their honors students to oversee the progress made in carrying out the plan of research. Formerly ETHN 192. **Prerequisites:** upper-division standing, consent of instructor, and completion of 191A.

191C. Honors Research in Ethnic Studies (4)

This course is a continuation of Ethnic Studies 191B Honors Research in Ethnic Studies. Students who have completed ETHN 191B and are continuing to work with a faculty research advisor may enroll in this course. During the quarter the written drafts and final honors paper will be completed under the faculty advisor's supervision. The student will meet weekly with the faculty advisor in order to prepare drafts and the final version of the honors paper. Formerly ETHN 193. **Prerequisites:** ETHN 191A and ETHN 191B.

EDUCATION ABROAD PROGRAM

Students are able to participate in the UC Education Abroad Program (EAP) or UCSD's Opportunities Abroad Program (OAP) while still making progress toward completing their major. Students considering this option should discuss their plans with the undergraduate advisor prior to going abroad, and courses taken abroad must be approved by the department. Interested students should contact the Programs Abroad Office in the International Center.

THE MINOR

Students may minor in ethnic studies. Consistent with the provision for a minor curriculum for students entering after January 1, 1998, students

wishing to minor in ethnic studies must satisfy the following requirements:

1. Students must take two four-unit courses in the history and theoretical dimensions of ethnic diversity in the United States from the lower-division sequence (Ethnic Studies 1A-B-C); or students must take two four-unit upper-division courses in analytic and comparative study of ethnicity. Theories and Methods of Ethnic Studies (ETHN 100); and Research Methods, Studying Ethnic and Racial Communities (ETHN 190).
2. Students must take five four-unit upper-division ethnic studies elective courses; at least two, but no more than three of the five elective courses must be selected from either the ethnic studies history and social studies courses (listed above in section 2B) or the ethnic studies literature and cultural expressions courses (listed above in section 2D). While language and ethnicity courses offered by the department (listed above in section 2C) may also be used to satisfy this requirement, foreign language and area studies courses from other departments may not. No more than two independent study courses (ETHN 197, 198, or 199) may be used to satisfy this requirement.
3. To satisfy the requirements for the minor, lower- and upper-division courses must be completed with a P, C-, or better grade.
4. Except for independent study course electives (ETHN 197, 198, or 199) that are always taken with a Pass/Not Pass grade option, students minoring in ethnic studies may take one course, either lower- or upper-division, with a Pass/Not Pass grade option.

Students interested in the African-American experience should consider the following courses:

- ETHN 149. African American History in the Twentieth Century**
ETHN 159. Topics in African American History
ETHN 161. Black Politics and Protest since 1941
ETHN 164. African Americans and the Mass Media
ETHN 165. Sex and Gender in African American Communities
ETHN 167. African-American History in War and Peace. 1917 to the Present
ETHN 170A. Origins of the Atlantic World, c. 1450–1650
ETHN 170B. Slavery and the Atlantic World
ETHN 172. Afro-American Prose
ETHN 174. Themes in Afro-American Literature
ETHN 175. Literature of the Harlem Renaissance
ETHN 176. Black Music/Black Texts. Communication and Cultural Expression
ETHN 178. Blues: An Oral Tradition
ETHN 179A. Jazz Roots and Early Development (1900–1943)
ETHN 179B. Jazz Since 1946: Freedom and Form
ETHN 181. Topics in the Comparative History of Modern Slavery
ETHN 184. Black Intellectuals in the Twentieth Century
ETHN 187. Black Nationalism
ETHN 188. African Americans, Religion, and the City

Students interested in the Chicano experience should consider the following courses:

- ETHN 116. The United States-Mexico Border in Comparative Perspective**
ETHN 130. Social and Economic History of the Southwest I
ETHN 131. Social and Economic History of the Southwest II
ETHN 132. Chicano Dramatic Literature
ETHN 133. Hispanic-American Dramatic Literature
ETHN 135A. Early Latino/a-Chicano/a Cultural Production: 1848 to 1960
ETHN 135B. Contemporary Latino/a-Chicano/a Cultural Production: 1960 to Present
ETHN 136. Topics in Chicano/a-Latino/a Cultures
ETHN 138. Chicano/a-Latino/a Poetry
ETHN 139. Chicano Literature in English
ETHN 145. Spanish Language in the United States
ETHN 148. Latino/a and Chicano/a Literature
ETHN 180. Topics in Mexican American History
Students interested in the Asian-American experience should consider the following courses:
ETHN 20. Introduction to Asian American History
ETHN 120. Race and Performance: The Politics of Popular Culture
ETHN 121. Contemporary Asian-American History
ETHN 122. Asian-American Culture and Identity
ETHN 123. Asian-American Politics
ETHN 124. Asian-American Literature
ETHN 125. Asian-American History
ETHN 126. Comparative Filipino- and Vietnamese-American Identities and Communities
Students interested in the Native American experience should consider the following courses:
ETHN 110. Cultural World Views of Native Americans
ETHN 111. Native American Literature
ETHN 112A. History of Native Americans in the United States I

ETHN 112B. HISTORY OF NATIVE AMERICANS IN THE UNITED STATES I **THE GRADUATE PROGRAM**

The UC San Diego Department of Ethnic Studies emphasizes comparative, analytic, and relational study of ethnicity and race in the United States. Our fields of emphasis include intercultural communication and conflict, population histories of the Americas, ethnicity and identity, immigration and assimilation, ethnic politics and social movements, race and racism, urban ethnicity, gender and ethnicity, sexuality, intellectual and cultural histories of ethnic groups, cultural pluralism, national integration, language and ethnic life, and mass media representations of ethnic identity.

ADMISSION

New students are admitted in the fall quarter of each academic year. Prospective applicants should submit the official application for admission and awards (same form), one set of official transcripts from each institution attended after high school, official scores from the Graduate Record Examination, application fee, at least three letters of recommendation, and one or more samples of the applicant's own writing, such as term papers. Additionally, foreign applicants must submit official scores from the Test of English as a Foreign Language (TOEFL). Applicants are encouraged to visit the department to talk with faculty and graduate students. The application deadline is January 15.

PROGRAM OF STUDY

Students are required to enroll as full-time graduate students, to carry a minimum enrollment of twelve units of graduate-level courses each quarter, and to maintain a grade-point average of 3.2 or better. To obtain an M.A. degree students must take fifty-four units of course work and write a master's thesis.

CORE CURRICULUM SEQUENCE REQUIREMENTS

1. Ethnic Studies 200A-B-C, Core Seminar
All graduate students will be required to take the introductory three-quarter core seminar (four units each, twelve units total) during their first year in the program. This course covers the genealogy of critical racial and ethnic studies (its antecedents and development as a distinct and interdisciplinary method of inquiry), interdisciplinarity and knowledge production in ethnic studies, and research in ethnic studies (Pro Seminar).
2. Ethnic Studies 230, Department Colloquium
During the first two years of graduate study, all students will be required to enroll in six one-quarter colloquia required by the department. In Ethnic Studies 230, department faculty and visiting lecturers will make presentations about research in progress in our field. This colloquium is a one-unit course and must be taken for a total of six quarters.
3. Ethnic Studies 240, 241, and 242, Research Methods Series
All graduate students will be required to take the three-quarter core research methods course (four units each, twelve units total) during their first year in the program. ETHN 240A, Historical Methods and Archives; ETHN 240B, Cultural Studies and Cultural Production; and ETHN 240C Qualitative Methods/Ethnography.
4. Ethnic Studies 290A-B, Master's Thesis Preparation
Students are required to write a master's thesis as part of the requirements for the master of arts in ethnic studies. Students should enroll in thesis preparation courses in the fall and spring quarters of the second year of graduate studies.

FOREIGN LANGUAGE REQUIREMENT

Competence in one or more foreign languages is encouraged but not required at the M.A. level. All doctoral candidates must satisfy the department's graduate committee that they have adequate linguistic competence in one foreign language relevant to their area of research by translating three pages of scholarly text written in the designated foreign language. The graduate committee may waive the language requirement and test the candidate on other specialized skills in instances where knowledge of a foreign language is not relevant to the candidate's areas of research.

INSTRUCTION IN QUANTIFICATION

The department encourages graduate students to employ quantitative methods where appropriate. Instruction in quantitative methods can fulfill elective requirements; recommended courses include Sociology 205 and 206, Survey and Demographic

Methods; Political Science 270, Quantitative Methods in Political Science. In cases where a reading knowledge of evidence assembled through quantitative methods would be useful, students who obtain the permission of the director of Graduate Studies may fulfill elective requirements by taking no more than two selected undergraduate courses including Sociology 103, Computer Applications to Data Management in Sociology; Sociology 107, Demographic Methods; Sociology 108, Quantitative Analysis of Survey Data; Sociology 109, Quantitative Analysis of Sociological Data; and Political Science 170, Quantitative Political Science, among others.

THE MASTER'S DEGREE

Students entering the ethnic studies doctoral program must first complete a master's degree before continuing toward the doctorate. University regulations prohibit entering students who already have a master's degree in ethnic studies from receiving a second master's degree. Nonetheless, students who are admitted to the ethnic studies doctoral program with a master's degree must complete all the requirements for the ethnic studies master of arts degree. The M.A. will also be a terminal degree for those students denied admission to candidacy.

To obtain the M.A. degree, students must complete the department's course requirements satisfactorily. At the end of the second year in the graduate program, students must submit a written thesis to their Master's Thesis Committee (MTC). The committee will assess the quality of the work and determine whether it demonstrates the likelihood of success in conducting doctoral research.

The final decision regarding the M.A. degree is based on grades, the master's thesis, and yearly faculty evaluations. The Graduate Program Committee awards three possible grades: Pass, M.A. Only, and Not Pass. All passing students (with the exception of those who already have a master's degree in ethnic studies from another institution) receive the master of arts degree and proceed in their course of studies for the doctorate. Students who receive M.A. Only evaluations gain the master's degree but may not continue in the department's Ph.D. program. Students who receive a Not Pass evaluation must withdraw from the program without a graduate degree. The master's degree is earned as one of the requirements for the Ph.D. and is based on the quality of the student's work during the first two years in the graduate program. At the end of the second year, students are evaluated by the Graduate Program Committee for the master's degree. At that time, the committee (GPC) ascertains the student's suitability for doctoral work and recommends either advancement to Ph.D. work or termination.

REQUIREMENTS FOR THE QUALIFYING EXAMINATIONS

When students complete all the core curriculum requirements and have taken five four-unit elective courses in appropriate areas or disciplines, they are eligible to take the qualifying examination for the Ph.D. degree. Students will be encouraged to take the exam by the end of their third year in the program, but this examination must be completed by the end of the student's fourth year in the program. The qualifying exam is both written and

oral; it consists of two parts. Part one tests the student's basic competence and knowledge of ethnic studies scholarship as spelled out in the Department of Ethnic Studies required graduate reading list. The reading list will be distributed to every student entering the graduate program. Over the next three years, students are required to read all of these books and articles, and to have their mastery of these readings tested during the qualifying examination. Part two of the examination requires the submission of a dissertation prospectus. The dissertation prospectus is a written document that (1) specifies the dissertation research topic; (2) places the dissertation research in the context of the relevant literature in the field; (3) identifies the significance of the project as original discovery scholarship; (4) explains and justifies the research methods to be employed; (5) establishes the feasibility of the research and identifies the primary sources or data bases to be used; (6) indicates the anticipated steps leading to completion of the project; and (7) provides a timetable for the research and writing phases of the project.

The Doctoral Committee consists of five persons proposed by the student and accepted by the department chair and the office of Graduate Studies according to graduate council regulations. A sixth member of the committee may be added with the approval of the department chair. Students are expected to select the chair of their examination committee by the winter quarter of the third year of study. The chair of the Ph.D. Examination Committee serves as the student's advisor for the remainder of the student's graduate program. Three of the Examination Committee members must be Department of Ethnic Studies faculty; the other two must be from other departments.

Fourteen days before the scheduled qualifying examination, the student must submit the written dissertation prospectus to the examination committee. On this same day, the student will receive from the chair of the examination committee a three-question written exam testing knowledge of the required graduate reading list. Seven days before the scheduled qualifying examination, the student must submit written answers to the questions that have been posed, distributing copies of these essays to all examination committee members. A two-hour oral examination will occur on the appointed date. At the two-hour oral exam, the student will answer questions posed by the committee about the student's dissertation prospectus, mastery of the required graduate reading list, answers to the written part of the exam, and comprehensive knowledge of ethnic studies scholarship. Based on written papers and on oral performance, three possible grades will be selected by the examination committee: Not Pass, Pass, and High Pass. Students who receive a Not Pass must retake the qualifying examination within one year and obtain a Pass grade to remain in the doctoral program.

THE DOCTORAL DISSERTATION

Once students pass the qualifying exam, they may begin dissertation research. Students are expected to consult with their committee members on a regular basis during the research process.

All doctoral students will be evaluated annually by the doctoral committee and given a written report signed by the thesis advisor according to campus policy.

When the dissertation has been substantially completed and once committee members have had the opportunity to review drafts of the written work, the committee meets (with or without the student present at the discretion of the committee chair) to consider the progress made and to identify concerns, changes to be made, or further research to be done. Once the committee members are substantially satisfied with the written work, the student, in consultation with the committee, schedules the oral defense of the dissertation. By university regulation, the defense is open to the public.

The final version of the dissertation must be approved by each member of the doctoral committee. Having successfully defended the dissertation in oral examination, the student is eligible to receive the Ph.D. degree. The final version of the dissertation is then filed with the university librarian via the office of Graduate Studies. Acceptance of the dissertation by the university librarian is the final step in completing all requirements for the Ph.D.

DEPARTMENTAL PH.D. TIME LIMITS POLICY

Pre-candidacy status, that is, the registered time before a student passes the qualifying examination and thereby advances to Ph.D. candidacy, may not exceed four years. Normative time for a Ph.D. in ethnic studies is six years. Normative time is defined as that period of time in which students under normal circumstances are expected to complete their doctoral program. To provide an incentive for students to complete the Ph.D. within normative time, students will only be eligible for departmental financial support for six years (eighteen quarters). By university policies, the doctoral dissertation must be submitted and defended within eight years. To meet this normative time limit, and to meet departmental requirements, students must complete the Qualifying Examination by the end of the fourth year.

In the spring quarter each year, the Graduate Program Committee will assess the progress of each pre-candidacy student on the basis of evaluations submitted by three faculty members chosen by the student. The committee will establish that the student is in good standing, recommend additional course work, or recommend dismissal. The committee may wish to meet with some students in person to discuss the student's evaluation and progress toward the degree.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

1A. Introduction to Ethnic Studies: Population Histories of the United States (4)

This course examines the comparative historical demography of what is today the United States, focusing on the arrival, growth, distribution, and redistribution of immigrants from Asia, Europe, Africa, and Latin America.

1B. Introduction to Ethnic Studies: Immigration and the Transformation of American Life (4)

A history of immigration to the United States from colonial times to the present, with emphasis on the roles of ethnic and racial groups in economics, power relations between dominant and subordinate groups, and contemporary ethnic and racial consciousness.

1C. Introduction to Ethnic Studies: Race and Ethnic Relations in the United States (4)

This course examines the theoretical literature on race and ethnicity, focusing on issues of domination and subordination, and the historical emergence of racism and ethnic conflict. Attention is given to class and gender differences within racial and ethnic groups.

20. Introduction to Asian-American History (4)

This course introduces students to key issues in Asian-American lives, with emphasis on the global historical context of migration; changing ethnic and racial consciousness; economic, social, and political status; cultural production; and family and gender relations.

87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

97. Field Studies in Racial and Ethnic Communities (1-4)

Supervised community fieldwork on topics of importance to racial and ethnic communities in the San Diego County region. Regular individual meetings with faculty sponsor and final project and/or written report are required. **Prerequisites:** lower-division standing, completion of at least thirty units of undergraduate study at UCSD, minimum 3.0 GPA at UCSD, consent of instructor, and completed and approved Special Studies Form.

98. Directed Group Studies (1-4)

Directed group study on a topic or in a field not included in the regular department curriculum by special arrangement with a faculty member. **Prerequisites:** lower-division standing, completion of at least thirty units of undergraduate study at UCSD, minimum 3.0 GPA at UCSD, consent of instructor, and completed and approved Special Studies Form.

99. Independent Study (1-4)

Directed study on a topic or in a field not included in the regular department curriculum by special arrangement with a faculty member. **Prerequisites:** lower-division standing, completion of at least thirty units of undergraduate study at UCSD, minimum 3.0 GPA at UCSD, consent of instructor, and completed and approved Special Studies Form.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor.

100. Theories and Methods in Ethnic Studies (4)

An introduction to research in ethnic studies with special emphasis on theories, concepts, and methods. Students will explore how racial and ethnic categories are shaped by gender, class, and regional experiences and will study ethnicity and race in comparative perspective.

101. Ethnic Images in Film (4)

An upper-division lecture course studying representations of ethnicity in the American cinema. Topics include ethnic images as narrative devices, the social implications of ethnic images, and the role of film in shaping and reflecting societal power relations.

103. Environmental Racism (4)

This course will examine the concept of environmental racism, the empirical evidence of its widespread existence, and the efforts by government, residents, workers, and activists to combat it. We will examine those forces that create environmental injustices in order to understand its

causes as well as its consequences. Students are expected to learn and apply several concepts and social scientific theories to the course material.

104. Race, Space, and Segregation (4)

Through in-depth studies of housing segregation, urban renewal and displacement, neighborhood race effects, and the location of hazards and amenities, this course examines how space becomes racialized and how race becomes spatialized in the contemporary United States.

105. Ethnic Diversity and the City (4)

This course will examine the city as a crucible of ethnic identity, exploring both the racial and ethnic dimensions of urban life in the U.S. from the Civil War to the present. (Cross-listed with USP 104.)

107. Fieldwork in Racial and Ethnic Communities (4)

This is a research course examining social, economic, and political issues in ethnic and racial communities through a variety of research methods that may include interviews and archival, library, and historical research. (Cross-listed with USP 130.)

108. Race, Culture, and Social Change (4)

Aggrieved groups often generate distinctive forms of cultural expression by turning negative ascription into positive affirmation and by transforming segregation into congregation. This course examines the role of cultural expressions in struggles for social change by these communities inside and outside the U.S. (Cross-listed with MUS 151.)

109. Race and Social Movements (4)

This course explores collective mobilizations for resources, recognition, and power by members of aggrieved racialized groups, past and present. Emphasis will be placed on the conditions that generate collective movements, the strategies and ideologies that these movements have developed, and on the prospect for collective mobilization for change within aggrieved communities in the present and future.

110. Cultural World Views of Native Americans (4)

Using interdisciplinary methods, this course examines the cultural world views of various Native American societies in the United States through an exploration of written literary texts and other expressive cultural forms such as dance, art, song, religious and medicinal rituals.

111. Native American Literature (4)

This course analyzes Native American written and oral traditions. Students will read chronicles and commentaries on published texts, historic speeches, trickster narratives, oratorical and prophetic tribal epics, and will delve into the methodological problems posed by tribal literature in translation.

112A. History of Native Americans in the United States I (4)

This course examines the history of Native Americans in the United States, with emphasis on the lifeways, mores, warfare, cultural adaptation, and relations with the European colonial powers and the emerging United States until 1870. (Cross-listed with HIUS 108A.)

112B. History of Native Americans in the United States II (4)

This course examines the history of Native Americans in the United States, with emphasis on the lifeways, mores, warfare, cultural adaptation, and relations with the United States from 1870 to the present. (Cross-listed with HIUS 108B.)

116. The United States-Mexico Border in Comparative Perspective (4)

This course critically explores the U.S.-Mexico frontier and the social-cultural issues on both sides of the international demarcation. Social-historical and political-economic patterns illuminate border life, ethnic identity, social diversity, and cultural expression. Border ethnography is complemented by film and music.

117. Organic Social Movements (4)

Examination of local responses to global change and social disruption through the examination of organic movements in indigenous societies. In-depth analysis of the Kuna Indians of San Blas, Panama; Maya-Zapatistas of Chiapas, Mexico; and Micronesians of the western Pacific.

118. Contemporary Immigration Issues (4)

This course examines the diversity of today's immigrants—their social origins and contexts of exit and their adaptation experiences and contexts of incorporation.

119. Race in the Americas (4)

This course explores the genesis, evolution, and contradictions of racially heterogeneous societies in the Americas, from European conquest to the present. Topics: the social history of Native Americans, blacks, and Asians, their interactions with European settlers, and racial, sexual, and class divisions. **Prerequisite:** upper-division standing.

120. Race and Performance: The Politics of Popular Culture (4)

This course explores how racial categories and ideologies have been constructed through performance and displays of the body in the United States and other sites. Racialized performances, whether self-displays or coerced displays, such as world's fairs, museums, minstrelsy, film, ethnography, and tourist performances are considered. **Prerequisite:** upper-division standing or consent of instructor.

121. Contemporary Asian-American History (4)

The course will study changes in Asian-American communities as a result of renewed immigration since 1965; the influx of refugees from Vietnam, Kampuchea, and Laos; the impact of contemporary social movements on Asian-Americans' current economic, social, and political status.

122. Asian-American Culture and Identity (4)

A survey of Asian-American cultural expressions in literature, art, and music to understand the social experiences that helped forge Asian-American identity. Topics: culture conflict, media portrayals, assimilation pressures, the model minority myth, and interethnic and class relations.

123. Asian-American Politics (4)

This course will examine the development of Asian-American politics by studying the historical and contemporary factors, such as political and economic exclusion, that have contributed to the importance and complexity of ethnicity as a mobilizing force in politics. **Prerequisite:** upper-division standing or instructor approval.

124. Asian-American Literature (4)

Selected topics in the literature by men and women of Asian descent who live and write in the United States. May be repeated for credit when topics vary. (Cross-listed with LTEN 181.)

125. Asian-American History (4)

Explore how Asian Americans were involved in the political, economic and cultural formation of United States society. Topics include migration; labor systems; gender, sexuality and social organization; racial ideologies and anti-Asian movements; and nationalism and debates over citizenship. (Cross-listed with HIUS 124.)

126. Comparative Filipino and Vietnamese-American Identities and Communities (4)

This course compares the historical and contemporary social, political, and economic experiences of Filipino and Vietnamese-Americans, paying particular attention to the impact of U.S. wars in the Philippines and in Vietnam on their respective lives. **Prerequisite:** upper-division standing.

127. Sexuality and Nation (4)

This course explores the nexus of sex, race, ethnicity, gender, and nation and considers their influence on identity, sexuality, migration, movement, and borders and other social, cultural, and political issues that these constructs affect. (Cross-listed with CGS 112.)

128. Hip Hop: The Politics of Culture (4)

Examination of hip hop's technology, lyrics, and dance and its influences in graffiti, film, music video, fiction, advertising, gender, corporate investment, government, and censorship with a critical focus on race, gender, and popular culture and the politics of creative expression. (Cross-listed with MUS 152.)

129. Asian and Latina Immigrant Workers in the Global Economy (4)

This course will explore the social, political, and economic implications of global economic restructuring, immigration policies, and welfare reform on Asian and Latina immigrant women in the United States. We will critically examine these larger social forces from the perspectives of Latina and Asian immigrant women workers, incorporating theories of race, class, and gender to provide a careful reading of the experiences of immigrant women on the global assembly line. (Cross-listed with USP 135.)

130. Social and Economic History of the Southwest I (4)

This course examines the history of the Spanish and Mexican Borderlands (what became the U.S. Southwest) from roughly 1400 to the end of the U.S.-Mexican War in 1848, focusing specifically on the area's social, cultural, and political development. (Cross-listed with HIUS 158.)

131. Social and Economic History of the Southwest II (4)

This course examines the history of the American Southwest from the U.S.-Mexican War in 1846–48 to the present, focusing on immigration, racial and ethnic conflict, and the growth of Chicano national identity. (Cross-listed with HIUS 159.)

132. Chicano Dramatic Literature (4)

Focusing on the contemporary evolution of Chicano dramatic literature, the course will analyze playwrights and theatre groups that express the Chicano experience in the United States, examining relevant actors, plays, and documentaries for their contributions to the developing Chicano theatre movement. (Cross-listed with THHS 110.)

133. Hispanic-American Dramatic Literature (4)

This course examines the plays of leading Cuban-American, Puerto Rican, and Chicano playwrights in an effort to understand the experiences of these Hispanic-American groups in the United States. (Cross-listed with THHS 111.)

134. Immigration and Ethnicity in Modern American Society (4)

Comparative study of immigration and ethnic-group formation in the United States from 1880 to the present. Topics include immigrant adaptation, competing theories about the experiences of different ethnic groups, and the persistence of ethnic attachments in modern American society. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students may be required to submit a more substantial piece of work. (Cross-listed with HIUS 180 and conjoined with HIUS 280.) **Prerequisites:** upper-division standing and department stamp.

135A. Early Latino/a-Chicano/a Cultural Production: 1848 to 1960 (4)

Cross-disciplinary study of nineteenth- and early twentieth-century Latino/a-Chicano/a literature, folklore, music, testimonio, or other cultural practices. Specific periods covered will fall between the immediate aftermath of the Treaty of Guadalupe Hidalgo to the Cuban revolution. Repeatable for credit when topics vary. (Cross-listed with LTSP 150A.) **Prerequisite:** LTSP 50B or consent of instructor.

135B. Contemporary Latino/a-Chicano/a Cultural Production: 1960 to Present (4)

Cross-disciplinary study of late twentieth-century Latino/a-Chicano/a literature, the visual and performing arts, film, or other cultural practices. Specific periods covered will fall between the Kennedy years to the era of neoliberalism and the creation of "Hispanic" or Latino/a identities. Repeatable for credit when topics vary. (Cross-listed with LTSP 150B.) **Prerequisite:** LTSP 50B or consent of instructor.

136. Topics in Chicano/a-Latino/a Cultures (4)

Cross-disciplinary study of late twentieth-century Latino/a-Chicano/a literature, the visual and performing arts, film, or other cultural practices. Representative areas of study are social movements, revolution, immigration, globalization, gender and sexuality, cultures of the U.S.-Mexican border, and Chicano/a-Mexicano/a literary relations. Repeatable for a credit when topics vary. (Cross-listed with LTSP 151.) **Prerequisite:** LTSP 50B or consent of instructor.

138. Chicano/a and Latino/a Poetry (4)

A study of themes and issues in the poetic production of Latino communities in the United States. Every effort will be made to select text in Spanish but some will be bilingual. Repeatable for credits when topics vary. (Cross-listed with LTSP 153.) **Prerequisite:** LTSP 50B or consent of instructor.

140. Language and American Ethnicity (4)

This course examines the intersection of language and ethnicity in the United States, focusing on the social and political impact of bilingualism, ethnically based English dialects, and standard and nonstandard English.

141. Language, Culture, and Inequality (4)

A critical review of conceptions of language and how they have been deployed in constructing images of culture, race, ethnicity, gender, sexuality, and class. Topics include cultural and linguistic relativism, structuralism, symbolic and cognitive approaches, ethnomethodology, sociolinguistics, ethnography of speaking, performance, and ethnopoetics.

142. Medicine, Race, and the Global Politics of Inequality (4)

Globalization fosters both the transmission of AIDS, cholera, tuberculosis, and other infectious diseases and gross inequalities in the resources available to prevent and cure them. This course focuses on how race, ethnicity, gender, sexuality, class, and nation both shape and are shaped by the social construction of health and disease worldwide.

144. Bilingual Communities in the U.S.A. (4)

This course compares the many ways of "doing being bilingual" that exist among communities of speakers of varied national origins, generations, networks, localities, races, classes, and genders. Of particular interest are the varied types of bilingual individuals and linguistic repertoires that exist in communities of Native American, Chicano/Latino, and Asian origin, and the implications of shifting and hybrid linguistic identities for the drawing of community boundaries and the shaping of national language policy. Specific topics include factors that promote language loss or maintenance in families, the linguistic and cultural repercussions of code switching and word borrowing, bilingual education, linguistic profiling, and language ideologies.

145. Spanish Language in the United States (4)

A sociolinguistic study of the popular dialects in the United States and their relation to other Latin American dialects. The course will cover phonological and syntactic differences between the dialects as well as the influence of English on the Southwest dialects. (Cross-listed with LTSP 162.)

146A. Theatrical Ensemble (4)

An intensive theatre practicum designed to generate theatre created by an ensemble, with particular emphasis upon the analysis of text. Students will explore and analyze scripts and authors. Ensemble segments include black theatre, Chicano theatre, feminist theatre, commedia dell'arte theatre. (Cross-listed with TDAC 120.)

148. Latino/a and Chicano/a Literature (4)

This course will study the representation of a variety of social issues (immigration, racism, class differences, violence, inter/intra-ethnic relations, etc.) in works written in Spanish by Latino/a and Chicano/a writers. May be repeated for credit as topics, texts, and historical periods vary. (Cross-listed with LTSP 154.) **Prerequisite:** LTSP 50B or consent of instructor.

149. African American History in the Twentieth Century (4)

This course examines the transformation of African America across the expanse of the long twentieth century: imperialism, migration, urbanization, desegregation, and deindustrialization. Special emphasis will be placed on issues of culture, international relations, and urban politics.

151. Ethnic Politics in America (4)

This course will survey the political effects of immigration, ethnic mobilization, and community building in America, and the contemporary role of ethnicity in politics and intergroup relations.

152. Law and Civil Rights (4)

In this course students explore the relationship between race, class, and law as it applies to civil rights both in a

historical and a contemporary context. Topics include racism and the law, history of the Fourteenth Amendment, equal protection, school desegregation, and affirmative action.

159. Topics in African American History (4)

A colloquium dealing with special topics in the history of people of African descent in the United States. Themes will vary from quarter to quarter. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students will be required to submit a more substantial piece of work. (Cross-listed with HIUS 183 and conjoined with HIUS 283.)

161. Black Politics and Protest Since 1941 (4)

Discussion of black social, political, and intellectual experiences since the publication of Richard Wright's *Native Son*. Close examination of blacks' involvement in and relationships to World War II, cold war, civil rights movement, black power movement, Reagan revolution, and underclass debate.

164. African Americans and the Mass Media (4)

Examination of the media representations of African Americans from slavery to the present focusing on emergence and transmission of enduring stereotypes; their relationship to changing social, political, and economic frameworks; and African Americans' responses to and interpretations of these mediated images. (Cross-listed with MUS 153.)

165. Sex and Gender in African American Communities (4)

This course will investigate the changing constructions of sex, gender, and sexuality in African American communities defined by historical period, region, and class. Topics will include the sexual division of labor, myths of black sexuality, the rise of black feminism, black masculinity, and queer politics.

167. African-American History in War and Peace: 1917 to the Present (4)

The social, political, economic, and ideological pressures generated during the international conflicts of the twentieth century have had an enormous impact on American life. This course examines how the pressures of "total war" and "cold war" shaped the African-American experience in both war and peacetime. (Cross-listed with HIUS 138)

168. Comparative Ethnic Literature (4)

A lecture-discussion course that juxtaposes the experience of two or more U.S. ethnic groups and examines their relationship with the dominant culture. Students will analyze a variety of texts representing the history of ethnicity in this country. Topics will vary. (Cross-listed with LTEN 178.)

170A. Origins of the Atlantic World, c. 1450–1650 (4)

An examination of interactions among the peoples of western Europe, Africa, and the Americas that transformed the Atlantic basin into an interconnected "Atlantic World." Topics will include maritime technology and the European Age of Discovery, colonization in the Americas, the beginnings of the transatlantic slave trade, and early development of plantation slavery in the New World. (Cross-listed with HIUS 135A.)

170B. Slavery and the Atlantic World (4)

The development of the Atlantic slave trade and the spread of racial slavery in the Americas before 1800. Explores the diversity of slave labor in the Americas and the different slave cultures African Americans produced under the constraints of slavery. (Cross-listed with HIUS 135B.)

172. Afro-American Prose (4)

Students will analyze and discuss the novel, the personal narrative, and other prose genres, with particular emphasis on the developing characters of Afro-American narrative and the cultural and social circumstances that influence their development. (Cross-listed with LTEN 183.)

174. Themes in Afro-American Literature (4)

This course focuses on the influence of slavery upon African American writers. Our concern is not upon what slavery was but upon what it is within the works and what these texts reveal about themselves, their authors, and their audiences. (Cross-listed with LTEN 185.)

175. Literature of the Harlem Renaissance (4)

The Harlem Renaissance (1917–39) focuses on the emergence of the “New Negro” and the impact of this concept on black literature, art, and music. Writers studied include Claude McKay, Zora N. Hurston, and Langston Hughes. Special emphasis on new themes and forms. (Cross-listed with LTEN 186.)

176. Black Music/Black Texts: Communication and Cultural Expression (4)

Explores role of music as a traditional form of communication among Africans, Afro-Americans, and West Indians. Special attention given to poetry of black music, including blues and other forms of vocal music expressive of contestatory political attitudes. (Cross-listed with LTEN 187 and MUS 154.)

178. Blues: An Oral Tradition (4)

This course will examine the development of the blues from its roots in work-songs and the minstrel show to its flowering in the Mississippi Delta to the development of urban blues and the close relationship of the blues with jazz, rhythm and blues, and rock and roll. (Cross-listed with MUS 126.)

179A. Jazz Roots and Early Development (1900–1943) (4)

This course will trace the early development of jazz and the diverse traditions which helped create this uniquely American art form. We will witness the emergence of Louis Armstrong in New Orleans and examine the composer's role in jazz with Jelly Roll Morton and Duke Ellington. (Cross-listed with MUS 127A.)

179B. Jazz Since 1946: Freedom and Form (4)

This course will examine the evolution of jazz from 1943 to the present. The course will survey the contrasting and competing styles in jazz from bebop to cool to the avant garde and fusion. (Cross-listed with MUS 127B.)

COLLOQUIA

180. Topics in Mexican-American History (4)

This colloquium studies the racial representation of Mexican-Americans in the United States from the nineteenth century to the present, examining critically the theories and methods of the humanities and social sciences. (Cross-listed with HIUS 167.)

181. Topics in the Comparative History of Modern Slavery (4)

Slavery was both a thread of continuity in the history of the Americas and distinctive institution in the specific social settings. The purpose of this course is to examine and discuss readings that explore topics in the Caribbean and the U.S. Because topics will vary, the seminar may be taken more than once for credit, with permission of the instructor. Requirements vary for undergraduates, M.A., and Ph.D. students. Graduate students are required to submit a more substantial piece of work. (Cross-listed with HIUS 164 and conjoined with HIUS 264.)

183. Gender, Race, Ethnicity, and Class (4)

Gender is often neglected in studies of ethnic/racial politics. This seminar explores the relationship of race, ethnicity, class, and gender by examining the participation of working class women of color in community politics and how they challenge mainstream political theory.

184. Black Intellectuals in the Twentieth Century (4)

An analysis of black cultural and intellectual production since 1895. Course will explore how race and race-consciousness have influenced the dialogue between ideas and social experience; and how other factors—i.e., age, gender, and class—affected scholars' insights.

185. Discourse, Power, and Inequality (4)

While discourse analysis has transformed numerous disciplines, a gap separates perspectives that envision discourse as practices that construct inequality from approaches that treat discourse as everyday language. This course engages both perspectives critically in analyzing law, medicine, and popular culture.

186. The Ethnic Press in the United States (4)

Readings and research on news media institutions established in ethnic communities since the nineteenth century.

The course will trace the emergence, development, and longevity of ethnic presses, their role in cultivating and maintaining ethnic identity, and their attempts to respond to and resist images in mainstream media.

187. Black Nationalism (4)

This course will investigate the ideologies and practices of black nationalist movements in the United States and/or across the black diaspora, focusing on their political philosophy, political culture, and gender and class structure.

188. African Americans, Religion, and the City (4)

This course details the history of African American migration to urban areas after World War I and World War II and explores the role of religion in their lives as well as the impact that their religious experiences had upon the cities in which they lived. (Cross-listed with USP 132.)

189. Special Topics in Ethnic Studies (4)

A reading and discussion course that explores special topics in ethnic studies. Themes will vary from quarter to quarter; therefore, course may be repeated three times as long as topics vary.

SEMINARS AND INDEPENDENT STUDIES

190. Research Methods: Studying Racial and Ethnic Communities (4)

The course offers students the basic research methods with which to study ethnic and racial communities. The various topics to be explored include human and physical geography, transportation, employment, economic structure, cultural values, housing, health, education, and intergroup relations. (Cross-listed with USP 129.)

191A. Undergraduate Research in Ethnic Studies (4)

This course is designed to help students conduct their own research rather than merely read the research of others. The course will introduce students to research paradigms in ethnic studies, familiarize them with finding aids and other library resources, and involve them in the design of research plans. **Prerequisite:** instructor approval.

191B. Honors Research in Ethnic Studies (4)

This course is a continuation of Ethnic Studies 191 Undergraduate Research in Ethnic Studies. Students who have completed ETHN 191 and selected a faculty research advisor may enroll in this course. During the quarter the research for the honors project will be completed under the faculty advisor's supervision. Faculty advisors will meet weekly with their honors students to oversee the progress made in carrying out the plan of research. **Prerequisite:** completion of 191.

191C. Honors Research in Ethnic Studies (4)

This course is a continuation of Ethnic Studies 192, Honors Research in Ethnic Studies. Students who have completed ETHN 192 and are continuing to work with a faculty research advisor may enroll in this course. During the quarter the written drafts and final honors paper will be completed under the faculty advisor's supervision. The student will meet weekly with the faculty advisor in order to prepare drafts and the final version of the honors paper. **Prerequisite:** instructor approval.

197. Fieldwork in Racial and Ethnic Communities (4)

This course comprises supervised community fieldwork on topics of importance to racial and ethnic communities in the greater San Diego area. Regular individual meetings with faculty sponsor and written reports are required. (May be repeated for credit.)

198. Directed Group Studies (4)

Directed group study on a topic or in a field not included in the regular department curriculum by special arrangement with a faculty member. (May be repeated for credit.)

199. Supervised Independent Study and Research (4)

Individual research on a topic that leads to the writing of a major paper. (May be repeated for credit.)

GRADUATE

200A. Departures: A Genealogy of Critical Racial and Ethnic Studies (4)

Introduction to critical racial and ethnic studies and how this perspective departs from traditional constructions of race and culture; examination of relevant studies to identify themes, concepts, and formulations that indicate the critical departures that characterize the field. **Prerequisite:** graduate standing or consent of instructor.

200B. Formulations: Interdisciplinarity and Knowledge Production in Ethnic Studies (4)

This course uses model studies to explore how comparative and relational problems are posed as research projects, how research questions are constructed, and how they employ theory to frame the project and establish what is at stake in the research. **Prerequisite:** graduate standing or consent of instructor.

200C. Projects (ProSeminar): Research in Ethnic Studies (4)

Students examine research designs presented by faculty and advanced graduate students to study how to conceive of and pose research questions, integrate theoretical and methodological models, and conceptualize their own research project. **Prerequisite:** graduate standing or consent of instructor.

230. Departmental Colloquium (1)

This course is a forum for the presentation of recent research by guests, faculty, and students. This course may be taken for credit six times.

240. Historical Methods and Archives (4)

This course seeks to develop research skills in historical methods; to understand techniques and tools historians use to create historical narratives using archival and historical sources; and to compare and relate the value of these to ethnic studies research.

241. Cultural Studies and Cultural Production (4)

This course will train students in approaches to interdisciplinary research concerned with power and the production of knowledge, with a focus on conducting multimedia field research, applying discourse analysis, and recognizing forms of data across disciplinary divides.

241A. Community Ethnography I: Method and Theory (4)

This course reviews the major tenets of ethnography using case studies of ethnographic work and critical theory pertaining to epistemological concerns in the social sciences. Critical here are the major ethical parameters of conducting ethnography in ethnic communities, the role of researchers, and the practical implications of such research.

241B. Community Ethnography II: Practicum (4)

This course focuses on the practical application of ethnographic concepts and methods in actual field research in a local San Diego community. The purpose here is to provide experience in conducting ethnography through participant observation, interviews, and contributing to communities. This will include a brief overview of ethnographic method, but will focus on hands-on research, analysis, and ethnographic writing.

242. Qualitative Methods/Ethnography (4)

This course focuses on conceptual and methodological frameworks of ethnography and qualitative inquiry, including research design, grounded theory, the field note journal, participant observation, and interviewing; major themes include the role of indigenous/insider researchers, ethics of involvement, and community collaboration.

253. Mass Media and Ethnic Identity (4)

This course examines the ways that ethnic identity influences the practices of mass media, and the ways in which mass media shape and reflect ethnic identity.

254. Race and Racism (4)

This course examines inequality based on race with a focus on the institutions, symbols, and social practices which structure and maintain racism. Particular attention is given to laws and social policy that reinforce racial inequality.

256. Gender, Sexuality, and Race (4)

This course studies the body cross-culturally as the site for the construction of gender, sex, ethnic, and racial identities.

Prerequisite: graduate standing or consent of instructor.

257A-B. Social Theory (4-4)

An intensive survey of social and cultural theory, focusing on how constructions of science, language, politics, and social inequality shaped early modernity, romantic nationalism, Marxism, cultural relativity, psychoanalysis, and fin de siècle social thought. The second quarter surveys poststructuralist, postmodern, feminist, subaltern studies, globalization, and other critiques. ETHN 257A is not a prerequisite for ETHN 257B.

259. Comparative Conquests, Colonization, and Resistance in the Americas (4)

This course will offer a comparative survey of the impact of European interactions with Native nations and populations in the New World, from Peru to Canada. Readings will emphasize modes of initial interaction, patterns of European colonization, and Native adaptation and resistance, and broader changes in Native culture and cosmology as a result of conquest and colonization.

260. Transnationalism and Borderlands: The Local and Global (4)

This course critically reviews the analytical frameworks of transnationalism and borderlands. The goals are to assess traditional and current social science practice on immigration, identity, and community studies, and to understand how diverse peoples engage and participate in global processes.

261. Race and Law (4)

This seminar advances a critique of law's innocence—of its claims for universality. The reading of legal and scientific texts will indicate how, by incorporation existing constructions of the meanings of race, the law produces racialized modern subjects.

262. Race, Inequality, and Health (4)

New critical and multidisciplinary perspectives provide tools for examining entrenched and newly emerging diseases and inequalities. This course examines medicine and public health in relationship to race, gender, sexuality, class, and nation and explores how these connections affect the distribution of health and health services locally, nationally, and internationally.

263. Language and Socialization across Cultures (4)

This course will focus on the ways in which children in different ethnic and racial groups are socialized to language and through language. We will explore racial and class and gender ideologies that underpin the ways parents expect children to learn to speak; examine effective and appropriate methods for studying cultural patterns and understanding ideologies; and consider impacts of bilingualism, stigmatized dialects, immigration, religious training, and home-school conflicts in ways of speaking and using language(s). **Prerequisite:** graduate standing or consent of instructor.

264. War, Race, and Violence (4)

This course critically examines theories and research on war, race, and violence, including everyday forms of state violence, war and the making of empire, the politics of war memory, and war refugees. **Prerequisite:** graduate standing or consent of instructor.

265. Critical Immigration and Refugee Studies (4)

This course surveys the field of immigration and refugee studies and introduces students to recent theories and cutting-edge research in the field. Key topics: gender and migration; diaspora and transnationalism; immigration, race, and citizenship; and globalization and immigrant labor. **Prerequisite:** graduate standing or consent of instructor.

266. Popular Culture and Pedagogy (4)

This course examines popular culture as a site of domination and resistance, and pedagogy broadly as (always political) educational projects in a variety of social contexts with a focus on youth popular culture in U.S. urban public schools. **Prerequisite:** graduate standing or consent of instructor.

289. Topics in Ethnic Studies Research (4)

This course is a research seminar on themes of contemporary and historic importance in ethnic studies. Themes will be determined by instructor. Course may be repeated three times for credit.

290A-B. Master's Thesis Preparation (4-4)

All graduate students are required to write a master's thesis as part of the requirements for the master of arts in ethnic studies. Students should enroll in the thesis preparation courses in the fall and spring quarters of the second year of graduate studies.

298. Directed Reading (1-12)

This is an independent research or individual guided tutorial in an area not covered by present course offerings. This course may be repeated for an indefinite number of times due to the independent nature of the content of the course.

299. Thesis Research (1-12)

Open to graduate students conducting doctoral thesis research. This course may be repeated for an indefinite number of times due to the independent nature of thesis research and writing.

500. Apprentice Teaching in Ethnic Studies (4)

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty: handling of discussions, preparation and grading of examinations and other written exercises, and student relations.

European Studies

FACULTY

Georgios H. Anagnostopoulos, *Professor, Philosophy*
Eric Bakovic, *Associate Professor, Linguistics*
Ronald S. Berman, *Professor, Literature*
Richard Biernacki, *Associate Professor, Sociology*
Frank Biess, *Associate Professor, History; Vice Chair, History*
John D. Blanco, *Associate Professor, Literature*
David O. Brink, *Professor, Philosophy*
Norman Bryson, *Professor, Visual Arts*
Nancy A. Caciola, *Associate Professor, History*
Craig Callender, *Professor, Philosophy*
Jim Carmody, *Associate Professor, Theatre and Dance*
Steven Cassedy, *Professor, Literature*
Charles Chamberlain, *Lecturer, Literature*
William M. Chandler, *Professor, Political Science*
Alain Cohen, *Professor, Literature*
Ellen T. Comisso, *Professor, Political Science*
Jaime Concha, *Professor, Literature*
Wayne Cornelius, *Professor, Political Science and Center for Comparative and Immigration Studies*
Stephen Cox, *Professor, Literature*
Thomas Csordas, *Professor, Anthropology*
R. Michael Davidson, *Professor, Literature*
Adriana De Marchi Gherini, *Lecturer, Literature*
Gerald D. Doppelt, *Professor, Philosophy*
Page duBois, *Professor, Literature*
Robert S. Edelman, *Professor, History*
Anthony Edwards, *Professor, Literature*
Fatima El-Tayeb, *Assistant Professor, Literature*
Thomas Gallant, *Professor, History; Endowed Chair, History*
Rosemary George, *Associate Professor, Literature*
Cathy Gere, *Assistant Professor, History*
Amelia Glaser, *Assistant Professor, Literature*
Harvey Goldman, *Professor, Sociology*
Jean-Pierre Gorin, *Professor, Visual Arts*
Peter Gourevitch, *Professor, Political Science*
Jack M. Greenstein, *Associate Professor, Visual Arts*
Daniel Hallin, *Professor, Communication*
Mark Hanna, *Assistant Professor, History*
Michael O. Hardimon, *Associate Professor, Philosophy*
Jeffrey Haydu, *Professor, Sociology*
Marcel Henaff, *Professor, Literature*
Ariana Hernandez-Reguant, *Assistant Professor, Communication*
Deborah Hertz, *Professor, History; Endowed Chair, History*
Germaine Hoston, *Professor, Political Science*
Alan Houston, *Associate Professor, Political Science; Provost, Eleanor Roosevelt College*
Judith M. Hughes, *Professor, History*
Stephanie H. Jed, *Associate Professor, Literature*
Monte Ransome Johnson, *Assistant Professor, Philosophy*
Dayna Kalleres, *Assistant Professor, Literature*
Hasan Kayali, *Associate Professor, History*
Grant Kester, *Associate Professor, Visual Arts*
Susan Kirkpatrick, *Professor Emerita, Literature*
Robert Kluender, *Associate Professor, Linguistics*

Todd Kontje, *Professor, Literature*
Lisa Lampert-Weissig, *Associate Professor, Literature*
Martha Lampland, *Associate Professor, Sociology*
Lisa Lowe, *Professor, Literature*
Margaret Loose, *Assistant Professor, Literature*
Gerald Mackie, *Associate Professor, Political Science*
Victor Magagna, *Associate Professor, Political Science*
Babette Mangolte, *Professor, Visual Arts*
John Marino, *Professor, History*
George Mariscal, *Professor, Literature*
Isaac Martin, *Associate Professor, Sociology*
Luis Martin-Cabrera, *Assistant Professor, Literature*
Marianne McDonald, *Professor, Theatre and Dance*
Louis A. Montrose, *Professor Emeritus, Literature*
Chandra Mukerji, *Professor, Communication*
Sheldon A. Nodelman, *Professor, Visual Arts*
W. Arctander O'Brien, *Associate Professor, Literature*
Esra G. Ozyurek, *Associate Professor, Anthropology*
Patrick Patterson, *Assistant Professor, History*
Catherine Ploye, *Lecturer, Literature*
Michael Provence, *Associate Professor, History*
Babak Rahimi, *Assistant Professor, Literature*
Pamela B. Radcliff, *Associate Professor, History*
Roddey Reid, *Professor, Literature; Director, European Studies Minor*
Samuel C. Rickless, *Professor, Philosophy*
David R. Ringrose, *Professor Emeritus, History*
Philip G. Roeder, *Professor, Political Science*
Akos Rona-Tas, *Associate Professor, Sociology*
John Rouse, *Associate Professor, Theatre and Dance*
Donald Rutherford, *Professor, Philosophy*
Andrew Scull, *Professor, Sociology*
Gershon Shafir, *Professor, Sociology*
Kathryn Shevelov, *Associate Professor, Literature*
Matthew Shugart, *Professor, Political Science*
Janet Smarr, *Professor, Theatre and Dance*
Susan Smith, *Associate Professor, Visual Arts; Provost, John Muir College*
Lesley Stern, *Professor, Visual Arts*
Jane Stevens, *Associate Professor, Music*
Kaare Strom, *Professor, Political Science*
Tracy B. Strong, *Professor, Political Science*
Charles Thorpe, *Associate Professor, Sociology*
Cynthia M. Truant, *Associate Professor, History*
Eric Van Young, *Professor, History*
Pasquale Verdichio, *Associate Professor, Literature*
Mary Vidal, *Associate Professor, Visual Arts*
Carlos Waisman, *Professor, Sociology*
Cynthia Walk, *Associate Professor, Emerita, Literature*
Eric Watkins, *Professor, Philosophy*
Don Wayne, *Associate Professor, Literature; Provost, Revelle College*
John Welchman, *Professor, Visual Arts*
Eliot Wirshbo, *Lecturer, Literature*
Winifred Woodhull, *Associate Professor, Literature*
Kathryn A. Woolard, *Professor, Anthropology*
Oumelbanine Zhiri, *Professor, Literature*

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THE EUROPEAN STUDIES MINOR

The European Studies minor is for students with strong European interests or who plan to study in Europe on an Education Abroad Program (EAP)

or Opportunities Abroad Program (OAP) but also those who seek to complement their major with the study of Europe as a political, cultural, and economic entity. To receive a minor in European Studies, a student must complete seven four-unit courses (twenty-eight units).

(A) Language requirement

ALL minors must demonstrate basic proficiency in a single European language other than English by completing four quarters of language instruction (or equivalent). Students may also complete this requirement by demonstrating advanced language ability on a proficiency exam. Students completing the language requirement through waiver (700 or better on SAT II language, score of 4 or better on AP language), or proficiency exam will fulfill the language component of the minor by completing one of these requirements but no course credit will be applied toward the (seven) courses required for the minor.

Up to TWO four-unit courses in foreign language can be included in the seven courses required for the minor. These may be lower-division courses.

(B) Additional course requirements

1. The remaining five to seven courses (depending on the number of language courses applied to the minor) must include at least three courses on Europe as a whole including one course in each of the two broad tracks.
 - a. Economics and Politics
 - b. Culture and Society (See course listings for each track.)
2. At least one of the track courses should be in the Department of History.
3. No more than three courses in any one department.
4. All courses applied to the minor must receive a letter grade of C– or better.
5. Upper-division courses may include up to two 198 and 199 courses and up to three courses from UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP) with the approval of the minor advisor.
6. Minors in European Studies are encouraged to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP). Students should consult with the faculty director before going abroad to determine which courses will be approved for minor credit.

TRACKS IN THE EUROPEAN STUDIES MINOR

Courses preceded by an asterisk are petitionable for credit towards the minor as content warrants.

ECONOMICS AND POLITICS

COMMUNICATION

COSF 140B. Comparative Media Systems: Europe

HISTORY

HIEU 109. European Nationalism from a Historical Perspective

HIEU 113. Rule, Conflict, and Dissent in the Middle Ages

HIEU 126. Age of Expansion: Europe and the World, 1400–1600

HIEU 128. Europe Since 1945

HIEU 141. European Diplomatic History, 1870–1945

HIEU 146. Fascism, Communism, and the Crisis of Liberal Democracy: Europe 1919–1945

PHILOSOPHY

PHIL 166. Classics in Political Philosophy

PHIL 167. Contemporary Political Philosophy

POLITICAL SCIENCE

POLI 110A. Citizens and Saints: Political Thought from Plato to Augustine

POLI 110B. Sovereigns, Subjects, and the Modern State: Political Thought from Machiavelli to Rousseau (4)

POLI 110C. Revolution and Reaction: Political Thought from Kant to Nietzsche

POLI 110DA. Freedom and Discipline: Political Thought in the Twentieth Century

POLI 120A. Political Development of Western Europe

POLI 120H. European Integration

POLI 126AA. Fundamentals of Political Economy: Modern Capitalism

POLI 126AB. Politics and Economics in Eastern Europe

SOCIOLOGY

Soc/B 111A. Human Rights—Principles and Problems

Soc/B 111B. Human Rights—Practices and Cases

SOCI 177. International Terrorism

CULTURE AND SOCIETY

ANTHROPOLOGY

ANRG 124. Paths to European Hegemony

HISTORY

HIEU 110. The Rise of Europe

HIEU 111. Europe in the Middle Ages

HIEU 125. Reformation Europe

HIEU 130. Europe in the Eighteenth Century

HIEU 133. Gender in Antiquity and the Early Medieval Mediterranean

HIEU 136A. European Society and Social Thought, 1688–1870

HIEU 136B. European Society and Social Thought, 1870–1989

HIEU 142. European Intellectual History, 1780–1870

HIEU 143. European Intellectual History, 1870–1945

HIEU 147. Women and Gender in Early Modern Europe

HIEU 148. Women and Gender from the Enlightenment to the Victorian Eras

HIEU 149. History of Women in Europe: 1870 to the Present

HIEU 163/263. Special Topics in Medieval History

HIEU 165/265. Special Topics in Early Modern Spain

HIEU 171/271. Special Topics in Twentieth-Century Europe

HIEU 174/274. The Holocaust: A Psychological Approach

HIEU 180/280. Topics in European Women's History

HISC 101A. Science in the Greek and Modern World

HISC 101B. Medieval Science in the Latin West, ca. 500–1500

HISC 101C. Early Modern Science

HISC 106. The Scientific Revolution

HISC 107. The Emergence of Modern Science

LINGUISTICS

*LIGN 141. Language Structures

*LIGN 150. Historical Linguistics

LITERATURE

LTEU 139. Marx/Nietzsche/Freud

LTTH 115. Introduction to Critical Theory

MUSIC

MUS 4. Introduction to Western Music

MUS 112. Topics in European Music Before 1750

MUS 113. Topics in Classical, Romantic, and Modern Music

*MUS 114. Music of the Twentieth Century

*MUS 115. Women in Music

MUS 120A-B-C. Survey of Music History and Literature

*ICAM 150. History of Art and Technology

PHILOSOPHY

PHIL 13. Introduction to Philosophy: Ethics

PHIL 14. Introduction to Philosophy: Metaphysics

PHIL 15. Introduction to Philosophy: Theory of Knowledge

PHIL 31. History of Philosophy: Ancient Philosophy

PHIL 32. History of Philosophy: The Origins of Modern Philosophy

PHIL 33. History of Philosophy: Philosophy in the Age of Enlightenment

PHIL 102. Hellenistic Philosophy

PHIL 104. The Rationalists

PHIL 105. The Empiricists

PHIL 108. Nineteenth-Century Philosophy

*PHIL 111. Contemporary Work in Epistemology and Metaphysics

*PHIL 126. Topics in the History of Logic

*PHIL 145. Philosophy of Science

*PHIL 146. Philosophy of Physics

PHIL 153. Philosophy of History

PHIL 161. Topics in the History of Ethics

PHIL 166. Classics in Political Philosophy

*PHIL 167. Contemporary Political Philosophy

*PHIL 169. Feminism and Philosophy

*PHIL 170. Philosophy and Race

PHIL 175. Aesthetics

*PHIL 177. Philosophy and Literature

PHIL 180. Phenomenology

PHIL 181. Existentialism

PHIL 182. Marx and Marxism

PHIL 183. Topics in Continental Philosophy

RELIGION, PROGRAM FOR THE STUDY OF

RELI 110A. The Modern Study of Religion: Religion in Modernity

RELI 112. Texts and Contexts: The Holy Book in Islam

*RELI 131. Topics in Religion and Sexuality

*RELI 132. Topics in Orthodoxy and Heterodoxy

*RELI 141. Public Sphere and Religion

*RELI 142. Secularization and Religion

*RELI 188. Special Topics in Religion

*RELI 189. Seminar in Religion

SOCIOLOGY

SOCI 20. Social Change in the Modern World

SOCI 100. Classical Sociological Theory

SOC/A 102. Contemporary Sociological Theory

SOCI 106. Comparative and Historical Methods

SOCI 106M. Holocaust Diaries

SOCI 178. The Holocaust

THEATRE AND DANCE

*TDHT 101/201. Topics in Dramatic Literature and Theatre History

TDHD 171. Dance History I (Ancient to 1900)

TDHD 172. Dance History II (1900 to 1960)

TDHD 173. Dance History III (1960 to Present)

VISUAL ARTS

VIS 20. Introduction to Art History

VIS 22. Formations of Modern Art

VIS 84. History of Film

VIS 113AN. History of Criticism I: Early Modern

VIS 113BN. History of Criticism II: Early Twentieth Century (1900–1950)

VIS 113CN. History of Criticism III: Contemporary (1950–Present)

VIS 117B. Theories of Representation

VIS 120C. Late Antique Art

VIS 121AN. The Idea of Medieval Art

VIS 121B. Castles, Cathedrals, and Cities

VIS 121C. Art and Gender in the Middle Ages and Renaissance

VIS 121D. The Illuminated Manuscript in the Middle Ages

VIS 122AN. Renaissance Art

VIS 122CN. Defining High Renaissance Art

VIS 123CN. Early Print Culture: The First Media Revolution

VIS 124AN. Baroque Art

VIS 125A. Twentieth-Century Art

***VIS 151. History of the Experimental Film**

***VIS 158. Histories of Photography**

Film Studies

OFFICE: 2113 Humanities and Social Sciences
Building, Muir College
(858) 534-3589
<http://muir.ucsd.edu/instructional/film-studies/>

DIRECTOR

Susan Smith, Ph.D., *Visual Arts*

PROFESSORS

Steven Adler, M.F.A., *Theatre and Dance*
Elizabeth Cartwright, Ph.D., *Communication*
Alain J.-J. Cohen, Ph.D., *Literature*
Stephen D. Cox, Ph.D., *Literature*
R. Michael Davidson, Ph.D., *Literature*
Allan Havis, M.F.A., *Theatre and Dance*
Walton Jones, M.F.A., *Emeritus, Theatre and Dance*
Bennetta Jules-Rosette, Ph.D., *Sociology*
Marianne McDonald, Ph.D., *Theatre*
Paul Pickowicz, Ph.D., *History*
Lesley Stern, Ph.D., *Visual Arts*
Yingjin Zhang, Ph.D. *Literature*

ASSOCIATE PROFESSORS

Robert Cancel, Ph.D., *Literature*
James Carmody, Ph.D., *Theatre*
Brian Goldfarb, Ph.D., *Communication*
Winifred Woodhull, Ph.D., *Literature*

SENIOR LECTURER WITH SECURITY OF EMPLOYMENT

Ursula Meyer, M.F.A., *Theatre and Dance*

OFFICE: 2113 Humanities and Social Sciences
Building, Muir College
(858) 534-3589
<http://muir.ucsd.edu/instructional/film-studies/>

THE MINOR

In the course of the twentieth century, film in all its applications—as storytelling, as documentary, as propaganda, as popular entertainment—became a powerful social and cultural force on an international scale. The importance of film is reflected in the number of faculty at UC San Diego whose scholarship and teaching involves film and in the number of courses regularly offered that focus on some aspect of film studies and use film as an essential component of the course material. The Film Studies minor is designed to give students a flexible introduction to the full range of courses on film available here. As noted below, the only constraints are that five of the seven courses must be in the upper division and that the seven courses must come from at least two different departments. This latter requirement is designed to insure some level of breadth in the minor. The minor should be of interest to students with a wide range of interests, from those who plan graduate study in film to those who simply wish

to understand better this powerful and influential medium.

REQUIREMENTS

Seven courses, at least five of which must be upper-division, from the following list. The seven courses must be drawn from at least two different departments.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

- COCU 110. Cinema in Latin America (4)**
- COCU 125. How to Read a Film (4)**
- COCU 132 Gender and Media (4)**
- COSF 186. Film Industry (4)**
- ETHN 101. Ethnic Images in Film (4)**
- FILM 87. Film Studies Freshman Seminar (1)**
- FILM 192. Senior Seminar in Film Studies (1)**
- HIEA 133. Twentieth-Century China: Cultural History (4)**
- HIUS 122. History and Hollywood: America and the Movies since the Great Depression (4)**
- LTWL 4A-B-C-D-E-M. Fiction and Film in Twentieth-Century Societies (4-4-4-4-4-4)**
- LTAF 120. Literature and Film of Modern Africa (4)**
- LTEA 120A. Chinese Films (4)**
- LTEA 120B. Taiwan Films (4)**
- LTEA 120C. Hong Kong Films (4)**
- LTWL 180. Film Studies and Literature: Film History (4)**
- LTWL 181. Film Studies and Literature: Film Movement (4)**
- LTWL 183. Film Studies and Literature: Director's Work (4)**
- LTWL 184. Film Studies and Literature: Close Analysis of Filmic Text (4)**
- PHIL 176. Film Aesthetics (4)**
- SOCA 105. Ethnographic Film: Media Methods (4)**
- SOCB 172. Films and Society (4)**
- SOCD 187. African Societies through Film (4)**
- TDGE 10. Theatre and Film (4)**
- TDGE 11. Great Performances on Film (4)**
- TDGE 27. User-Friendly Shakespeare (4)**
- TDGE 122. The Films of Woody Allen (4)**
- TDGE 124. Cult Films: Weirdly Dramatic (4)**
- TDHT 116. Old Myths in New Films (4)**
- TDPW 104. Screenwriting (4)**
- VIS 84. History of Film (4)**
- VIS 150. History and Art of the Silent Cinema (4)**
- VIS 151. History of the Experimental Film (4)**
- VIS 152. Film in Social Context (4)**
- VIS 153. The Genre Series (4)**
- VIS 154. Hard Look at the Movies (4)**

VIS 155. The Director Series (4)

VIS 156N. Special Problems in Film History and Theory (4)

Freshman Seminar Program

Office of the Senior Vice Chancellor—Academic Affairs
Associate Vice Chancellor—Undergraduate Education

OFFICE: University Center, Room 104
(858) 822-5855
<http://ugseminars.ucsd.edu>

The Freshman Seminar Program debuted in 2003–04 to offer students early intellectual contact with faculty members, spark their interest in a broad range of topics, and enrich the undergraduate experience at UC San Diego. These seminars create a unique classroom environment by providing new students with opportunities to engage in intellectual discussions with faculty and peers in a small supportive class setting, and by fostering the development of critical thinking and analytical skills. Incoming students are highly encouraged to enroll in freshman seminars during their first year at UCSD. Students can select from an interesting and exciting array of seminars each quarter, designated by courses numbered 87 (e.g., PHYS 87).

Faculty from all departments offer approximately 150 seminars each academic year. Seminars offer one unit of credit and are graded Pass/Not Pass. Enrollment is limited to twenty students per seminar, with preference given to entering freshmen, and up to four seminars may be taken for credit.

Please visit the Freshman Seminar Program Web site at <http://ugseminars.ucsd.edu> for a description of seminars currently offered. This site also contains useful information, such as enrollment procedures for freshmen with advanced standing, and additional program details. Questions about a specific freshman seminar should be directed to the department offering the seminar.

German Studies

PROGRAM DIRECTOR

Lisa Lampert-Weissig, *Associate Professor, Literature*

FACULTY

Frank Biess, *Associate Professor, History*
William M. Chandler, *Professor, Political Science*
Fatima El-Tayeb, *Assistant Professor, Literature*
Harvey S. Goldman, *Professor, Sociology*
Michael O. Hardimon, *Associate Professor, Philosophy*
Deborah Hertz, *Professor, History*
Todd Kontje, *Professor, Literature*
William A. O'Brien, *Associate Professor, Literature*
Esra Özyürek, *Associate Professor, Anthropology*
Carol Plantamura, *Professor Emerita, Music*
John Rouse, *Associate Professor, Theatre and Dance*
Donald P. Rutherford, *Professor, Philosophy*
Jane Stevens, *Associate Professor, Music*
Tracy B. Strong, *Professor, Political Science*
Cynthia Walk, *Associate Professor Emerita, Literature*
Eric Watkins, *Professor, Philosophy*

OFFICE:

History Undergraduate Advising
Humanities and Social Sciences Building, Fifth Floor
Muir College
(858) 534-0491
<http://history.ucsd.edu/programs/caesar-programs/german-stud/>

PROGRAM DESCRIPTION

German Studies is an interdisciplinary program that offers both a major and a minor for students with broad academic interests in the German-speaking world.

In consultation with a faculty advisor in the program, students design individual plans of study from the many core courses offered in the Departments of History, Literature, Music, Philosophy, Political Science, Sociology, and Theatre and Dance. Further courses, including some offered by other departments, may be incorporated into the student's program, if they bear directly on German studies. Students considering a major or minor should consult a member of the German Studies faculty as early as possible.

Students need to attain competence in German (two years of university-level language courses or the equivalent) before they can take certain required upper-division courses. It is recommended that students attain this level of competence early in the program.

STUDY ABROAD

All German Studies students are strongly encouraged to make overseas study an integral part of their program. The UC Education Abroad Program (EAP) conducts formal programs of study in Berlin, Göttingen, and Bayreuth ranging from one-quarter, intensive beginning language programs to a full year of study at a German university. Students may petition to use up to five courses completed while

studying abroad in their major, and three in their minor.

SENIOR HONORS THESIS

At the beginning of his or her senior year, a student major in German Studies may elect to write a Senior Honor's Thesis. To be eligible, the student must have a GPA of 3.5 in the German Studies major at the beginning of the senior year.

To begin work, the student forms a committee of three appropriate faculty members, including a committee chair, who is chosen from among the German Studies Core Faculty. The chair supervises the student in a two-quarter program of independent study to research and write an Honor's Thesis of approximately thirty to fifty pages (GMST 196A/B; the two courses count among the required twelve for the major). The student defends the thesis in a one-hour oral exam with the full committee, which is charged with recommending the degree of honors that will appear on the student's transcript and diploma.

THE MAJOR

The major in German Studies requires twelve upper-division courses chosen from the core course list, and includes **German Studies I and II (LTGM 100 and 101) three courses in German Literature two courses in History five additional core courses, taken in at least two different departments. At least two of these courses must be taken outside the literature department.**

Students plan their major in consultation with their German Studies faculty advisor, and submit it to the program director for approval.

THE MINOR

The minor in German Studies consists of seven courses, at least five of which must be upper-division, including **German Studies I or II (LTGM 100 or 101) At least six additional core courses, taken in at least two departments.**

Students plan their minor in consultation with their German Studies faculty advisor, and submit it to the program director for approval.

CORE COURSES

Courses marked with an asterisk (*) frequently cover topics bearing on German Studies. Students should check the departments' quarterly course descriptions and yearly course spreads for their applicability to the program, and discuss them in advance with their German Studies advisor.

GERMAN STUDIES

GMST 196A/B. Honors Thesis

HISTORY

HIEU 125. Reformation Europe

HIEU 132. Germany from Luther to Bismarck

HIEU 142. European Intellectual History: 1780–1870

HIEU 143. European Intellectual History: 1870–1945

HIEU 146. Fascism, Communism, and the Crisis of Liberal Democracy: Europe 1919–1945

HIEU 154. Modern German History: From Bismarck to Hitler

HIEU 155. Modern Austria

HIEU 177. Special Topics in Modern German Thought

LITERATURE

LTGM 2A. Intermediate German I

LTGM 2B. Intermediate German II

LTGM 2C. Intermediate German III

LTGM 100. German Studies I: Aesthetic Cultures

LTGM 101. German Studies II: National Identities

LTGM 123. Eighteenth-Century German Literature

LTGM 125. Nineteenth-Century German Literature

LTGM 126. Twentieth-Century German Literature

LTGM 130. German Literary Prose

LTGM 131. German Dramatic Literature

LTGM 132. German Poetry

LTGM 190. Seminars in German Culture

***LTEU 110. European Romanticism**

LTEU 130. German Literature in Translation

LTEU 139. Marx, Nietzsche, Freud

***LTWL 4B. Fiction and Film in Twentieth-Century Societies**

***LTWL 160. Women and Literature**

***LTWL 172. Special Topics in Literature**

LTWL 176. Literature and Ideas*

***LTWL 180. Film Studies and Literature: Film History**

***LTWL 183. Film Studies and Literature: Director's Work**

MUSIC

***MUS 113. Topics in Classic, Romantic, and Modern Music**

PHILOSOPHY

PHIL 106. Kant

PHIL 107. Hegel

***PHIL 108. Nineteenth-Century Philosophy**

PHIL 180. Phenomenology

PHIL 181. Existentialism

***PHIL 183. Topics in Continental Philosophy**

POLITICAL SCIENCE

POLI 110C. Revolution and Reaction: Political Thought from Kant to Nietzsche

POLI 114B. Marxist Political Thought

POLI 120B. The German Political System

POLI 120D. Germany: Before, During, and After Division

***POLI 120H. European Integration**

SOCIOLOGY

SOCI 178. The Holocaust

THEATRE AND DANCE

***TDHT 101. Topics in Dramatic
Literature and Theatre History**

***TDHT 102. Masters of Theatre**

UC San Diego Global Seminars Program

OFFICE: Programs Abroad Office in the International Center (corner of Gilman Drive and Library Walk)
(858) 534-1123
<http://programsabroad.ucsd.edu>

Sharon Rose, *Linguistics, Faculty Director*
Paula Levin, *Education Studies, Associate Faculty Director*
Lynn Anderson, *Dean of International Education*
Kimberly Burton, *Director of Programs Abroad*
Jim Galvin, *Director of Faculty-Led Programs Abroad*
Jenny Garza, *Coordinator of Faculty-Led Programs Abroad*
Kelly O'Sullivan, *Academic Integration Officer*

UC San Diego Global Seminars are summer study abroad experiences led by a UCSD professor. These programs are five weeks in duration. Students enroll in two courses for a total of eight UCSD units. Class sizes are between fifteen and thirty students, so there are excellent opportunities for interaction with some of the best professors at UCSD. All courses are taught in English, but several programs have some very basic, elementary language instruction to help students navigate the local community. The Programs Abroad Office assists students with advising, application, financial aid, predeparture orientation, and reentry issues. Special study abroad scholarships are available. For more information, consult the UC San Diego Global Seminars section of the Programs Abroad Web site at <http://globalseminar.ucsd.edu>.

RELATED PROGRAMS

For other study abroad opportunities, see UC ["Education Abroad Program \(EAP\)"](#) and UC San Diego ["Opportunities Abroad Program \(OAP\)"](#).

Health Care— Leadership of Healthcare Organizations

PROGRAM DIRECTOR

Richard Kronick, Ph.D., *Associate Professor and Chief, Division of Healthcare Sciences, Family and Preventive Medicine*

ASSOCIATE PROGRAM DIRECTOR

Todd Gilmer, Ph.D., *Associate Adjunct Professor, Family and Preventive Medicine*

ASSOCIATED FACULTY

Gloria E. Bader, Ed.D., *The Bader Group*

Stephan J. Bera, Ph.D., *Academic Coordinator, UCSD Extension*

Bruce Dunn, M.P.A., *Associate Dean, UCSD Extension*
Theodore Ganiats, M.D., *Professor, Chair, Family and Preventive Medicine*

Robert H. Kaplan, Ph.D., *Torrey Pines Health Group*

David Kraus, J.D., MPH, *UCSD Healthcare*

Brendan R. Kremer, MBA, *Administrative Director, UCSD Medical Center*

Joshua Lee, M.D., *Associate Clinical Professor*

Bryan Liang, M.D., Ph.D., J.D., *Associate Adjunct Professor, Anesthesiology, UCSD School of Medicine; Professor of Law, Institute of Health Law Studies, California Western School of Law*

Robert Resnik, M.D., *Professor, Reproductive Medicine*

Maria Savoia, M.D., *Professor, Clinical Medicine*

Douglas Werner, M.A., *Torrey Pines Health Group*

Michael Willoughby, Ph.D., *Lecturer, Economics*

OFFICE: La Jolla Village Professional Center
8950 Villa La Jolla Drive, Suite A-212
(858) 534-9160

E-mail: lhco@ucsd.edu

<http://lhco.ucsd.edu>

PROGRAM DESCRIPTION

The Master of Advanced Studies (MAS) in the Leadership of Healthcare Organizations provides depth and focus on management for healthcare professionals with an emphasis on clinical process improvement. The goal of the program is to prepare healthcare professionals to participate more effectively in the business decisions that affect the quality of patient care by teaching participants to deal with error prevention, process quality, and systems of care. Students gain the advanced knowledge and skills that are essential to manage escalating challenges in the competitive business environment of health care. The MAS program crosses many fields and clinical and administrative professions in the health industry, including medicine, nursing, mental health, dentistry, insurance, pharmacy, and other related areas. The program is appropriate for nurses, managers, physicians, allied health professionals,

healthcare executives, and medical students as they assume more active roles in healthcare leadership and on management teams.

The MAS in the Leadership of Healthcare Organizations is a part-time, self-supporting degree program with a flexible course schedule designed for working professionals. It is the first graduate degree of its kind within the University of California system. The UC San Diego graduate division confers the MAS degree and the Department of Family and Preventive Medicine in the UCSD School of Medicine is responsible for the academic management of the curriculum. UCSD Extension administers the program and provides student advising and career counseling services.

ADMISSION

New students are admitted in the fall, winter, and spring quarter of each academic year. Prospective candidates should submit and complete the official UCSD online graduate application for admission, the application fee, one set of official transcripts from each institution attended after high school, three letters of professional recommendation, and a current résumé or c.v. The GRE/GMAT is not required; however, it is strongly recommended that candidates have a minimum of five years of professional experience in health care. International applicants must submit official scores from the Test of English as a Foreign Language (TOEFL). The application deadlines are July 15 (fall), October 15 (winter), and January 15 (spring).

PROGRAM OF STUDY

The part-time degree program is designed to be completed in one, two, or three years, depending upon a participant's time to devote to the program. Classes are typically scheduled in the late afternoons, evenings, or weekends to meet the demands of working professionals. Students are required to complete forty-two units of required courses.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

CURRICULUM

LHCO 201A-B. Topics in Healthcare Management and Innovation (2-2)

Weekly discussions with healthcare entrepreneurs and managers will expose students to real-life experiences. How are solutions to healthcare delivery identified and implemented? How are solutions brought to the marketplace?

LHCO 202. Organizational Dynamics and Change Management (4)

This course examines principles and applications of management and organization theory as applied to healthcare organizations. It covers methods for assessing key features of organizational environments and internal structures and identifying, developing, and implementing strategies for improved performance.

LHCO 203. Using and Managing Information and Information Technologies (4)

Designed to familiarize health administrators and professionals with the principles of information systems design and management for health care. Provides an understanding of current trends in information technologies for

health care and management issues unique to it. Includes hands-on computer lab.

LHCO 204. Managing People and Teams (2)

This course studies key management concepts and roles of management and how they apply in successful, dynamic organizations. It also examines competencies of effective managers in developing customer focus, planning, selecting and developing individuals and teams, communicating, managing resources, using technology and being adaptable.

LHCO 205. Modern Healthcare Organizations (4)

Describes and analyzes the dynamics responsible for the change in healthcare delivery and effects on development of modern healthcare organizations. Describes actions taken by employers, insurers, consumers, and government, analyzing the effects on physicians and provider organizations. Note: It is recommended that students take this course in their first winter quarter in the program.

LHCO 206. Topics in Financial Management and Decision Making (2)

This course presents real-life applications in healthcare provider organizations of financial management and decision-making. Topics include budgeting, uses of financial reports, development of long-range financial forecasts, benchmarking, business plan development, and actuarial analysis in projecting health care delivery costs.

LHCO 207. Health Law and Medical Liability (4)

This course provides an introduction to the relationship of law to health care, including liability, government regulation, financial and ethical issues, contracting and negotiation and dispute resolution.

LHCO 209. Patient Outcomes and Quality of Care (4)

This course provides a critical overview of the tools used to measure outcomes and quality of care, development and use of practical guidelines, advantages and disadvantages of various methods, and the use of such analysis in administrative decision-making.

LHCO 211. Healthcare Leadership and Political Advocacy (2)

Within the context of healthcare advocacy, the course examines the organizational and individual issues that impact success in promoting and advocating for a healthcare agenda. The course aims to provide clarity to that process and assist students with understanding how to navigate the political landscape. Students learn about the legislative process, lobbying, the impact of political campaigns, the involvement of the media, and how healthcare economics impact politics.

LHCO 212. Statistics and Applied Decision Making (2)

Students will learn statistical methods and their most common applications in healthcare management. Topics covered include data presentation, sampling, the development and use of confidence intervals, hypothesis testing, analysis of variance and simple regression. We will also explore elementary probability theory and decision making under uncertainty. Students who have taken LHCO 208 may not receive credit for LHCO 212. **Prerequisite:** admission to MAS in LHCO or consent of department.

LHCO 213. Financial Accounting and Analysis (2)

Students will learn the use of financial information within a healthcare organization. Topics covered will include capital structure, working capital and cash management, the time value of money, and capital budgeting. Students who have taken LHCO 208 may not receive credit for LHCO 213. **Prerequisites:** admission to the MAS in the Leadership of Healthcare Organizations Program or consent of department.

LHCO 214. Practical Business Communication Skills for Healthcare Professionals (2)

This course focuses on developing effective business communication skills for professionals in managerial/senior roles in healthcare. Writing scenarios include: preparing briefings and updates using presentation software and/or briefing packets; organizing data; constructing proposals and reports; solicitations; coordinating projects via email; and drafting and editing group documents. On-the-job examples from the student's workplace are used throughout the course. **Prerequisite:** admission to the MAS in

the Leadership of Healthcare Organizations Program or consent of department.

LHCO 296A. Independent Study

Project (ISP) Prospectus (2)

As part of preparing for the ISP, each student must prepare a prospectus based on some topic of research interest relevant to leadership of healthcare organizations. The prospectus will consist of an integrative literature review and a proposal for an applied research project based on the chosen topic. **Prerequisite:** admission to the MAS in the Leadership of Healthcare Organizations Program or consent of department.

**LHCO 296B. Independent Study Project
in the Management of Healthcare (4)**

The Independent Study Project (ISP) is the cornerstone of the MAS Program. Students will be involved in a high-level applied research project that integrates what they have learned in their formal course work. The ISP will be an independent and creative scholarly activity in an area related to one or more of the topics covered in the formal curriculum. Students' work will be evaluated by a committee consisting of faculty and, when appropriate, industry advisors.

Health Care— Social Issues

OFFICE: Interdisciplinary Programs, EBU 3B
Computer Science and Engineering Building
Room 1114, Warren College
<http://provost.ucsd.edu/warren/health/>

Health Care–Social Issues is an interdisciplinary minor designed to enhance students' competence in analyzing complex social and ethical implications and ramifications of health care issues, policies, and delivery systems. Students gain an understanding of how the economy, culture, technology, and sociological and psychological processes influence modern health care. Although it is administered by Warren College, it is available to all UC San Diego undergraduate students with a general interest in health care as well as to students considering health care careers. This minor offers students the opportunity to examine health care related issues from the perspectives of a wide range of disciplines, including anthropology, biology, cognitive science, contemporary issues, economics, ethnic studies, philosophy, psychology, science, technology, public affairs, sociology, and urban studies. By bringing together course work from these academic departments, this interdisciplinary curriculum offers a breadth of intellectual experience that enhances students' undergraduate education and their preparation for professional and postgraduate education in the health care field.

Students should consult an academic advisor at their college to determine how the Health Care–Social Issues minor can best meet their college graduation requirements. Minor declarations must be made online using the [TritonLink](#) major and minor application.

Students are urged to supplement the Health Care–Social Issues minor with a health-related internship. The Academic Internship Program offers internship placements in clinical settings and with medical research teams that provide valuable experience, career clarification, and an opportunity to apply theories learned in course work.

Further information on the program is available at the Warren College Interdisciplinary Programs Office.

HEALTH CARE–SOCIAL ISSUES MINOR REQUIREMENTS

The minor consists of three required courses and four elective courses. At least five courses must be taken at the upper-division level. Upper-division courses must not overlap with courses in the student's major. No more than three courses may be taken in any one discipline. For full descriptions of the following courses, please see departmental listings.

Required Courses

Sociology 40—Sociology of Health Care Issues
Philosophy 163—Biomedical Ethics

One course in Urban Studies and Planning chosen from the following:

- 143—The U.S. Health Care System
- 144—Environmental and Preventive Health Issues
- 145—Aging: Social and Health Policy Issues
- 147—Case Studies in Health Care Programs/Poor and Underserved Population

(Additional Urban Studies and Planning courses may be taken to fulfill elective requirements in the minor.)

Elective Course Options

Anthropology

- ANTH 2—Human Origins
- ANBI 100—Special Topics in Biological Anthropology (topic approval required)
- ANBI 141—The Evolution of Human Diet
- ANSC 100—Special Topics in Socio-Cultural Anthropology (topic approval required)
- ANSC 164—The Anthropology of Medicine

Biology

- BILD 36—AIDS, Science, and Society
- BICD 136—AIDS, Science, and Society

Cognitive Science

- 174—Drugs: Brain, Mind, and Culture
Contemporary Issues

- 22—Human Sexuality
- 40—The AIDS Epidemic
- 136—The Anthropology of Medicine

Economics

- 140—Economics of Health Producers
- 141—Economics of Health Consumers

Ethnic Studies

- 142—Medicine, Race, and the Global Politics of Inequality

History

- HISC 115—History of Modern Medicine
- HISC 116—History of Bioethics
- HISC 174—History of Localization of Brain Function

Philosophy

- 147—Philosophy of Biology
- 148—Philosophy and the Environment
- 151—Philosophy of Neuroscience
- 162—Contemporary Moral Issues
- 164—Technology and Human Values

Psychology

- 2—General Psychology: Biological Foundations
- 60—Introduction to Statistics
- 104—Introduction to Social Psychology
- 124—Introduction to Clinical Psychology
- 132—Hormones and Behavior
- 134—Eating Disorders
- 154—Behavior Modification
- 155—Social Psychology and Medicine
- 163—Abnormal Psychology
- 168—Psychological Disorders of Childhood
- 169—Brain Damage and Mental Function
- 172—Psychology of Human Sexuality
- 179—Drugs, Addiction, and Mental Disorders
- 181—Drugs and Behavior

- 188—Impulse Control Disorders
Science, Technology, and Public Affairs

- 181—Essentials of Global Health

Sociology

- Soc 60—The Practice of Social Research

- Soc 120T—Special Topics in Culture, Language, and Social Interaction (topic approval required)

- Soc 134E—The Making of Modern Medicine

- Soc 135—Medical Sociology

- Soc 136E—Sociology of Mental Illness: A Historical Approach

- Soc 136F—Sociology of Mental Illness in Contemporary Society

- Soc 138—Genetics and Society

- Soc 143—Suicide

- Soc 159—Special Topics in Social Organizations and Institutions (topic approval required)

Urban Studies and Planning

- 143—The U.S. Health Care System
- 144—Environmental and Preventive Health Issues
- 145—Aging: Social and Health Policy Issues
- 147—Case Studies in Health Care Programs/Poor and Underserved Population

Students may petition to substitute courses in the minor that have substantial content related to health care and society. Petitions should be submitted to the Warren College Interdisciplinary Programs Office.

RECOMMENDED INTERNSHIP EXPERIENCE

A health care related internship (AIP 197) is recommended and should be arranged at least one quarter in advance through the Academic Internship Program, Literature Building, Second Floor, <http://aip.ucsd.edu/>. Clinical and research placements are available.

FACULTY ADVISORY COMMITTEE

Sandra Brown, *Professor, Psychology, Program Director*
Gerald Doppelt, *Professor, Philosophy*
John Evans, *Associate Professor, Sociology*
Leslie Lewis, *Lecturer, Urban Studies and Planning*
Dana Nelkin, *Associate Professor, Philosophy*
Vivian Reznik, *Professor of Pediatrics, School of Medicine*
Andrew Scull, *Professor, Sociology*

Health Law

PROGRAM CODIRECTORS

Susan A. Channick, J.D., *Professor of Law, California Western School of Law*

Bryan Liang, M.D., Ph.D., J.D., *Executive Director and E. Donald Shapiro Distinguished Professor of Law; Institute of Health Law Studies, California Western School of Law; Associate Professor of Anesthesiology, UCSD School of Medicine*

Leonard Deftos, M.D., J.D., LL.M., *Professor of Medicine, UCSD School of Medicine; Physician, VA San Diego Healthcare System; Adjunct Professor of Law, California Western School of Law*

ASSOCIATED FACULTY

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Leonard J. Deftos, M.D., J.D. LL.M., *Professor of Medicine, UCSD School of Medicine; Physician, VA San Diego Healthcare System; Adjunct Professor of Law, California Western School of Law*

Mary Devereaux, Ph.D., *Director, Biomedical Ethics Program, Department of Pathology, UCSD School of Medicine*

Theodore Ganiats, M.D., *Professor, Interim Chair, Department of Family and Preventive Medicine, UCSD School of Medicine*

Robert E. Hertzka, M.D., *Assistant Clinical Professor, Department of Anesthesiology, UCSD School of Medicine*

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Loki Natarajan, *Associate Adjunct Professor, Biostatistics, UCSD School of Medicine*

Rema Raman, Ph.D., *Assistant Adjunct Professor, Biostatistics, UCSD School of Medicine*

Michael Willoughby, Ph.D., C.F.A., *Lecturer, Department of Economics, UCSD*

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PROGRAM DESCRIPTION

The Master of Advanced Studies (M.A.S.) in Health Law is a joint-degree offering from UC San Diego and California Western School of Law. The program was developed in response to the increasing need to equip professionals from the health care and legal disciplines with a more complete understanding of

the best scientific, ethical, regulatory, and management practices. As medical decisions grow more complicated and far-reaching, the intersection of legal and medical/health care practices will be one of the most critical focal points of society for decades to come. Managed care, advances in medical treatment and biotechnology, issues of access, and bioethics all absorb the attention of our regulatory, legislative, and judicial systems. Health care and legal professionals will need to have the specialized skills and training to be effective and influential in this complex environment.

Led by select faculty from the School of Medicine at UC San Diego and California Western School of Law, the rigorous and timely graduate-level curriculum is designed to orient professionals to the common activities, philosophy of practice, and challenges of the companion discipline in health care or law. The program focuses on acculturating practitioners in both fields to become leaders in providing integrated, sensitive solutions to everyday practice and policy issues.

ADMISSION

New students are admitted in the fall quarter of each academic year. Prospective candidates should submit an official UCSD on-line graduate application for admission, the application fee, one set of official transcripts from each institution attended after high school, three letters of professional letters of recommendation, and a current résumé or c.v. The GRE/GMAT is not required; however, it is strongly recommended that candidates possess, or currently be pursuing, a graduate degree in a scientific or health care related field and also have some level of experience in scientific or clinical research. In some instances candidates without an advanced degree may be admitted to the joint-degree program if they have demonstrated substantial professional experience in the field at increasing levels of responsibility. The application deadline is April 2.

PROGRAM OF STUDY

The part-time master's degree program is designed to be completed in eighteen months to two or three years, depending upon a participant's time to devote to the program. Responsibility for course offerings is shared between UC San Diego School of Medicine and California Western School of Law and students will be expected to enroll in courses at both institutions. Classes are typically held in the late afternoons or evenings, to allow flexibility for participants' home and work life. The forty-five-unit degree comprises fifteen units of required courses, twelve units of core courses, twelve units of general electives, and six units of a capstone project.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

REQUIRED COURSES (FROM UCSD)

HLAW 201. Introduction to Medical/Health Care Practice (3)

This overview for the non-medical professional examines the environment in which the medical practitioner must manage the patient relationship and deal with legal concerns. Topics include patient safety and privacy, medical technology and research, pharmaceuticals, and economics. Cases are used. **Prerequisite:** M.A.S. health law student or consent of instructor.

HLAW 207A. Principles in Health Law and Policy A (6)

This course presents a comprehensive view of modern issues at the intersection of healthcare and law, with an emphasis on improving understanding and synergy between the professions. The course stresses foundational understanding of how health law and policy is formulated and the application of health law and policy in current practice. A portion of the class is devoted to group work where students select and study issues in depth to build a framework for resolving enduring challenges in the field. A variety of timely topics on the health law system and procedures/processes, such as Medicare and MediCal coverage, are introduced to reinforce understanding. Students who have taken HLAW 202A–C, HLAW 203A–C, or HLAW 204A–C may not receive credit for HLAW 207A. **Prerequisite:** M.A.S. health law student or consent of department.

HLAW 207B. Principles in Health Law and Policy B (6)

This course presents a comprehensive view of modern issues at the intersection of healthcare and law, with an emphasis on improving understanding and synergy between the professions. The course stresses foundational understanding of how health law and policy is formulated and the application of health law and policy in current practice. A portion of the class is devoted to group work where students select and study issues in depth to build a framework for resolving enduring challenges in the field. A variety of timely topics on the health law system and procedures/processes, such as Medicare and MediCal coverage, are introduced to reinforce understanding. Students who have taken HLAW 202A–C, HLAW 203A–C, or HLAW 204A–C may not receive credit for HLAW 207B. **Prerequisite:** HLAW207A, M.A.S. health law student, or consent of department.

HLAW 296A. Independent Study Project Proposal (2)

As part of preparing for the independent study project, each student must prepare a proposal based on a topic of research interest directly relevant to health law. The proposal will consist of an integrative literature review and a proposal for an applied research project based on the chosen topic. **Prerequisite:** admission to the M.A.S. in Health Law Program or consent of the department.

HLAW 296B. Independent Study Project in Health Law (4)

The independent study project is the cornerstone of the M.A.S. Program. Students will be involved in a high-level applied research project that integrates what they have learned in their formal course work. The project will be an independent and creative scholarly activity in an area of health law related to one or more of the topics covered in the formal curriculum. Students' work will be evaluated by a committee of faculty and may also include industry advisors when appropriate. **Prerequisites:** admission to the M.A.S. in Health Law Program or consent of department; HLAW 296A.

PRESCRIBED ELECTIVES (FROM UCSD)

HLAW 205A. Bioethics Seminar—Clinical Focus A (2)

This seminar examines bioethical concerns and considerations from a clinical perspective. Using medical literature and case law, topics such as bioethics principles, informed consent, technology and reproduction, surrogacy, fetal rights, and the right to die are presented and discussed. **Prerequisite:** M.A.S. health law student or consent of instructor.

HLAW 205B. Bioethics Seminar—Clinical Focus B (2)

The seminar broadens the focus on the patient/doctor relationship and medical ethical issues in healthcare policy at the national and global levels. Topics include allocation of scarce medical resources; compulsory public health measures; clinical research in the developing world; and cross-cultural medical practice. **Prerequisite:** M.A.S. health law student or consent of instructor.

LHCO 205. Modern Health Care Organizations (4)

Describes and analyzes the dynamics responsible for the change in health care delivery and effects on development of modern health care organizations. Describes actions taken by employers, insurers, consumers, and government, and analyzes the effects on physicians and provider organizations. **Prerequisite:** M.A.S. health law student or consent of instructor.

LHCO 206. Topics in Financial Management/ Decision-Making in Health Care (2)

Presents real-life applications in health care provider organizations of financial management and decision-making. Topics include budgeting, uses of financial reports, development of long-range forecasts, benchmarking, business plan development, and actuarial analysis in projecting health care delivery costs. **Prerequisite:** M.A.S. health law student or consent of instructor.

LHCO 213. Financial Accounting and Analysis (2)

Students will learn the use of financial information within a healthcare organization. Topics covered will include capital structure, working capital and cash management, the time value of money, and capital budgeting. Students who have taken LHCO 208 may not receive credit for LHCO 213. **Prerequisite:** admission to the M.A.S. in the leadership of healthcare organizations program or consent of department.

HLAW 208. Influencing Public Policy (2)

Students will learn the basic policy framework in the U.S. (i.e., the "legal process") and points at which this framework can be influenced to formulate public policy in healthcare. **Prerequisite:** M.A.S. health law student or consent of department.

GENERAL ELECTIVES

Varies. Refer to list of elective courses from UCSD and California Western School of Law.

History

PROFESSORS

Robert S. Edelman, Ph.D.
Joseph W. Esherick, Ph.D., *Hsiu Professor of Chinese Studies, Hwei-Chih and Julia Hsiu, Endowed Chair in Chinese Studies*
Takashi Fujitani, Ph.D.
Thomas Gallant, Ph.D., *Nicholas Family Endowed Chair, Modern Greek History*
David M. Goodblatt, Ph.D., *Endowed Chair, Judaic Studies*
David G. Gutiérrez, Ph.D.
Deborah Hertz, Ph.D., *Herman Wouk Endowed Chair in Modern Jewish Studies*
Judith M. Hughes, Ph.D.
Christine F. Hünefeldt, Ph.D., *Director, Center for Iberian and Latin American Studies*
John A. Marino, Ph.D., *Chair*
Michael P. Monteón, Ph.D.
Naomi Oreskes, Ph.D., *Provost, Sixth College*
Michael E. Parrish, Ph.D.
Paul G. Pickowicz, Ph.D., *Endowed Chair, Modern Chinese History*
William H. Propp, Ph.D., *Endowed Chair, Harriet and Louis Bookheim Professor of Biblical and Related Languages*
Stefan A. Tanaka, Ph.D.
Eric Van Young, Ph.D.
Robert S. Westman, Ph.D.

ASSOCIATE PROFESSORS

Luis Alvarez, Ph.D.
Frank Biess, Ph.D.
Nancy Caciola, Ph.D.
Tal Golan, Ph.D.
Hasan Kayali, Ph.D.
Rachel Klein, Ph.D.
Weijing Lu, Ph.D.
Rebecca Jo Plant, Ph.D.
Jeremy Prestholdt, Ph.D.
Michael Provence, Ph.D.
Pamela B. Radcliff, Ph.D.
Sarah Schneewind, Ph.D.
Nayan B. Shah, Ph.D.
Cynthia M. Truant, Ph.D.
Daniel L. Widener, Ph.D.

ASSISTANT PROFESSORS

Catherina M. Gere, Ph.D.
Mark Hanna, Ph.D.
Mark Hendrickson, Ph.D.
Todd A. Henry, Ph.D. (In Residence), Professorship is supported by a grant from the Korea Foundation.
Nancy H. Kwak, Ph.D.
Everard Meade, Ph.D.
Patrick Patterson, Ph.D.

ADJUNCT FACULTY

Michal Belknap, Ph.D., *Earl Warren Professor of Law, California Western School of Law*
Amy Bridges-Kronick, Ph.D., *Professor, Political Science*
Suzanne Cahill, Ph.D., *Adjunct Professor*

Paul Drake, Ph.D., *Professor, Political Science and Institute of the Americas Chair for Inter-American Affairs; Senior Vice Chancellor, Academic Affairs*
Steve Erie, Ph.D., *Professor, Political Science*
Peter H. Smith, Ph.D., *Professor, Political Science and Simón Bolívar Chair in Latin American Studies*

LECTURER WITH POTENTIAL SECURITY OF EMPLOYMENT

Jane Kuo, Ph.D.

PROFESSORS EMERITI

Guillermo Cespedes, Ph.D.
Stanley A. Chodorow, Ph.D.
Gabriel Jackson, Ph.D.
David Luft, Ph.D.
Thomas A. Metzger, Ph.D.
Allan Mitchell, Ph.D.
Alden A. Mosshammer, Ph.D.
Edward Reynolds, Ph.D.
David R. Ringrose, Ph.D.
Martin J. S. Rudwick, Ph.D.
Ramón Eduardo Ruíz, Ph.D.

EMERITUS LECTURER WITH SECURITY OF EMPLOYMENT

Ping C. Hu

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THE UNDERGRADUATE PROGRAM

"Whereas other subjects may make us smarter for next time," said the great historian of the Renaissance, Jakob Burckhardt, "the study of history makes us wiser forever." History prepares students for careers in law, government, diplomacy, international business, nonprofit administration, and education. But history is also good preparation for any other field that requires assessing evidence and making written and oral arguments, fields including engineering, medicine, and entrepreneurship. Moreover, history opens the mind to the full range of the human experience as it has unfolded over the ages. As an academic discipline at the crossroads of the humanities, the arts, and the social sciences, history is a unique gateway to the richness of the American cultural heritage, to the immense variety of world civilizations, and to understanding what has happened in the past and why.

To declare a major in history, consult with the undergraduate student affairs advisor on the fifth floor of H&SS. In selecting your field of emphasis, you may also consult with the director of undergraduate studies or other faculty members. The fields of emphasis are as follows: Africa (HIAF), East Asia (HIEA), Europe (HIEU), Near East (HINE), Latin America (HILA), History of Science (HISC), United States (HIUS); as well as the following three thematic fields: gender and sexuality; race, ethnicity, and migration;

and war, revolution, and social change. A list of courses approved for the thematic fields is available in the department office or on its Web site <http://history.ucsd.edu>. In special cases, upon approval of the director of undergraduate studies, students may devise a different field of emphasis (e.g., economic, legal, or social history).

The department also administers the following special research and instructional units: Chinese Studies; Judaic Studies; and the Committee on Area and Ethnic Studies and Research (CAESAR), which includes Classical Studies, European Studies, German Studies, Italian Studies, Japanese Studies, Middle East Studies, and Russian and Soviet Studies.

The department is fortunate in having the research and professional activities of its faculty supported by the Laura and John Galbraith Faculty Development Fund.

Basic requirements for the major are as follows:

1. Three lower-division courses in history.

Lower-division courses may be selected from the following:

HILD 2 A-B-C. United States History

HILD 7 A-B-C. Race and Ethnicity in the U.S.A.

HILD 10-11-12. East Asia

Majors may also satisfy the lower-division requirement by completing the Revelle College Humanities Sequence or the Eleanor Roosevelt College Sequence "Making of the Modern World." Majors may petition to fulfill all or part of the lower-division requirement with AP credit in history or courses from another school.

2. Twelve four-unit upper-division courses, distributed as follows:

- a. At least three courses in the field of emphasis.
- b. At least three courses in other fields within the department.
- c. Three of the twelve courses must focus on the period before 1800, indicated by the (+).
- d. At least one of the twelve courses must be a colloquium in which students write a substantial term paper. Colloquia are courses with numbers between 160 and 190, or others approved by the undergraduate advisor. Note: the colloquium need not be in the major field of emphasis.

Students majoring in history will normally take at least eight of their twelve upper-division history courses at UC San Diego. Exceptions may be made for transfer students and for students participating in the EAP/OAP program.

Special independent study courses, such as HITO 198, Directed Group Study, and HITO 199, Independent Study, are available, especially for students interested in the Honors Program and in graduate study.

With the exception of 199 courses, all work in the major must be taken for a letter grade. Of the twelve upper-division courses required in the major, no more than two may be History 199 credits. Exceptions to these rules may be approved by the director of undergraduate studies.

Established in 1983, the Armin Rappaport Memorial Fund endows an annual prize for the best

graduating student in the major. The recipient of the award is announced at every June commencement.

THE HONORS PROGRAM

The department offers a special program for outstanding students. The Honors Program is especially recommended for those students interested in pursuing graduate study in history or allied fields. It is also a particularly effective preparation for professional careers. Candidates for History Honors are chosen during the spring quarter from among juniors in history who have taken at least four upper-division courses in the department. Juniors with a 3.5 GPA in history (3.0 overall) are eligible to apply. Admission to the program is based on the student's academic work. Interested candidates should complete the application form (available in the Department of History office) by the second Friday of May.

In addition to regular course work in the department, the Honors Program consists of a colloquium in historiography offered in the fall quarter of the senior year and a program of independent study leading to the completion of an honors essay on a topic of the student's choice. During the fall quarter of the senior year, candidates select a topic and begin preliminary work on the Honors essay in consultation with a major field advisor (HITO 194). During the winter quarter the student pursues a course of independent study devoted to the completion of the Honors essay (HITO 195). The award of History Honors is based on satisfactory completion of the colloquium in history and the Honors essay. Students are expected to maintain an average of 3.5 or better in all work taken within the department. Honors candidates must include at least three colloquia in their regular course work.

Candidates for history honors should organize their upper-division course work as follows:

1. Six quarter-courses in one of the major fields offered by the department.
2. Three quarter-courses in a field other than the primary one.
3. Three of these nine quarter-courses must be colloquia.
4. HITO 196. Colloquium in History.
5. HITO 194 and 195. History Honors—Honors Essay.

MINORS IN HISTORY

The minor consists of at least seven courses, five of which must be upper-division. Although there is no specific distribution requirement, the courses should be selected to constitute a coherent curriculum. No more than two upper-division courses applied to a minor may be taken for Pass/Not Pass. Prospective minors in history should consult with an undergraduate advisor for approval of their program.

EDUCATION ABROAD PROGRAM

History majors are encouraged to participate in the UC Education Abroad Program (EAP) or UCSD's

Opportunities Abroad Program (OAP), while still making progress toward completing their major. Students considering this option should discuss their plans with the departmental Educational Abroad faculty advisor before going abroad, and courses taken abroad must be approved by the department. (For more information on departmental procedures for study abroad see undergraduate program <http://history.ucsd.edu>.) EAP is detailed in the Educational Abroad Program of the *UC San Diego General Catalog*, or visit <http://programsabroad.ucsd.edu>. Financial aid is applicable to study abroad, and study abroad scholarships are available. Interested students should contact the Programs Abroad Office in the International Center.

THE GRADUATE PROGRAM

THE MASTER'S PROGRAM

The M.A. program is designed to introduce students to the basic skills of historical research as well as to the debates about, and the approaches to, historical scholarship in a specific field. Master's students ordinarily do not receive financial aid from the department or the university except when funds are not utilized for support of Ph.D. candidates.

The department offers M.A.s in European history, United States history, and history of science. In addition, the Department of History administers an interdisciplinary M.A. program in Judaic studies. Students interested in pursuing an M.A. degree in Latin American history are encouraged to apply for admission to the Latin American Studies program. The department also offers the opportunity for students to design special M.A. programs in areas such as African history or medieval European history. In consultation with an appropriate faculty member, students may petition the department for approval of a special M.A.

Admissions

Admission is based on the applicant's undergraduate preparation; previous graduate work, if any; three letters of recommendation; one or two papers (preferably written for history courses); and scores from the Graduate Record Examination (GRE). The GRE subject exam in history is not required. The Test of English as a Foreign Language (TOEFL) is required for foreign applicants. A minimum score of 550 for the paper-based test, a score of 213 for the computer-based test, or a score of 80 on the Internet-based test is required on the TOEFL. The minimum grade-point average for admission is 3.0 with a higher average in history and related subjects. Refer to the online application for filing deadline.

For online application visit <http://ogs.ucsd.edu/>.

General Requirements

The master's program can be completed in one year of full-time study or two years of half-time study, and includes nine four-unit courses (thirty-six units) in a major field. Required courses vary for each major field (see below), but all courses must be taken for a letter grade. With very few exceptions, students are expected to begin their programs in the

fall quarter. In addition to the course requirements, completion of the M.A. degree requires that students pass a one-hour oral examination at the end of their final quarter of enrollment.

Language requirement: While proficiency in a foreign language is only required in European history (see below), prospective applicants are strongly urged to begin study of a foreign language appropriate to the proposed area of concentration as early as possible in their academic career.

Area of Concentration: Judaic Studies

Judaic Studies is an interdisciplinary program that allows students interested in many areas to build a coordinated graduate program leading to an M.A. Courses that count toward the degree may be in a wide array of university programs and departments, including history, literature, anthropology, political sciences, sociology, and philosophy.

1. Admission Requirements

- a. B.A. or equivalent.
- b. Two years of course work in the language or languages appropriate to the field of Judaic studies.
- c. Applicants should apply through the Department of History.

2. Degree Requirements

- a. The M.A. degree will be granted for thirty-six credits, ordinarily completed in one or two years.
- b. Students may enroll in no more than two undergraduate courses. All courses should be approved by the faculty mentor of the student.

Area of Concentration: Europe

Candidates for the M.A. degree in European history pursue a program concentrating on the history of early modern and modern Europe. Some training in a discipline other than history is also recommended. The requirement of nine courses (thirty-six units) is normally distributed as follows:

1. A two-quarter research seminar, either HIGR 230 or 231.
2. Cross-field historiography course: HIGR 200.
3. European historiography courses: HIGR 220, 221, and/or 222. Each year one to two of these historiography courses are offered, and the student must take these.
4. Two courses in pre-industrial Europe, 1450–1750: HIGR 220 and 221, or HIGR 230 may be counted for this distribution requirement.
5. Two courses in industrial Europe since 1750: HIGR 221, 222, or HIGR 231 may be counted for this requirement, as well as appropriate graduate level colloquia.
Note: HIGR 221 may NOT be used for both (3) AND (4).
6. One course in a discipline other than history, if relevant to the student's program.
7. The remaining courses may be chosen, in consultation with the graduate advisor in the student's

field, from among the available undergraduate/graduate colloquia (#260S–280S).

Language requirement: M.A. candidates in European history must demonstrate reading competency in one European language other than English.

Area of Concentration: History of Science

The master's program in history of science provides a broad background in preparation for a variety of careers related to science and technology, business, journalism, education, government, or for more advanced degree work. The nine courses (thirty-six units) required are normally distributed as follows:

1. Two courses in science in early modern Europe.
2. Two courses in science since 1750.
3. A two-quarter research seminar.
4. The remaining courses are chosen in consultation with the faculty in history of science. For students whose previous training has been mainly scientific, these will include courses in historical fields other than the history of science. For students who already have historical training, they may include one or more courses related to the sciences.

Area of Concentration: Latin America

This program offers the student a general preparation in the history of Latin America. Students will have the opportunity to specialize in national or colonial periods and can emphasize work in one country. Advanced work in another discipline related to Latin America may also be included in the program. Thirty-six units normally should be distributed as follows:

1. HILA 267, 268, 269
2. Three graduate courses in Latin American history
3. Three other courses related to Latin America in history or in other disciplines

Area of Concentration: United States

This area of concentration offers the M.A. candidate a broad grounding in the literature of American history from the colonial period to the present. In addition to a shared core of courses, students specialize in a topical field of their own choosing. Training in a related discipline outside of history is encouraged. The requirement of nine courses (thirty-six units) is ordinarily distributed as follows:

1. HIGR 265A-B-C. The Literature of American History. These colloquia are required of all entering graduate students in American history.
2. A two-quarter research seminar.
3. Two courses in a single topical field chosen from African-American history, Asian American history, Atlantic history, history of the borderlands and Southwest, Chicano history, economic history, legal and constitutional history, political history, social and cultural history, history of the South, history of the West, or history of women, gender, and sexuality.

4. Two additional courses chosen in consultation with the student's advisor. These courses may be in a related field outside the department.
5. At least six of the nine courses must be colloquia or graduate-level courses. Students may take conjoined courses, directed readings, research seminars, or the 265 series to meet this requirement.

PH.D. PROGRAM

Admission

The Department of History offers the doctor of philosophy degree in the fields of ancient history, East Asian history, European history, history of science, Latin American history, Middle Eastern history, and United States history. Applicants must indicate to which of these programs they seek admission.

Admission is based on the applicant's undergraduate preparation; previous graduate work, if any; three letters of recommendation; one or two writing samples (preferably written for history courses); and scores from the Graduate Record Examination (GRE). The GRE subject exam in history is not required. The Test of English as a Foreign Language (TOEFL) is required for foreign applicants. A minimum score of 550 for the paper-based test or a score of 213 for the computer-based test is required on the TOEFL. The minimum grade-point average for admission is 3.0 with a higher average in history and related subjects. With very few exceptions, students are expected to begin their programs in the fall quarter.

In most areas of concentration, knowledge of at least two foreign languages will be required during a student's academic career. In general, applicants are expected to have a reading knowledge of the languages most appropriate to their major field at the time of admission. Thus, students in ancient history, East Asian history, European history, history of science, Latin American history, and Middle Eastern history should have a working knowledge of *at least* one foreign language at the time of admission. Refer to the online application for filing deadline.

For online application visit: <http://ogs.ucsd.edu/>

Fields of Study

Each student will pursue a major field within one of the Ph.D. programs, and two minor fields. The first minor field can be a supplementary field within their program (e.g., medieval Chinese history for a modern Chinese historian), while the second minor field is usually chosen from outside the geographical area or outside the discipline. During the first two years, the student should identify a special area of interest in the major field to pursue a dissertation project.

I. Ancient History

Students in ancient history will be expected to demonstrate a broad mastery of the entire field, with special concentration as follows:

1. Major Fields
 - a. The history of Israel in the biblical period
 - b. The history of the Jewish people in antiquity
2. First Minor

- a. One of the fields listed above not chosen as the major field
 - b. Greek and Roman history
 - c. The Middle East before Islam (western Asia and northeastern Africa from the sixth century B.C.E. to the seventh century C.E.)
3. Second Minor
 - a. A field of history outside of ancient history
 - b. A related discipline, offered through another department
 4. Language Requirements

- a. All students will be expected to demonstrate a reading knowledge of two modern foreign languages, usually French and German. This requirement may be satisfied by any of the means recognized by the department.
- b. All students will be expected to demonstrate a reading knowledge of at least one and usually two of the three following ancient languages: Greek, Hebrew, and Latin. The languages will be chosen as appropriate to the student's particular interests and the requirement will be satisfied by departmental examination.
- c. The second and sometimes third language not elected under (2) may be required if necessary for the student's research. Additional languages, such as Akkadian, Aramaic, Egyptian, Ugaritic, Phoenician, and middle and modern Hebrew, may be required as necessary for the student's research. The required level of competence will be set as appropriate to the student's needs and the requirement will be satisfied by departmental examination.

5. Core Courses

HIGR 255 Historical Scholarship in Ancient History

HIGR 260 Research Seminar in Ancient History (two quarters)

II. East Asian History

Students in East Asian history will be expected to demonstrate a broad competence in the entire field, with special concentration as follows:

1. Major Fields

- a. Modern China
- b. Modern Japan
- c. Pre-modern China

2. Minor Fields

Students majoring in modern Chinese history will be expected to pass three minor fields for a broad perspective on East Asian history:

- a. Pre-modern Chinese history
- b. Modern Japanese history
- c. A history field outside of East Asia, or a discipline outside of history

For students majoring in Japanese history:

- d. A field in history
- e. A related field offered through another department

Note: One of the minor fields must not focus exclusively on East Asia.

Students majoring in pre-modern Chinese history will pass three minor fields:

- g. Modern Chinese history
- h. Pre-modern history of another area

- i. One of modern Japanese history; a relevant field outside of East Asia; or a discipline outside of history
3. Language Requirements
For students majoring in Chinese history: students must demonstrate a reading knowledge of Chinese and a reading knowledge of a second foreign language related to the student's research interests.

For students majoring in Japanese history: students must demonstrate a reading and speaking knowledge of Japanese. Depending on specialization, reading knowledge of a second foreign language might be necessary.

Students majoring in pre-modern Chinese history must demonstrate proficiency in Chinese, classical Chinese, and another relevant Asian or European language.

4. Core Courses

For Chinese history students:

HIGR 210: Historical Scholarship on Modern Chinese History (three quarters)

HIGR 211: Historical Scholarship on Modern Japanese History (two quarters)

HIGR 212: Historical Scholarship on Modern East Asian History

HIGR 213: Sources on Modern Chinese History

HIGR 215A-B: Research Seminar in Modern Chinese History

HIGR 217A-B-C: Historical Scholarship on Pre-Modern Chinese History

For Japanese history students:

HIGR 211: Historical Scholarship on Modern Japanese History (two quarters)

HIGR 212: Historical Scholarship on Modern East Asian History

HIGR 214: Readings in Japanese on Modern Japan

HIGR 216A-B: Research Seminar in Modern Japanese History

III. European History

The graduate program in European history aims to achieve a dual objective: to develop a broad mastery of the major themes and scholarship in the field, as well as to encourage a special focus of research within a single nation or region in either the modern or early modern era.

1. Major Fields

Within the major field, national specialization is offered in modern Germany, Spain, Russia and Greece, and in early modern Italy and France. Regional specialization is offered in central/eastern Europe and in the Mediterranean.

- a. Modern Europe
- b. Early modern Europe

2. First Minor Field

The first minor field should be selected from within the parameters of European history, but in

a chronological period outside that of the major field.

- a. Ancient Mediterranean
- b. Medieval Europe
- c. Early modern Europe
- d. Modern Europe
- e. A second national history

3. Second Minor Field

The second minor field is designed either to develop a non-European teaching expertise or to pursue broader theoretical reading related to the research interests of the student.

- a. A geographical area outside Europe
- b. History of science
- c. A transnational thematic or theoretical concentration, such as gender history, citizenship, nationalism, etc.
- d. A thematic or theoretical concentration rooted in another discipline, such as anthropology, sociology, art history, ethnic studies, or literature.

4. Language Requirement

All European Ph.D. students must show reading proficiency in two European languages other than English.

5. Core Required Courses

HIGR 200: History and Social Theory

HIGR 220: Historical Scholarship on European History, 1500–1715

HIGR 221: Historical Scholarship on European History, 1715-1850

HIGR 222: Historical Scholarship on European History Since 1850

HIGR 230A-B: Research Seminar in Early Modern Europe

HIGR 231A-B: Research Seminar in Modern Europe

IV. History of Science

Note: Students should indicate whether they are also applicants for admission to the interdepartmental program in Science Studies (history, philosophy, and sociology of science).

1. Major Fields

- a. Science in early modern Europe
- b. Science in the eighteenth and nineteenth centuries
- c. Science in the twentieth century
- d. Another field of comparable breadth, defined in consultation with the major field advisor

2. First and Second Minor Fields (any two of the following may be selected, in consultation with the major field advisor).

- a. Science Studies (mandatory for students in the Science Studies program).
- b. Any of the other fields offered by the department, provided that it offers general historical understanding of the same period as the major field.
- c. A field of history of science not chosen as the major field.

- d. A second field of history, provided that it concentrates on a period or region other than that chosen for the first minor field.
- e. A related discipline, offered through another department. **Note:** This field may be in the physical or life sciences.

3. Language Requirement

Competency in one or two languages in addition to English before advancement to candidacy is required. The requirement will vary depending on chosen major field.

4. Core Required Courses

HIGR 236A-B: Seminar in History of Science

HIGR 238: Introduction to Science Studies

HIGR 239: Seminar in Science Studies

HIGR 240: Colloquium in Science Studies

HIGR 241: Advanced Approaches to Science Studies

V. Latin American History

Doctoral candidates in Latin American history are expected to gain a broad chronological and geographical mastery of the field as a whole. The oral examination in the major field, while concentrating on the student's special area of interest, will be a comprehensive examination covering the whole field of Latin American history.

1. Major Fields

- a. The national period of Latin America, with a specialty in the Andean Republics, Brazil, the Caribbean, Mexico, or the Southern Cone countries
- b. Colonial Latin America, with an emphasis on one major region

2. First Minor

The student should select either the national period or the colonial period as a chronological supplement to the major.

3. Second Minor

- a. The history of another geographic area outside Latin America and the Caribbean
- b. An area of discipline, offered through another department, related to the student's dissertation or preparation for university teaching

4. Language Requirement

Competency in two languages in addition to English before advancement to candidacy is required. Normally the first of these will be Spanish. The second may be Portuguese or another European or non-European language, including an indigenous language of the Americas.

5. Core Required Classes

HIGR 200: History and Social Theory

HILA 267/268/269: Seminar in the Literature of Latin American History

HIGR 247A-B: Readings and Seminar on Colonial Latin America

HIGR 248A-B-C: Readings and Seminar on Latin America, National Period

VI. Middle Eastern History

The objective of the doctoral program in Middle Eastern history is to achieve broad expertise in the modern history of the Middle East and to develop a special focus in the history of the late Ottoman Empire or its successor states.

1. Major Fields
 - a. Late Ottoman history (approximately 1780 to 1920)
 - b. Colonial and national period of the post-Ottoman Middle East with a specialty in the Arab East, Turkey, Egypt, etc.
2. Minor Fields
Any two of the following:
 - a. The field of Middle Eastern history not chosen as a major field (see above)
 - b. The modern history of a geographic area outside of the Middle East (ordinarily in European history)
 - c. A related geographical or topical field (e.g., medieval Middle East, Iran, gender studies) offered through another department
3. Language Requirement
Students must possess a sound foundation in reading Arabic or Turkish (Ottoman Turkish or modern Turkish) as a requirement for admission to the program. Reading competence in two languages in addition to English is required before advancement to candidacy: the regional language Arabic or Turkish (above), and a modern European language (other than English) related to the major field of specialization.
4. Core Required Classes
HIGR 275A-B: Research Seminar in Middle Eastern History

VII. United States History

1. Major Fields
 - a. United States History
2. First Minor
 - a. One of the following topical fields: African-American history, Asian-American history, Atlantic history, history of the borderlands and Southwest, Chicano history, economic history, legal and constitutional history, political history, social and cultural history, history of the South, history of the West, or history of women, gender, and sexuality, or one designed in consultation with the advisor
3. Second Minor
 - a. A geographic area outside the United States in either the premodern or modern period
 - b. A related discipline offered through another department
4. Language Requirement
Competency in one language in addition to English before advancement to candidacy is required.
5. Third-Year Seminar
U.S. History students are encouraged in their third year of study to complete HIGR 271: New Research Directions in U.S. History.

6. Core Courses

- HIGR 200: History and Social Theory
HIGR 265A-B-C: The Literature of American History
HIGR 267A-B: Research Seminar in United States History
HIGR 271: New Research Directions in U.S. History

VIII. Dual Degree Program

Students who wish to earn both the Ph.D. in history from UC San Diego and the Juris Doctor from California Western School of Law must apply to and be independently accepted into both programs under each of the campus' standards and procedures.

Students pursuing the dual degree program will normally alternate years at each institution, in a manner agreed on by the student's advisors and appropriate committees. Thus, for example, a student may spend his or her first year at Cal Western, his or her second year at UCSD, and so on through the program. At least one year at each institution must be completed by the end of three years.

Each institution will accept a small number of course credits from the other institution to satisfy its degree requirements. Cal Western remains on a semester system, while UCSD continues on a quarter system. With the exception of the historiography and research seminars and subject to approval by a faculty advisor and the graduate committee, the Department of History will accept for credit up to two classes from Cal Western.

IX. Other Fields

Students may be admitted to graduate study leading to the Ph.D. in fields other than those listed above upon the recommendation of an appropriate faculty member. In such cases, a special program of study appropriate to the field will be devised by the major field advisor, subject to the approval of the department's graduate committee.

Note: The department also offers graduate work in African history. When appropriate, students may select a minor field in this area.

Ph.D. Course Work

A normal full-time program consists of twelve units (or three four-unit courses) per quarter. Ph.D. students are expected to complete at least one of the following minimum formal courses of study prior to their qualifying examination: (1) two two-quarter research seminars, three one-quarter historiography courses in their major field, and five other courses (which may be a combination of colloquia, conjoined courses, or directed readings, but which must include one cross-field graduate colloquium like HIGR 200); or (2) three two-quarter research seminars (not necessarily in the same field), three one-quarter historiography courses in their major field, and three other courses (which may be a combination of colloquia, conjoined courses, or directed readings, but which must include one cross-field graduate colloquium like HIGR 200). Students are encouraged to take their first research seminar in their major field during the initial year of graduate

study. After the first year, most students' full-time program includes two regular academic courses each quarter (eight units) and employment as a 50 percent teaching assistant (four units).

Cross-Field Thematic Graduate Colloquia

In addition to the graduate courses offered by the field groups, the department will offer at least one and up to three cross-field colloquia each year, which are designed to cross geographical and chronological boundaries. Two of these courses are taught at least every other year under this rubric:

HIGR 200: History and Theory [required for U.S., Europe, and L.A.]

An introductory graduate course for students in all fields. Themes include cross-field historiography and theory, interdisciplinary approaches to history and historical method. (May be taken twice for credit, if the reading list is significantly different.)

HIGR 205: Feminist Historical Studies

An introduction to feminist historical studies. This course will provide students with training in women's history, in the feminist theories that undergird that scholarship, and in gender analysis. (May be taken twice for credit, if the reading list is significantly different.)

HIGR 207: Nationalism, Colonialism, and Race

A transdisciplinary and comparative course on the interplay of nationalism, colonialism, and race (as well as class and gender/sexuality) in the nineteenth and twentieth centuries.

All Ph.D. students are required to complete at least one cross-field graduate course (typically in the HIGR 200-HIGR 208 series) before advancement to candidacy. Students are strongly encouraged to meet this requirement in their first year, as their field and program of study permits.

Part-time Study

Students who enroll in fewer than twelve graduate or upper-division units per quarter are considered part-time students. Part-time study may be pursued in several master's programs and a few Ph.D. programs at UCSD. Approval for individual students to enroll on a part-time basis may be given for reasons of occupation, family responsibilities, or health. Individuals who are interested in part-time study and meet the above qualifications should see the department's graduate coordinator.

Part-time students must satisfy the same admission requirements as full-time students and are eligible, at the discretion of the department, for 25 percent time teaching or research assistantships. Students who are approved by the dean of Graduate Studies for enrollment in a program of half-time study or less (maximum of six units) may be eligible for a reduction in fees. All other students pay the same fees as full-time students.

Ph.D. and M.A. Language Requirements

Ph.D. candidates in Chinese, European, Middle Eastern, and Latin American history must demonstrate competency in two foreign languages.

Ph.D. candidates in history of science, Japanese, and United States history, as well as M.A. candidates in European and Latin American history, must demonstrate competency in one foreign language.

Ph.D. candidates in ancient history must demonstrate competency in two modern foreign languages as well as the relevant ancient languages.

Ph.D. candidates in Middle Eastern history must possess a sound foundation in reading Arabic or Turkish (Ottoman Turkish or modern Turkish) as a requirement for admission to the program. Reading competence in two languages in addition to English is required before advancement to candidacy: the regional language Arabic or Turkish above, and a modern European language (other than English) related to the major field of specialization.

Additional languages appropriate to the special field of study as well as language requirements for a candidate in a field other than those already mentioned may be required by the graduate committee in consultation with the student's major field advisor.

Students may satisfy the foreign language requirement in one of the following ways:

1. By completing, with a grade of B– or better in each term, a two-year language sequence from the student's undergraduate institution. Such a sequence must have been completed within two years of the time the request is made to the graduate committee for certification of competency.
2. By completing, while as a graduate student, with a satisfactory (S) grade in each term, a two-year, lower-division sequence in the language approved by the graduate committee.
3. By completing, while as a graduate student, with a satisfactory (S) grade in each term, a one-year, upper-division sequence in the language approved by the graduate committee.
4. By passing a translation examination administered by the department. (This is the only option available for Chinese and Japanese.)

Students are urged to complete at least one foreign language examination by the end of the first year of study and must do so by the beginning of their third year. Failure to meet this requirement is grounds for denial of financial support. No student may take the oral qualifying examination before completing all language requirements.

Ph.D. Examinations

A. Minor Fields

Ph.D. candidates are strongly encouraged to take at least one minor field examination by the end of the first year and to complete the second minor exam by the end of the second year. All minor fields must be completed before the major field exam can be taken. Generally, the department recognizes two types of minor fields. The first is a teaching field. That is, passing a minor field in an area certifies, on a student's record and resume, that the student has mastered the literature and the major issues in another geographical or chronological field such that the student is qualified to teach in that area. (An example would be a minor field in modern Japanese

history for an East Asian history student specializing in modern China; or early modern European history for a modern Europeanist.) A second type of minor field is designed to familiarize a student with a range of theoretical, comparative, and/or transnational issues, which will be useful in the formulation of a dissertation topic and future research in the student's major field.

In some cases, this minor field is pursued outside the department (in consultation with the student's advisor): an example might be a minor in the Department of Ethnic Studies for a student working on race and ethnicity in the U.S. In other cases, the student may identify a faculty member or series of faculty members within the department who focus on a particular theme, such as gender, citizenship, or imperialism.

The minor field is defined by a reading list agreed on by the student and the minor field advisor(s). As a guideline, the reading list should encompass about three quarters' worth of course work (which may be taken with up to three faculty members), and include about fifty titles, with forty to seventy titles representing a reasonable range, depending on the combination of books and articles. The list is intended to establish what will be expected of the student and to prevent confusion over the material to be covered. The list should be finalized at the beginning of the quarter during which the student plans to complete the minor field.

Completion or evaluation of a minor field takes several forms, depending on the policies of different field groups or individual professors.

1. A one-hour oral examination.
2. A three-hour or twenty-four-hour take-home written exam.
3. An "un-timed" synthetic essay, twenty-five to thirty pages, that organizes the scholarship of the field.
4. Three shorter papers (eight to ten pages) each encompassing a single quarter's worth of reading. This option is especially appropriate in cases where the student is working with more than one faculty member on a minor field.
5. Developing a course syllabus in the field.

B. The Major Field: Oral Qualifying Examination and Candidacy

Students are normally expected to take their qualifying examination no later than the spring of their third year of study (except as otherwise specified by the individual fields), and required to do so within four years. Students must fulfill all course work, minor field, and language requirements before taking the qualifying examination. The qualifying examination is an oral test in the student's major field of study, conducted by at least five examiners. A minimum of three examiners must be members of the Department of History, and usually they will be in the student's major field. The fourth can be either a faculty member from inside the department but outside the major field, or someone from another department. The fifth must be a tenured faculty member in another department. The student's minor field advisor(s), whether inside the department or

in another department, often serve in this "outside" capacity on the orals committee, although this is not required. Students should consult with their advisor about the composition of the examining committee well before their examination. In addition, the membership of the committee must be approved before the exam by the department chair and the dean of Graduate Studies. The student must meet with the graduate coordinator at least three weeks prior to the orals date to arrange for the submission of this paperwork.

The purpose of the major field oral examination is twofold: 1) to evaluate the student's knowledge of the major research field and 2) to discuss the student's dissertation project (with the exception of the U.S. field, which holds a separate meeting for this purpose, no later than two months after the exam).

The exam lasts between two and three hours, and is structured to give each of the five committee members an opportunity to ask questions of the student, based on the major field reading list. When the prospectus is also under discussion, usually the last half-hour is reserved for this purpose. When the exam is over, the student leaves the room and the committee decides whether the student has passed the exam and advanced to candidacy.

1. The major field book list should be drawn up by the student in consultation with the faculty advisor, and should be finalized at least thirty days before the date of the exam. Each major field list will reflect the unique interests of the student, while also incorporating core themes of the field. Some field groups have formal core lists that may comprise a part of each student's total list, while others do not. In all cases, students are expected to organize their major field lists according to the specific themes/nations/issues that have informed their graduate study, since no major field list can be all-inclusive. The number of titles on a major field list should be around 100, with 80–120 titles representing a reasonable range. The date of the examination is determined by consultation between the candidate and the examining committee.
2. The discussion of the dissertation project will be framed by a five- to ten-page prospectus written by the student and submitted to the committee with the book list, at least three weeks before the exam. The purpose of the discussion is to determine the feasibility of the scope of the project and to offer suggestions about source materials and research strategies.

Should a student fail the examination, the examining committee will clarify the weaknesses in the exam, so that the student can prepare to take it a second time. If a second oral examination is warranted, the department requires that it should be taken no later than one quarter after the first examination. If the student fails the oral examination a second time, his or her graduate studies in the department will be terminated.

An M.A. degree may also be awarded to continuing Ph.D. students upon successfully passing the oral qualifying examination. The M.A. is not automatically awarded; students must apply in advance to receive the degree, but no additional work is required. **Note:** Students who wish to receive an M.A. degree as part

of the Ph.D. program must apply for master's degree candidacy by the end of the second week of the quarter in which they expect to receive the degree. Please see the graduate coordinator regarding this application.

The various requirements noted above apply to students who have done no previous graduate work in history. If a candidate has completed some graduate work before entering UCSD, appropriate adjustments in course work may be approved by general petition to the graduate committee. Nevertheless, all candidates are required to meet language requirements, pass field examinations, and complete and defend a dissertation.

Dissertation

After completing all relevant examinations and language requirements, the student is expected to write a dissertation under the supervision of his or her faculty advisor and the doctoral committee. The Department of History has established the following guidelines for dissertation work. The dissertation should

- represent an original and significant contribution to knowledge
- be based upon primary research
- clearly demonstrate the capacity of the student to pursue independent historical research
- be written in clear and coherent prose

The scope of the dissertation and its length will depend upon the nature of the problem and the documentation. The department encourages students to complete their research and writing by the end of their sixth year of study. The scope and length of the dissertation should therefore be such that a complete project can be executed in no more than three years, but it should also be capable of further development for publication as a series of articles in scholarly journals, or as a book.

Guidelines for Ph.D. Completion

First Year	All courses must be taken for a letter grade. Research seminar and field group historiography courses. Cross-field graduate colloquium (recommended). One language requirement. Select an advisor in major field. Define major and two minor fields with advisor. Complete one minor field.
Second Year	Second research seminar and remaining field group required courses. Complete language requirement. Complete second minor field.

Third Year If not done so already, complete all minor field exams, language requirements, and course work (twelve four-unit courses required).

Write a dissertation prospectus in preparation for the major field exam.

Pass qualifying exam in major field.

Fourth Year Primary/field/archival research for the dissertation.

Fifth–Seventh Years Writing and completing dissertation.

Note: While students may take an eighth year to complete the Ph.D., they may not receive financial support from the university or the department, including TAs or readerships after the seventh year.

Departmental Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

Financial Support

Upon recommendation of the department, several types of financial aid are available to graduate students: teaching assistantships, readerships, research assistantships, fellowships, and travel grants, and full or partial remission of fees and tuition. Graduate students are eligible for one or a combination of the six forms of financial support.

Entering students who are offered a multi-year financial package are either offered fellowships or readerships, along with fee and tuition remission during their first year, followed by guaranteed employment as a teaching assistant in subsequent years. In some cases, guaranteed dissertation writing funds are part of such a package. Regardless of the initial financial package, the department seeks to ensure that all continuing Ph.D. students are financially supported, usually through TAs. In recent years all students needing support have received either fellowships, teaching assistant, or research assistant positions. To the extent that resources are insufficient to meet the need, the department, on the advice of the graduate committee, will rank students using a combined criterion of academic performance and financial need.

Fellowships, travel grants, and research assistantships are granted by the Office of Graduate Studies (OGS) upon the recommendation of the department. Teaching assistants are appointed by the department upon the recommendation of the graduate committee and by the college writing programs. Readers are appointed by the department upon the recommendation of the professor whose course requires such assistance. At the discretion of the department, half-time graduate students are eligible for 25 percent TAs. Graduate students must maintain a minimum grade-point average of 3.0 to be considered for any type of financial aid. Financial support is not renewed automatically but is approved by the department on a yearly basis.

Departmental policy has been to seek seven years of support for students in the program. The Office of Graduate Studies grants partial remission

of fees for nine quarters after advancement to candidacy ("normative time") if the student is advanced to candidacy by the end of the third year. (If the student delays advancement, the amount of normative time is reduced accordingly.) Upon expiration of normative time the student must complete the dissertation or resume full payment of fees.

Opportunities for Teaching

Undergraduate teaching, for which graduate teaching assistants earn regular academic credit, is an integral part of the graduate program at UCSD. The department considers experience in teaching an important part of a graduate student's professional training. To prepare for an academic career, the Ph.D. candidate is encouraged to assist in courses offered by the department, ordinarily as a course Reader (grader) or Teaching Assistant. A maximum of four units per quarter may be taken in undergraduate teaching.

Readerships are available in a variety of upper-division history courses, while the department offers positions for teaching assistantships in lower-division East Asian and U.S. history courses. Graduate students in other fields usually serve as TAs in the interdisciplinary college programs, such as ERC's "Making of the Modern World," Revelle's "Humanities," Marshall's "Dimensions of Culture," Sixth's "CAT," and the Muir College Writing Program.

Students must maintain a minimum grade-point average of 3.0 in order to receive academic employment on campus.

Job Placement

In recent years, 85 percent of the department's Ph.D. graduates received positions as tenure-track assistant professors at colleges and universities around the country. The remaining 15 percent are currently administrators, visiting scholars, lecturers, or postdoctoral fellows at various educational institutions. Experience indicates that many from this latter group will eventually get professional appointments.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

+ Courses that focus on the period before 1800.

LOWER-DIVISION

HILD 2A-B-C. United States

A year-long lower-division course that will provide students with a background in United States history from colonial times to the present, concentrating on social, economic, and political developments. (Satisfies Muir College humanities requirement and American History and Institutions requirement.)

HILD 7A-B-C. Race and Ethnicity in the United States

Lectures and discussions surveying the topics of race, slavery, demographic patterns, ethnic variety, rural and urban life in the U.S.A., with special focus on European, Asian, and Mexican immigration.

HILD 7A. Race and Ethnicity in the United States (4)

A lecture-discussion course on the comparative ethnic history of the United States. Of central concern will be

slavery, race, oppression, mass migrations, ethnicity, city life in industrial America, and power and protest in modern America.

HILD 7B. Race and Ethnicity in the United States (4)
A lecture-discussion course on the comparative ethnic history of the United States. Of central concern will be the Asian-American and white ethnic groups, race, oppression, mass migrations, ethnicity, city life in industrial America, and power and protest in modern America.

HILD 7C. Race and Ethnicity in the United States (4)
A lecture-discussion course on the comparative ethnic history of the United States. Of central concern will be the Mexican-American, race, oppression, mass migrations, ethnicity, city life in industrial America, and power and protest in modern America.

HILD 10-11-12. East Asia
A lower-division survey that compares and contrasts the development of China and Japan from ancient times to the present. Themes include the nature of traditional East Asian society and culture, East Asian responses to political and economic challenges posed by an industrialized West, and war, revolution and modernization in the twentieth century.

HILD 10. East Asia: The Great Tradition (4)
The evolution of East Asian civilization from the first writing through classical Hei'an Japan and late imperial Song China. Primary and secondary readings on basic ideas, institutions and practices of the Confucian, Daoist, and Buddhist paths and of the state and family.

HILD 11. East Asia and the West, 1279–1911 (4)
From the Mongol conquests to China's last dynasty and Japan's annexation of Korea, this course examines political, institutional, and cultural ruptures and continuities as the East Asian countries responded to the challenges of Western imperialism with defense, reform, conservative reaction and creative imitation.

HILD 12. Twentieth-Century East Asia (4)
Examines the emergence of a regionally dominant Japan before and after World War II; the process of revolution and state-building in China during the Nationalist and Communist eras; and Korea's encounter with colonialism, nationalism, war, revolution and industrialization.

HILD 14. Film and History in Latin America (4)
Students watch films on Latin America and compare them to historical research on similar episodes or issues. Films will vary each year but will focus on the social and psychological consequences of colonialism, forced labor, religious beliefs, and "Modernization."

UPPER-DIVISION

Please note: The following upper-division courses are offered on a regular basis, although not every class is available every year. Check with the department to see what is available each quarter.

AFRICA

Lecture Courses

HIAF 111. Modern Africa Since 1880 (4)
A survey of African history dealing with the European scramble for territory, primary resistance movements, the rise of nationalism and the response of metropolitan powers, the transfer of power, self-rule and military coups, and the quest for identity and unity. **Prerequisite:** upper-division standing.

HIAF 112. West Africa Since 1880 (4)
West Africa from the nineteenth century onwards and examines the broad outlines of historical developments in the sub-region through the twentieth century, including such themes as religious, political, and social changes. **Prerequisite:** upper-division standing.

HIAF 113. Small Wars and the Global Order: Africa and Asia (4)
Examines the traumas, interrelation, and global repercussions of national conflicts ('small wars') in the postcolonial world. Focus on Africa and Asia from the Cold War to the present with particular attention to the intersection of foreign interests, insurgency, and geopolitics. **Prerequisite:** upper-division standing or instructor consent.

HIAF 120. History of South Africa (4)
The origins and the interaction between the peoples of South Africa. Special attention will be devoted to industrial development, urbanization, African and Afrikaner nationalism, and the origin and development of apartheid and its consequences. **Prerequisite:** upper-division standing.

HIAF 122. Traditional African Religions (4)
A study of the meaning, structure, and sources of African traditional religion. The course examines the attitudes of mind and belief and practices which have evolved in many societies in Africa.

HIAF 123. West Africa from Earliest Times to 1800 (4)
Plant and animal domestication, iron-working and the distribution of ethnic/language groups, urbanization, regional and long-distance commerce, and the rise of medieval kingdoms. **Prerequisite:** upper-division standing. +

HIAF 124. Islam in Contemporary African Societies (4)
The spread of Islam in Africa. The rise of Islamic orthodoxy during the eighteenth and nineteenth centuries, and the social movements in the contemporary period geared towards the establishment of Islamic theocracies. **Prerequisite:** upper-division standing.

HIAF 130. African Society and the Slave Trade (4)
Topics include trans-Saharan trade, slavery with African societies, Atlantic slave trade, East African slave trade, problems of numbers exported and profitability, impact of slave trade on African society, and the abolition of the slave trade. **Prerequisite:** upper-division standing.

Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

HIAF 161/261. Special Topics in African History (4)
This colloquium is intended for students with sufficient background in African history. Topics, which vary from year to year, will include traditional political, economic, and religious systems, and theory and practice of indirect rule, decolonization, African socialism, and pan-Africanism. Department stamp required.

HIAF 162/262. The African Diaspora in the Atlantic World (4)
Expose students to the competing paradigms adopted by scholars in the search for an appropriate analytical framework for understanding the African diaspora in the Atlantic world, as well as examine the African impact on Atlantic communities. Graduate students are required to submit an additional paper. **Prerequisite:** upper-division or graduate standing. Department stamp required.

HIAF 199. Independent Study in African History (4)
Directed readings for undergraduates. **Prerequisite:** consent of instructor and academic advisor required.

EAST ASIA

Lecture Courses

HIEA 111. Japan: Twelfth to Mid-Nineteenth Centuries (4)
Covers important political issues—such as the medieval decentralization of state power, unification in the sixteenth and seventeenth centuries, the Tokugawa system of rule, and conflicts between rulers and ruled—while examining long-term changes in economy, society, and culture. +

HIEA 112. Japan: From the Mid-Nineteenth Century through the U.S. Occupation (4)
Topics include the Meiji Restoration, nationalism, industrialization, imperialism, Taisho Democracy, and the Occupation. Special attention will be given to the costs as well as benefits of "modernization" and the relations between dominant and subordinated cultures and groups within Japan.

HIEA 113. The Fifteen-Year War in Asia and the Pacific (4)
Lecture-discussion course approaching the 1931–1945 war through various "local," rather than simply national, experiences. Perspectives examined include those of marginalized groups within Japan, Japanese Americans, Pacific Islanders, and other elites and nonelites in Asian and Pacific settings.

HIEA 114. Postwar Japan (4)
Examines social, cultural, political, and economic transformations and continuities in Japan since World War II. Emphases will differ by instructor. **Prerequisite:** upper-division standing.

HIEA 115. Social and Cultural History of Twentieth-Century Japan (4)
Japanese culture and society changed dramatically during the twentieth century. This course will focus on the transformation of cultural codes into what we know as "Japanese," the politics of culture, and the interaction between individuals and society.

HIEA 116. Japan-U.S. Relations (4)
Survey of relations between Japan and the United States in the nineteenth and twentieth centuries. Although the focus will be on these nation-states, the course will be framed within the global transformation of societies. Topics include cultural frameworks, political and economic changes, colonialism and imperialism, and migration.

HIEA 117. Ghosts in Japan (4)
By examining the roles of ghosts in Japanese belief systems in a non-scientific age, this course addresses topics including folk beliefs and ghost stories, religiosity, early science, tools of amelioration and authoritative knowledge, and the relationship between myth and history. **Prerequisite:** upper-division standing or consent of instructor.

HIEA 119/SOCB 162R. Religion and Popular Culture in East Asia (4)
Historical, social, and cultural relationships between religion and popular culture. Secularization of culture through images, worldviews, and concepts of right and wrong which may either derive from, or pose challenges to, the major East Asian religions. **Prerequisite:** upper-division standing.

HIEA 120. Classical Chinese Philosophy and Culture (4)
The relation of social, political, and economic developments to the philosophical and religious traditions of China c. 1200 B.C. to 400 A.D., including Confucianism, Daoism, Legalism, correlative cosmology, and ideas about fate, spirits, and health. Previous course work on China helpful but not required. **Prerequisite:** upper-division standing or consent of instructor. +

HIEA 121. Medieval Chinese Culture and Society (4)
This course covers the period from the sixth century to thirteenth century, the time of the glorious Tang and Song dynasties. We focus on the "medieval revolution" that changed the political, economic, and social life of the empire. As much as possible we study these changes from the eyes of the people who lived through them—aristocrats, peasants, soldiers, merchants, women. **Prerequisite:** HIEA 120 recommended but not required. +

HIEA 122. Late Imperial Chinese Culture and Society (4)
Using primary and secondary sources, we survey the interactions of ideas and institutions in the commercial economy of China from the tenth through the eighteenth centuries, and consider their impact on the lives of individuals. Previous course work on China helpful but not required. **Prerequisite:** upper-division standing or consent of instructor. +

HIEA 125. Women and Gender in East Asia (4)

The impact of modern transformations on female roles and gender relations in China, Japan, and Korea, focusing on the late imperial/early modern periods through the twentieth-century. **Prerequisite:** upper-division standing or instructor consent.

HIEA 126. The Silk Road in Chinese and Japanese History (4)

This course studies the peoples, cultures, religions, economics, arts, and technologies of the trade routes known collectively as the Silk Road from c. 200 BCE to 1000 CE. We will use an interdisciplinary approach. Primary sources will include written texts and visual materials. We will examine these trade routes as an early example of globalization. **Prerequisite:** upper-division standing or consent of instructor. +

HIEA 128. History of Material Culture in China (4)

Introduction to material culture in China from a historical perspective. Consider Chinese primary sources (including both historical texts and objects) from the point of view of the new interdisciplinary field of material culture studies. **Prerequisite:** upper-division standing. +

HIEA 129. Faces of the Chinese Past (4)

Through the biographies and autobiographies of prominent and ordinary men and women from antiquity to today, this course explores the relation of the individual to social structures, class and gender in personal experience, and the production of primary and secondary sources. **Prerequisite:** upper-division standing or consent of instructor. +

HIEA 130. End of the Chinese Empire, 1800–1911 (4)

From the Opium War to the 1911 Revolution. Key topics include ethnic identity under Manchu rule, the impact of Western imperialism, the Taiping and other rebellions, overseas Chinese, social change and currents of reform, and the rise of Chinese nationalism. **Prerequisite:** upper-division standing or consent of instructor.

HIEA 131. China in War and Revolution, 1911–1949 (4)

An exploration of the formative period of the twentieth-century Chinese Revolution: the New Culture Movement, modern urban culture, the nature of Nationalist (Guomindang) rule, war with Japan, revolutionary nationalism, and the Chinese Communist rise to power. **Prerequisite:** upper-division standing or instructor consent.

HIEA 132. History of the People's Republic of China (4)

This course analyzes the history of the PRC from 1949 to the present. Special emphasis is placed on the problem of postrevolutionary institutionalization, the role of ideology, the tension between city and countryside, Maoism, the Great Leap Forward, the Cultural Revolution.

HIEA 133. Twentieth-Century China: Cultural History (4)

This course looks at how the historical problems of twentieth-century China are treated in the popular and elite cultures of the Nationalist and Communist eras. Special emphasis is placed on film and fiction. **Prerequisite:** upper-division standing or consent of instructor.

HIEA 134. History of Thought and Religion in China: Confucianism (4)

Course will take up one of the main traditions of Chinese thought or religion, Confucianism, and trace it from its origins to the present. The course will explain the system of thought and trace it as it changes through history and within human lives and institutions. **Prerequisite:** upper-division standing or instructor consent. +

HIEA 135. History of Thought and Religion in China: Buddhism (4)

Course will take up one of the main traditions of Chinese thought or religion, Buddhism, and trace it from its origins to the present. The course will explain the system of thought and trace it as it changes through history and within human lives and institutions. **Prerequisite:** upper-division standing or instructor consent. +

HIEA 136. History of Thought and Religion in China: Daoism (4)

Course will take up one of the main traditions of Chinese thought or religion, Daoism, and trace it from its origins to the present. The course will explain the system of thought and trace it as it changes through history and within human lives and institutions. **Prerequisite:** upper-division standing or instructor consent. +

HIEA 137. Women and the Family in Chinese History (4)

The course explores the institutions of family and marriage, and women's roles and experiences within the family and beyond, from classical times to the early twentieth century. **Prerequisite:** upper-division standing or consent of instructor. +

HIEA 138. Women and the Chinese Revolution (4)

Examines women's roles and experiences in the twentieth-century Chinese revolution, the ways in which women participated in the process of historical change, the question of to what extent the revolution "liberated" women from "Confucian tradition." **Prerequisite:** upper-division standing or consent of instructor.

HIEA 150. Modern Korea, 1800–1945 (4)

This course examines Korea's entrance into the modern world. It utilizes both textual and audio-visual materials to explore local engagements with global phenomenon, such as imperialism, nationalism, capitalism, and socialism. HILD 10, 11, and/or 12 recommended. **Prerequisite:** upper-division standing or consent of instructor.

HIEA 151. The Two Koreas, 1945–Present (4)

This course traces the peninsula's division into two rival regimes. It utilizes both textual and audio-visual materials to reveal the varied experiences of North and South Koreans with authoritarianism, industrialization, and globalization. HILD 10, 11, and/or 12 recommended. **Prerequisite:** upper-division standing or consent of instructor.

Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

HIEA 160/260. Seminar in Modern Japanese History (4)

This colloquium examines controversial domestic and international issues in Japanese history from 1850 to recent times. Topics will vary from year to year. **Prerequisite:** department stamp, consent of instructor.

HIEA 162/262. History of Women in China (4)

This course concerns women in Chinese history in Imperial times. This course will focus on women's changing roles in the family, society, and culture. Topics will vary from year to year. Requirements will vary for undergraduate, M.A., and Ph.D. students. **Prerequisite:** upper-division standing.

HIEA 163/263. Cinema and Society in Twentieth-Century China (4)

This colloquium will explore the relationship between cinema and society in twentieth-century China. The emphasis will be on the social, political, and cultural impact of filmmaking. The specific period under examination (1930s, 1940s, post-1949) may vary each quarter. Graduate students will be expected to submit an additional paper. **Prerequisite:** upper-division or graduate standing and department stamp.

HIEA 164/264. Seminar in Late Imperial Chinese History (4)

Pairs primary sources with scholarship built on them to illuminate later imperial state, society, and individual lives, and to show how historians generate and answer questions. Topics vary; may be repeated for credit. Graduate students will be expected to submit an additional paper or project. **Prerequisite:** upper-division or graduate standing and department stamp. +

HIEA 165/265. Topics in Medieval Chinese History (4)

Topics will vary in the history of medieval China. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students will submit a more substantial piece of work with in-depth analysis and with an increased number of sources cited. A typical undergraduate paper would be ten pages, whereas a typical graduate paper would require engagement with primary sources, more extensive reading of secondary material, and be about twenty pages. **Prerequisites:** upper-division or graduate standing and department stamp. +

HIEA 166/266. Creating Ming Histories (4)

The Ming (1368–1644) is often considered expanding Europe's opposite: absolutist, closed, and stagnant. Reading new scholarship in conjunction with its primary sources, we'll explore the period's dynamic politics and competitive society, and the production of historical knowledge. Graduate students will be required to submit an additional paper. **Prerequisite:** upper-division or graduate standing and department stamp.

HIEA 167/267. Special Topics in Modern Chinese History (4)

This seminar examines various domestic and international issues in Chinese history from 1800 to recent times. When topics vary, may be repeated for credit. Graduate students will be required to submit a more substantial piece of work or an additional paper. **Prerequisite:** upper-division standing or consent of instructor.

HIEA 168/268. Topics in Classical and Medieval Chinese History (4)

Chinese society, thought, religion, culture, economy and politics from the Shang through the Song dynasties, through primary and secondary sources. Topics vary; may be repeated for credit. Requirements differ for undergraduate, M.A. and Ph.D. students. Graduate students will be required to submit a more substantial piece of work or an additional paper. **Prerequisite:** upper-division standing or consent of instructor and department stamp. +

HIEA 171/271. Society and Culture in Premodern China (4)

Explores premodern Chinese society and culture through the reading and discussion of classics and masterpieces in history. Examines how values and ideas were represented in the texts and how they differed, developed, or shifted over time. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students are required to submit an additional paper. **Prerequisites:** upper-division or graduate standing, department stamp. +

HIEA 180. Topics in Modern Korean History (4)

This colloquium will examine selected topics in modern Korean history through both primary sources (in translation) and secondary sources. Topics will vary year to year. **Prerequisites:** upper-division standing and departmental stamp.

HIEA 199. Independent Study in East Asian History (4)

Directed reading for undergraduates under the supervision of various faculty members. **Prerequisite:** consent of instructor required.

EUROPE

See History of Science for more European courses (HISC 101ABC, HISC 106).

Lecture Courses**HIEU 101. Greece in the Classical Age (4)**

The social, political, and cultural history of the ancient Greek world from the Persian Wars to the death of Alexander the Great (480–323 B.C.). +

HIEU 101A. Ancient Greek Civilization (4)

The social, political, and cultural history of the ancient Greek world from the earliest settlements to the empire of Alexander the Great (c. 2000–323 B.C.). **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 102. The Roman Republic (4)

The political, economic, and intellectual history of the Roman world from the foundation of Rome to the time of Julius Caesar. +

HIEU 103. The Roman Empire (4)

The political, economic, and intellectual history of the Roman world from the time of Julius Caesar to the death of Justinian (A.D. 565). +

HIEU 104. Byzantine Empire (4)

A survey course of the history of the Byzantine state from the reign of Constantine to the fall of Constantinople. This course will emphasize the importance of the Byzantine state within a larger European focus, its relationship to the emerging Arab states, its political and cultural contributions to Russia and the late medieval west. +

HIEU 105. The Early Christian Church (4)

A study of the origin and development of early Christian thought, literature, and institution from the New Testament period to the Council of Chalcedon. **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 110. The Rise of Europe (4)

The development of European society and culture from the decline of the Roman Empire to 1050. **Prerequisite:** Humanities

HIEU 111. Europe in the Middle Ages (4)

The development of European society and culture from 1050 to 1400. **Prerequisite:** Humanities sequence or its equivalent. +

HIEU 112. Saints and Sinners in the Middle Ages (4)

This class examines medieval history through the lens of hagiography and biography. Such texts provide intimate views of the culture, including: family and social structures; attitudes towards the supernatural; the body, gender, and aging; peace and violence; hierarchy and dissent. **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 113. Rule, Conflict, and Dissent in the Middle Ages (4)

This course explores the question of religious and political dissent in Europe from the twelfth through the fifteenth centuries. We will explore the tensions between ideal models of religious and cultural unity, and the realities of community conflict, heretical controversies, and popular uprisings. +

HIEU 113A. Conflict and Settlement in Medieval Europe (4)

This course studies conflict resolution in Europe during the ninth to thirteenth centuries when governments were too weak to enforce norms of peace and order. We will read medieval literature and histories and anthropological accounts of conflict resolution in stateless societies. **Prerequisite:** upper-division standing or instructor consent. +

HIEU 115. The Pursuit of the Millennium (4)

The year 2000 provokes questions about the transformation of time, culture, and society. Taking the year 1000 as a touchstone, this class examines the history of apocalyptic expectations in the Middle Ages through a close scrutiny of both texts and art. **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 116. The Greek Diaspora (4)

This course examines the history of the Greek Diaspora in Canada, South America, Australia, and Africa from 1700 to the present. Special attention is paid to the Greek migration to North America during the twentieth century. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 117A. Greece and the Balkans in the Age of Nationalism (4)

This course examines the history of Greece and the Balkans (1683–1914). Topics covered: social and economic development in the eighteenth century, nationalism, independence wars, state-nation formation, interstate relations, the Eastern Question, rural society, urbanization, emigration, and the Balkan Wars. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 117B. Greece and the Balkans during the Twentieth Century (4)

This course examines the history of Greece and the Balkans (1914–2001). Topics covered: World War I, population exchanges, authoritarianism, modernization, World War II, resistance, civil wars, Cold War, Greek-Turkish relations, Cyprus, collapse of Communism, 1990s conflicts, and EU expansion. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 118. Americanization in Europe (4)

Examines problems surrounding the transfer of American culture, values, and styles to Europe in the twentieth and twenty-first centuries. Topics may include: consumer society, popular culture, commercial and business practices, "McDonaldization," political and military influence, democratization, and resistance to Americanization. Students may not receive credit for both HIEU 117S and HIEU 118. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 119. Modern Italy: From Unification to the Present (4)

History of Italy from the 1860s to the present with special focus on the changing relationship between state and society. Topics include the "Southern problem," the Catholic Church, the fascist dictatorship, the Cold War, terrorism, contemporary politics and culture. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 120. The Renaissance in Italy (4)

The social, political, and cultural transformation of late-medieval Italy from the heyday of mercantile expansion before the plague to the dissolution of the Italian state system with the French invasions of 1494. Special focus upon family, associational life and factionalism in the city, the development of the techniques of capitalist accumulation, and the spread of humanism. **Prerequisite:** upper-division standing. +

HIEU 122. Politics Italian Renaissance Style (4)

Modern political and historical thought find their roots in the realistic examination of fifteenth- and sixteenth-century Italian political experience. Contemporary Renaissance humanists and thinkers—Machiavelli, Guicciardini, Castiglione, Botero, and Campanella—tested classical, Christian, and legal models against practical necessities. +

HIEU 125. Reformation Europe (4)

The intellectual and social history of the Reformation and Counter-Reformation from the French invasions to the Edict of Nantes. Emphasis is upon reform from below and above, the transformation of grass-roots spirituality into institutional control. **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 126. Age of Expansion: Europe and the World, 1400–1600 (4)

Course will begin with a survey of the major empires of the fifteenth century, concentrating on the links between them. It will then examine the entrance of Europeans on the global scene in the sixteenth century. This part of the course will examine European/ non-European encounters, focusing on perceptions, economic interaction, and institutional adaptation and will emphasize the Hispanic American, Ottoman, and Indian Ocean cases. +

HIEU 127. Sport in the Modern World (4)

This course looks at the phenomenon of sport in all of its social, cultural, political, and economic aspects. The starting point will be the emergence of modern sport in nineteenth-century Britain, but the focus will be global. Since the approach will be topical rather than chronological, students should already have a good knowledge of world history in the nineteenth and twentieth centuries. **Prerequisite:** upper-division standing.

HIEU 128. Europe Since 1945 (4)

An analysis of European history since the end of the Second World War. Focus is on political, social, economic, and cultural developments within European societies as well as on Europe's relationship with the wider world (the Cold War, decolonization).

HIEU 129. Paris, Past and Present (4)

This course surveys the historical and cultural significance of Paris from about 1500 to the present. The focus is on

interactions between political, architectural, and urban evolutions, and the changing populations of Paris in times of war, revolutions, and peace. +

HIEU 130. Europe in the Eighteenth Century (4)

A lecture-discussion course focusing on Europe from 1688–1789. Emphasis is on the social, cultural, and intellectual history of France, Germany, and England. Topics considered will include family life, urban and rural production and unrest, the poor, absolutism, and the Enlightenment from Voltaire to Rousseau. **Prerequisite:** upper-division standing. +

HIEU 131. The French Revolution: 1789–1814 (4)

This course examines the Revolution in France and its impact in Europe and the Caribbean. Special emphasis will be given to the origins of the Revolution, the development of political and popular radicalism and symbolism from 1789 to 1794, the role of political participants (e.g., women, sans-culottes, Robespierre), and the legacy of revolutionary wars and the Napoleonic system on Europe. **Prerequisite:** upper-division standing. +

HIEU 132. Germany from Luther to Bismarck (4)

How Germany, from being a maze of tiny states rife with religious conflict, became a nation. Did the nations-building process lead to Nazism? **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 133. Gender in Antiquity and the Early Medieval Mediterranean (4)

This course discusses sex and gender at the end of the classical period and its development into the Middle Ages in both Eastern and Western Mediterranean. Course will examine the ways in which our medieval predecessors assigned gender traits and relationships to members of society. It will approach the topic in part through an examination of the language used about gender and in part through use of modern gender theories. **Prerequisite:** upper-division standing. +

HIEU 134. The Formation of the Russian Empire, 800–1855 (4)

State-building and imperial expansion among the peoples of the East Slavic lands of Europe and Asia from the origins of the Russian state in ninth-century Kiev, through Peter the Great's empire up to the middle of the nineteenth century. **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 136. Social History of Crime and Criminal Justice in Europe, 1700–1914 (4)

This course investigates the social history of crime, criminal justice, and policing in Europe between approximately 1700 and 1900. The topic enables historians to investigate a variety of issues, including state-formation, gender relations, and class relations. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 136A. European Society and Social Thought, 1688–1870 (4)

A lecture and discussion course on European political and cultural development and social theory from 1688–1870. Important writings will be considered both as responses to and as provocations for political and cultural change. +

HIEU 136B. European Society and Social Thought, 1870–1989 (4)

A lecture and discussion course on European political and cultural development and theory from 1870–1989. Important writings will be considered both as responses to and as provocations for political and cultural change.

HIEU 137. History of Colonialism: From New Imperialism to Decolonization (4)

This course surveys the age of colonialism in the nineteenth and twentieth century. The course will focus on the debates on colonialism in the metropolis as well as on the conflicts inside the colonies. Considerable emphasis will be placed on colonialism in Africa. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 138. Imperial Spain, 1476–1808 (4)

The rise and decline of Spain's European empire from Ferdinand and Isabella to 1700. The revival of Spain and her return to European affairs in the eighteenth century.

Prerequisite: upper-division standing or graduate standing. +

HIEU 139. The Origins of Constitutions (4)

The course will cover the development of constitutional ideas and institutions from the twelfth century to the U.S. Constitution. Students will read legal texts and commentaries that established the foundations of the ideas of the rule of law, limited government, inalienable rights, and the independent judiciary. Students will study the formation of institutions such as parliament, the court system, and common law. The course will start and finish with an analysis of the U.S. Constitution. **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 141. European Diplomatic History, 1870–1945 (4)

European imperialism, alliances, and the outbreak of the First World War. The postwar settlement and its breakdown. The advent of Hitler and the disarray of the western democracies. The Second World War and the emergence of the super powers.

HIEU 142. European Intellectual History, 1780–1870 (4)

European thought from the late Enlightenment and the French Revolution to Marx and Baudelaire, emphasizing the origins of romanticism, idealism, and positivism in England, Germany, and France. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 143. European Intellectual History, 1870–1945 (4)

A lecture-discussion course on the crisis of bourgeois culture, the redefinition of Marxist ideology, and the transformation of modern social theory. Readings will include Nietzsche, Sorel, Weber, Freud, and Musil. (This course satisfies the minor in the Humanities Program.) **Prerequisite:** upper-division standing.

HIEU 145. The Holocaust as Public History (4)

We will study historical accounts, memoirs, diaries, and oral histories to master the Holocaust epoch. We will contrast scholarly narratives to personal experience as different ways to learn about the past. Students will design projects for public education. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 146. Fascism, Communism, and the Crisis of Liberal Democracy: Europe 1919–1945 (4)

A consideration of the political, social, and cultural crisis that faced Western liberal democracies in the interwar period, with emphasis on the mass movements that opposed bourgeois liberalism from both the left and the right.

HIEU 147. Women and Gender in Early Modern Europe (4)

This course examines the history of European women and gender issues from about 1500 to 1700. Three major themes are covered: intellectual and cultural trends; the nature of the human body and work roles; and, spiritual beliefs, experiences, and practices. **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 147A. Women in the Middle Ages (4)

This course examines the image and the reality of women in the period from 200–1500. We will focus upon the ambivalent status of women in this period as “internal others” to medieval—simultaneously necessary to the functioning of society, yet viewed as marginal to its interests or even as outsiders. **Prerequisite:** upper-division standing or instructor consent. +

HIEU 148. Women and Gender from the Enlightenment to the Victorian Eras (4)

This course examines European women and gender issues from about 1700 to 1871. Major themes covered are: intellectual and cultural trends (e.g., education and politics); attitudes toward female and male bodies and work roles; and, spiritual beliefs and practices. **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 149. History of Women in Europe: 1870 to the Present (4)

This course explores the history of women across classes from 1870 to the present, with an emphasis on the variety of women's experience and the efforts towards and obstacles to empowerment. Topics include: women and the

state, science and gender, feminist movements and the evolution of women's work. **Prerequisite:** upper-division standing.

HIEU 150. Modern British History (4)

Emphasis on changes in social structure and corresponding shifts in political power. The expansion and the end of empire. Two World Wars and the erosion of economic leadership. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 151. Spain since 1808 (4)

Social, political, cultural history of Spain since Napoleon. Features second Spanish Republic, the Civil War, Franco era, and transition to democracy. **Prerequisite:** upper-division standing.

HIEU 152. The Worst of Times: Everyday Life in Authoritarian and Dictatorial Societies (4)

Examines how ordinary citizens coped with the problems of life under Europe's authoritarian regimes. Topics may include Nazism, fascism, and quasi-fascist societies (e.g., Franco's Spain, Salazar's Portugal), and communist practice from Leninism to Stalinism to the milder Titoism of Yugoslavia. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 154. Modern German History: From Bismarck to Hitler (4)

An analysis of the volatile course of German history from unification to the collapse of the Nazi dictatorship. Focus is on domestic developments inside Germany as well as on their impact on European and global politics in the twentieth century.

HIEU 155. Modern Austria (4)

The political, social, and intellectual history of Austria from Maria Theresa to the First Republic with special emphasis on the crisis of liberal culture in the late nineteenth century. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 156. History of the Soviet Union, 1905–1991 (4)

This course explores war, revolution, development, and terror in the Soviet Union from 1905–1991. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 157. Religion and the Law in Modern European History (4)

Comparative examination of the relationship between religious commitments and legal norms in Europe from the Reformation to the present. Topics may include government sponsorship; religious expression; conflicts with secular law; religious rights as human rights; and religious and cultural politics. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 158. Why Hitler? How Auschwitz? (4)

Why did Germany in 1919 produce an Adolf Hitler; how did the Nazis take power in 1933; and why did the Third Reich last until 1945? Why did the war against the Jews become industrial and absolute? **Prerequisite:** upper-division standing or consent of instructor.

HIEU 159. Three Centuries of Zionism, 1648–1948 (4)

For centuries the land of Israel was present in Jewish minds and hearts. Why and how did the return to Zion become a reality? Which were the vicissitudes of Jewish life in Palestine? **Prerequisite:** upper-division standing or consent of instructor.

Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

HIEU 160/260. Topics in the History of Greece (4)

A seminar focusing on selected topics in Greek history from the Bronze Age to the Roman Conquest. **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 163/263. Special Topics in Medieval History (4)

Intensive study of special problems or periods in the history of medieval Europe. Topics vary from year to year, and students may therefore repeat the course for credit. **Prerequisites:** background in European history and upper-division standing. +

HIEU 164/264. Special Topics in Early Modern Europe (4)

This course looks at the European and non-European in the early modern era. Topics will vary year to year. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students are required to submit a more substantial piece of work. **Prerequisite:** upper-division standing or consent of instructor. +

HIEU 166/266. Europeans Abroad 1400–1700 (4)

Between 1400 and 1700 Europeans spread around the world. This course looks at the personal, face-to-face ways in which Europeans survived and prospered in early modern Asia, Africa, and Latin America—religious conversion, intermarriage, collaboration, coercion. Graduate students are expected to submit an additional piece of work. **Prerequisite:** upper-division standing. Department stamp required. +

HIEU 171/271. Special Topics in Twentieth-Century Europe (4)

This course alternates with HIEU 170. Topics will vary from year to year. **Prerequisite:** background in European history.

HIEU 172/272. Comparative European Fascism (4)

This course will be a comparative and thematic examination of the fascist movement and regimes in Europe from the 1920s to the 1940s. In particular, it will focus on the emergence of the two major fascist movements in Italy and Germany. Graduate students will be required to submit a more substantial piece of work with in-depth analysis and with an increased number of sources cited. A typical undergraduate paper would be ten pages, whereas a typical graduate paper would require engagement with primary sources, more extensive reading of secondary material, and be about twenty pages. **Prerequisites:** upper-division or graduate standing and departmental stamp.

HIEU 174/274. The Holocaust: A Psychological Approach (4)

An examination of how traditional moral concerns and human compassion came to be abandoned and how the mass murder of the Jews was organized and carried out. The focus of this course will be on the perpetrators. Requirements will vary for undergraduate M.A. and Ph.D. students. Graduate students are required to submit a more substantial piece of work. **Prerequisites:** upper-division or consent of instructor. Department stamp required.

HIEU 176/276. Politics in the Jewish Past (4)

This seminar addresses Jewish civic autonomy in the late medieval era, the terms of emancipation in the European states, the politics of Jewish socialists, the costs of assimilation, and the consequences of a successful Zionist state in 1948. Graduate students will be required to submit a more substantial piece of work with in-depth analysis and with an increased number of sources cited. A typical undergraduate paper would be ten pages, whereas a typical graduate paper would require engagement with primary sources, more extensive reading of secondary material, and be about twenty pages. **Prerequisites:** upper-division or graduate standing and departmental stamp.

HIEU 177/277. Special Topics in Modern German Thought (4)

Topics will vary from year to year. (Satisfies the Humanities Program minor.) **Prerequisite:** background in European history.

HIEU 178/278. Soviet History (4)

Topics will vary from year to year. Graduate students are required to submit a more substantial paper. **Prerequisite:** upper-division standing or consent of instructor.

HIEU 181/281. Immigration, Ethnicity, and Identity in Contemporary European Society. (4)

Comparative study of immigration and migration in Europe since 1945. Topics include (im)migrant adaptation, assimilation, and identity; labor systems, opposition to and regulation of migration; competing concepts of nationality

and citizenship, conflicts over Muslim immigration; and implications for European integration. Students may not receive credit for both HIEU 181/281 and ERC 101. Graduate students will be expected to submit an additional paper. **Prerequisites:** upper-division or graduate standing and department stamp.

HIEU 182/282. The Muslim Experience in Contemporary European Society (4)

Comparative study of Islam in Europe since 1945. Topics include: indigenous populations; immigration; Islamic law/church-state questions; EU expansion/integration; gender issues; terrorism; Islamophobia; "Europeanizing" Islam; the historical tradition of European-Muslim encounter and its present political/cultural issues. Graduate students will be required to do an additional paper. **Prerequisites:** upper-division or graduate standing and department stamp.

HIEU 183/283. Social History and Anthropology of the Mediterranean (4)

This seminar examines the social history and anthropology of the Mediterranean. Topics covered are: the Mediterranean debate, rural economy, peasant society, gender relations, honor and shame, rural violence, class formation, and emigration. The seminar introduces the methodology of historical anthropology. Graduate students will be expected to complete an additional paper or project. **Prerequisite:** upper-division or graduate standing and department stamp.

HIEU 184/284. Yugoslavia: Before, During, and After (4)

Examines the multi-ethnic Yugoslav states that existed from 1918 until the 1990s. Topics include inter-ethnic relations, foreign affairs, Tito's revisionist communism, the consumerist Yugoslav Dream, culture and society, the violent break-up of the 1990s, and the post-Yugoslav order. Graduate students will be required to submit an additional paper. **Prerequisite:** upper-division or graduate standing and department stamp.

HIEU 198. Directed Group Study (1, 2, 3, 4)

Directed group study on European history under the supervision of a member of the faculty on a topic not generally included in the regular curriculum. Students must make arrangements with individual faculty members. **Prerequisites:** upper-division standing, completion of at least ninety units of UCSD undergraduate study, a minimum UCSD G.P.A. of 2.95, a completed and approved Special Studies form, and department stamp.

HIEU 199. Independent Study in European History (4)

Directed readings for undergraduates under the supervision of various faculty members. **Prerequisite:** consent of instructor.

LATIN AMERICA

Lecture Courses

HILA 100. Latin America—Colonial Transformations (4)

Lecture-discussion survey of Latin America from the pre-Columbian era to 1825. It addresses such issues as the nature of indigenous cultures, the implanting of colonial institutions, native resistance and adaptations, late colonial growth and the onset of independence. +

HILA 101. Latin America: The Construction of Independence 1810–1898 (4)

Lecture-discussion survey of Latin America in the nineteenth century. It addresses such issues as the collapse of colonial practices in the society and economy as well as the creation of national governments, political instability, disparities among regions within particular countries, and of economies oriented toward the export of goods to Europe and the United States.

HILA 102. Latin America in the Twentieth Century (4)

This course surveys the history of the region by focusing on two interrelated phenomena: the absence of democracy in most nations and the region's economic dependence on more advanced countries, especially the United States. Among the topics discussed will be the Mexican Revolution, the military in politics, labor movements, the wars in Central America, liberation theology, and the

current debt crisis. **Prerequisite:** upper-division standing or consent of instructor.

HILA 103. Revolution in Modern Latin America (4)

A political, economic, and social examination of the causes and consequences of the Mexican, Cuban, and Nicaraguan revolutions. Also examine guerrilla movements that failed to gain power in their respective countries, namely the Shinning Path in Peru, FARC in Colombia, and the Zapatistas in Mexico. **Prerequisite:** upper-division standing.

HILA 104. Modern U.S.–Latin American Relations (4)

A survey of inter-American relations during the twentieth century. Emphasis will be placed on U.S. territorial and economic expansion, U.S. national-security and ideological morality, and Latin American efforts to influence U.S. policy in order to strengthen, in most cases, elite domination of society. **Prerequisite:** upper-division standing.

HILA 112. Economic and Social History of the Andean Region (4)

Study of the economic and social problems of the Andean region from the colonial period until the crisis of 1912, with special attention to theoretical models to explain the processes of change. **Prerequisite:** upper-division standing.

HILA 113. Lord and Peasant in Latin America (4)

Examination of the historical roots of population problems, social conflict, and revolution in Latin America, with emphasis on man-land relationships. Special emphasis on modern reform efforts and on Mexico, Cuba, Brazil, and Argentina. Lecture, discussion, reading, and films. **Prerequisite:** upper-division standing or consent of instructor. +

HILA 114. Dictatorships in Latin America (4)

How did dictatorships come about? Who were the authoritarian leaders? How did they organize their regimes and what were the consequences? Recent publications on dictators in Latin America allow for comparisons across countries and throughout time to answer those questions. **Prerequisite:** upper-division standing.

HILA 115. The Latin American City, a History (4)

A survey of the development of urban forms of Latin America and of the role that cities played in the region as administrative and economic centers. After a brief survey of pre-Columbian centers, the lectures will trace the development of cities as outposts of the Iberian empires and as "city-states" that formed the nuclei of new nations after 1810. The course concentrates primarily on the cities of South America, but some references will be made to Mexico City. It ends with a discussion of modern social ills and Third World urbanization. Lima, Santiago de Chile, Buenos Aires, Rio de Janeiro, and Sao Paulo are its principal examples. **Prerequisite:** upper-division standing.

HILA 116. El Salvador and the United States: Human Rights and Revolution (4)

From coffee boom through rebellion, militarization, revolution, state terrorism, and migration, the U.S. has loomed large in the history of El Salvador. This course explores this relationship from 1920 to the present through the prisms of revolution and human rights. **Prerequisite:** upper-division standing.

HILA 120. History of Argentina (4)

A survey from the colonial period to the present, with an emphasis on the nineteenth and twentieth centuries. Among the topics covered: the expansion of the frontier, the creation of a cosmopolitan, predominately European culture, and the failure of industrialization to provide an economic basis for democracy. **Prerequisite:** upper-division standing.

HILA 121. History of Brazil (4)

From colonial times to the present, with an emphasis on the nineteenth and twentieth centuries. Among the topics covered: the evolution of a slave-based economy, the key differences among regions, the military in politics, and the creation of the most populous and industrialized country in Latin America. **Prerequisite:** upper-division standing.

HILA 121A. History of Brazil, 1808 to 1904 (4)

This course will discuss transformations in Brazilian society from 1808 to 1904, covering the Independence, the Empire, end of slavery, beginning of a Republican system, modernization, social protests, popular culture, nation

building, and changes in the politics of social dominance. **Prerequisite:** upper-division standing or consent of instructor.

HILA 122. Cuba: From Colony to Socialist Republic (4)

A lecture-discussion course on the historical roots of revolutionary Cuba, with special emphasis on the impact of the United States on the island's development and society. **Prerequisite:** upper-division standing.

HILA 124A. History of Women and Gender in Latin America (4)

A broad historical overview of Hispanic-American women's history focusing on issues of gender, sexuality, and the family as they relate to women, as well as the historiographical issues in Latin American and Chicana women's history. **Prerequisite:** upper-division standing or consent of instructor.

HILA 126. From Columbus to Castro: Caribbean Culture and Society (4)

Exploration of the relationships between socioeconomic and cultural development in Caribbean history; slavery and empire; nationalism and migration; voodoo and Rastafarianism, and the literary arts. **Prerequisite:** upper-division standing.

HILA 127. History, Culture, and Power (4)

What is the historical evidence on the relationship between culture and power: from the indigenous "national" revolution (eighteenth century) to "indigenismo"; from indigenous upheavals in Ecuador, Bolivia, Mexico and Peru, to the intellectual "archaic utopia" (twentieth century). **Prerequisite:** upper-division standing or instructor consent.

HILA 131. A History of Mexico (4)

A century of Mexican history, 1821–1924: the quest for political unity and economic solvency, the forging of a nationality, the Gilded Age and aftermath, the ambivalent Revolution of Zapata and his enemies. **Prerequisite:** upper-division standing or consent of instructor.

HILA 132. A History of Contemporary Mexico (4)

The paradox of a conservative state as heir to a legendary social upheaval, with special emphasis on the mural art renaissance, the school crusade, the economic dilemma, and the failure to eradicate poverty and inequality. Lectures and discussion. **Prerequisite:** upper-division standing or consent of instructor.

Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

HILA 161/261. History of Women in Latin America (4)

A broad historical overview of Hispanic-American women's history focusing on issues of gender, sexuality, and the family as they relate to women, as well as the historiographical issues in Latin American and Chicana women's history. **Prerequisites:** upper-division standing and consent of instructor.

HILA 162/262. Special Topics in Latin American History (4)

Topics will vary from year to year or quarter to quarter. May be repeated for an infinite number of times due to the nature of the content of the course always changing. **Prerequisite:** upper-division standing or consent of instructor.

HILA 163/263. The History of Chile 1880–Present (4)

The course surveys Chile's basic developments beginning with the era of nitrate exports. Students will have the opportunity to address a specific issue of his/her own choosing and develop the topic for class presentation and a final paper. Graduate students are expected to submit a more substantial piece of work. **Prerequisite:** upper-division standing or consent of instructor.

HILA 164/264. Women's Work and Family Life in Latin America (4)

Inside or outside of the household, women have always worked. Where do we find Latin American women, how has the labor market changed, how was and is women's work perceived, what were the consequences of changing work patterns on family life? Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students are required to submit a more substantial piece of work. **Prerequisite:** upper-division standing or consent of instructor and department stamp.

HILA 167/267. Scholarship on Latin American History in the Colonial Period (4)

Introduction to the historiography on Latin America for the colonial period from Spanish and Portuguese conquests to the Wars of Independence. Requirements will vary for undergraduate, M.S., and Ph.D. students. Graduate students are required to submit an additional research paper. **Prerequisites:** upper-division standing or consent of instructor; reading knowledge of Spanish; department stamp. +

HILA 168/268. Scholarship on Latin American History in the Nineteenth Century (4)

Introduction to the historiography on Latin America for the nineteenth century: world economy, nation-state building, agrarian processes, incipient industrialization, political and cultural thought, and social structure. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students are required to submit an additional research paper. **Prerequisites:** upper-division standing or consent of instructor; reading knowledge of Spanish; department stamp.

HILA 169/269. Scholarship on Latin American History in the Twentieth Century (4)

Introduction to the historiography on Latin America for the twentieth century: agrarian reforms, unionization, industrialization by import substitution, the political left, social development, and international relations. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students are required to submit an additional research paper. **Prerequisites:** upper-division standing or consent of instructor; reading knowledge of Spanish; department stamp.

HILA 199. Independent Study in Latin American History (4)

Directed readings for undergraduates under the supervision of various faculty members. **Prerequisite:** consent of instructor and department stamp.

NEAR EAST

Lecture Courses

HINE 101A. History of Ancient Mesopotamia (4)

Course will trace the political and cultural history of Mesopotamia (modern Iraq), beginning with rise of cities in the fourth millennium B.C.E., continuing through the Sumerian, Akkadian, Assyrian, and Babylonian periods, and ending with the fall of Babylon (539 B.C.E.). **Prerequisite:** upper-division or instructor consent. +

HINE 102. The Jews in Their Homeland in Antiquity (4)

The Jews in Israel from the sixth century BCE to the seventh century CE. Statehood, nationalism, and autonomy within the framework of the Persian empire, the Hellenistic kingdoms, and the Roman-Byzantine empire. Cultural and religious developments will be explored. **Prerequisite:** upper-division standing. +

HINE 103. The Jewish Diaspora in Antiquity (4)

The Jews outside their homeland and in pre-Islamic times, concentrating on the Greco-Roman West and the Parthian-Sasanian East. Topics include assimilation and survival; anti-Semitism and missionizing; patterns of organization and autonomy; cultural and religious developments. **Prerequisite:** upper-division standing. +

HINE 108. The Middle East before Islam (4)

The peoples, politics, and cultures of Southwest Asia and Egypt from the sixth century B.C.E. to the seventh century C.E. The Achaemenid Empire, the Ptolemaic and Seleucid

kingdoms, the Roman Orient, the Parthian and Sasanian states. **Prerequisite:** upper-division standing. +

HINE 109B. Learning to Read Biblical Hebrew II (4)

Continued study of the language of the Bible with emphasis on advanced grammar and vocabulary. **Prerequisite:** HINE 109A. Offered during the summer.

HINE 111. Anthropology and the Hebrew Bible (4)

This course approaches the Hebrew Bible (Old Testament) from the perspective of cultural anthropology. Institutions studied will include the family, rites of passage, food taboos, warfare, animism, demons, sorcery, and animal sacrifice. **Prerequisite:** upper-division or instructor consent. Not off A close reading of select prose narratives from the Hebrew Bible/Old Testament. **Prerequisite:** upper-division standing or consent of instructor. +

HINE 112AL. Great Stories from the Hebrew Bible/Foreign Language (1)

Students with advanced Hebrew can study the texts in HINE 112A in the original language. **Prerequisite:** upper-division standing or consent of instructor.

HINE 112B. Great Poems from the Hebrew Bible (4)

A close reading of select poetic passages from the Hebrew Bible/Old Testament. **Prerequisite:** upper-division standing or consent of instructor. +

HINE 112BL. Great Poems from the Hebrew Bible/Foreign Language (1)

Students with advanced Hebrew can study the texts in HINE 112B in the original language. **Prerequisite:** upper-division standing or consent of instructor.

HINE 113. Ancient Near East Mythology (4)

Course will analyze and compare major myths from Egypt, Israel, Ugarit, and Mesopotamia, employing a variety of modern approaches. **Prerequisite:** upper-division standing or consent of instructor. +

HINE 114. History of the Islamic Middle East (4)

A survey of the Middle East from the rise of Islam to the region's economic, political, and cultural integration into the West (mid-nineteenth century). Emphasis on socioeconomic and political change in the early Arab empires and the Ottoman state. +

HINE 115. Islamic Civilization (4)

An introductory survey of Islamic civilizations. History and society, law, science and philosophy, arts and letters, and architecture. A broad picture of the dynamics and achievements of Islamic societies over time. **Prerequisite:** upper-division standing or consent of instructor. +

HINE 116. The Middle East in the Age of European Empires (1798-1914) (4)

Examines the contacts of the late Ottoman Empire and Qajar Iran with Europe from the Napoleonic invasion of Egypt to World War I, the diverse facets of the relationship with the West, and the reshaping of the institutions of the Islamic states and societies.

HINE 118. The Middle East in the Twentieth Century (4)

An introduction to the history of the Middle East since 1914. Themes such as nationalism, imperialism, the oil revolution, and religious revivalism will be treated within a broad chronological and comparative framework drawing on the experience of selected countries.

HINE 119. US Mid-East Policy Post-WWII (4)

An examination of post-WWII Middle East conflicts, including the Israeli-Arab conflicts, the Lebanese Civil War, and the Gulf War of the 1980s. The roles of the superpowers and Middle Eastern states during the period.

HINE 122. Politicization of Religion in the Middle East (4)

Islamic formulations of dissent from the nineteenth century to our day; social, cultural, and political movements inflected by religion; domestic, interregional, and international dimensions with emphasis on the Arab East, Iran, and Turkey. **Prerequisite:** upper-division standing.

HINE 123. The Emergence of Middle East Nationalisms (4)

A survey of nationalism in the modern Middle East with reference to current theories of identity formation in Europe and South Asia. The course will examine shifting identities in the Ottoman Empire, its Turkish and Arab successor states, and Iran. **Prerequisite:** upper-division standing or consent of instructor.

HINE 126. Iranian Revolution in Historical Perspective (4)

Iran's social and political history in the twentieth century with emphasis on the Constitutional movement of the late Qajar period, formation and development of the Pahlavi state, anatomy of the 1978-79 Revolution, and a survey of the Islamic Republic. **Prerequisite:** upper-division or instructor consent.

HINE 127. History of Modern Turkey (4)

Eastern problems on the example of Turkey and with special attention to collective identities, state-society dynamics, foreign and regional policies, and varieties of modernity. **Prerequisite:** upper-division standing or consent of instructor.

HINE 151B/251B. Introduction to Aramaic Dialects (4)

Study of Ancient Inscriptional Persian Imperial and Syriac Aramaic. +

HINE 152A/252A. The Evolution of the Northwest Semitic Dialects (4)

Principles of historical linguistics, application to the languages of the ancient Levant. **Prerequisites:** knowledge of at least one Semitic language; a course in general linguistics is also desirable. +

HINE 152B/252B. Introduction to Ugaritic (4)

Decipherment of Ugaritic tablets, history, and culture of ancient Ugarit, study of Ugaritic mythic texts. +

HINE 152C/252C. Advanced Ugaritic (4)

Continued study of Ugaritic literature, comparison with Canaanite inscriptions. +

HINE 153A/253A. Introduction to Akkadian Language and Mesopotamian Culture (4)

Students study cuneiform script and elements of Babylonian-Assyrian grammar, as well as the history of Ancient Mesopotamia. +

HINE 153B/253B. Continued Akkadian Language (4)

Student begin to read and analyze ancient Mesopotamian texts from a variety of genres. +

HINE 153C/253C. Advanced Akkadian Language (4)

Continued study of Mesopotamia literature and history. +

Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

HINE 161/HINE 261. Seminar in the Hebrew Bible (4)

Systematic reading and rendering of the books of the Hebrew Bible in order. Each time the class is taught, we will look at a different book. Adequate knowledge of Biblical Hebrew is required. Graduate students will have to write an extra paper or exam. **Prerequisites:** Judaic Studies 103, graduate standing, or consent of instructor. +

HINE 162/262. Anthropology and the Hebrew Bible (4)

This course approaches the Hebrew Bible (Old Testament) from the perspective of cultural anthropology. Institutions studied will include the family, rites of passage, food taboos, warfare, animism, demons, sorcery, and animal sacrifice. Formerly HINE 111; students may not receive credit for HINE 111 and HINE 162/262. Graduate students will be required to complete an extra paper. **Prerequisites:** upper-division or graduate standing and department stamp. +

HINE 163/263. Topics in the Ancient World (4)

Topics on the ancient world will vary from year to year. Requirements will vary for undergraduate and graduate students. Graduate students will submit a more substantial piece of work with in-depth analysis and with an increased number of sources cited. A typical undergraduate paper would be ten pages, whereas a typical graduate paper would require engagement with primary sources, more extensive reading of secondary material, and be about twenty pages. **Prerequisite:** upper-division or graduate standing and departmental stamp. +

HINE 166/266. Nationalism in the Middle East (4)

Growth of nationalism in relation to imperialism, religion, and revolution in the nineteenth- and twentieth-century Middle East. Emergence of cultural and political ethnic consciousness in the Ottoman state. Comparative study of Arab, Iranian, and Turkish nationalism as well as Zionism. **Prerequisite:** department stamp or consent of instructor.

HINE 170/270. Special Topics in Jewish History (4)

This course studies a period or theme in Jewish history. Topics will vary from year to year. **Prerequisite:** department stamp required.

HINE 181/281. Problems in the Study of Hebrew Manuscripts (4)

Detailed study of a portion of biblical text. Focus on text-critical and source-critical problems. **Prerequisite:** upper-division or graduate standing. +

HINE 186/286. Special Topics in Middle Eastern History (4)

Focused study of historical roots of contemporary problems in the Middle East: Islamic modernism and Islamist movements; contacts with the West; ethnic and religious minorities; role of the military; economic resources and development. Department stamp and permission of instructor.

HINE 199. Independent Study in Near Eastern History (4)

Directed readings for undergraduates under the supervision of various faculty members. **Prerequisite:** consent of instructor.

HISTORY OF SCIENCE

Lecture Courses

HISC 101A. Science in the Greek and Roman World (4)

A survey of the principal features of ancient science: the origins of Greek naturalism, the criticism of magic, notions of quantification. Topics may include astronomy, astrology, geography, geometry, optics, mechanics and physical theory, classification of living beings, and human cognition. Emphasis on primary sources, such as the presocratic natural philosophers: Plato, Aristotle, Euclid, Archimedes, Ptolemy, Pliny Galen, and Proclus. **Prerequisite:** upper-division standing. +

HISC 101B. Medieval Science in the Latin West, ca. 500–1500 (4)

Styles of the medieval scientific imagination. Reception and assimilation of the learning of the ancient world, especially Aristotle, Plato, Euclid, Galen, and Ptolemy. Struggles to reconcile Greek, Arabic, and Christian ideals of knowledge. Rise of universities. Natural philosophy, logic, geometry, optics, astronomy, astrology, mechanics, geography, and classification of living beings. **Prerequisite:** upper-division standing. +

HISC 101C. Early Modern Science (4)

Early forms of modern science, mid-15th to 17th centuries. The revolution in printing. Sites of knowledge-making: university and court cultures, museums, academies. Astrology, astronomy, literature of the heavens, prophecy and apocalyptic expectation. Natural history, medicine, alchemy, magic and the physico-mathematical sciences. **Prerequisite:** upper-division standing. +

HISC 102. Technology in World History (4)

Technology as an agent of change. How have humans harnessed the power of nature? What factors have contributed to successes and failures? How has technology

changed human life? How should we evaluate the quality of these changes? **Prerequisite:** upper-division standing.

HISC 103. Gender and Science in Historical Perspective (4)

History of women's struggles and strategies for access and equality in professional science. Questions related to gender bias in science—as a social institution and as an epistemological enterprise—will be addressed in light of the historical and biographical readings. **Prerequisite:** upper-division standing.

HISC 104. History of Popular Science (4)

Historical aspects of the popularization of science. The changing relation between expert science and popular understanding. The reciprocal impact of scientific discoveries and theories, and popular conceptions of the natural world. **Prerequisite:** upper-division standing or consent of instructor.

HISC 105. History of Environmentalism (4)

History of human effects on the natural environment, with emphasis on understanding the roles of the physical and biological sciences in providing insights into environmental processes. **Prerequisite:** upper-division standing or consent of instructor.

HISC 106. The Scientific Revolution (4)

A cultural history of the formation of early modern science in the sixteenth and seventeenth centuries: the social forms of scientific life; the construction and meaning of the new cosmologies from Copernicus to Newton; the science of politics and the politics of science; the origins of experimental practice; how Sir Isaac Newton restored law and order to the West. **Prerequisite:** upper-division standing. +

HISC 107. The Emergence of Modern Science

The development of the modern conception of the sciences, and of the modern social and institutional structure of scientific activity, chiefly in Europe, during the eighteenth and nineteenth centuries. **Prerequisite:** upper-division standing.

HISC 108. Life Sciences in the Twentieth Century (4)

The history of twentieth-century life sciences, with an emphasis on the way in which model organisms such as fruit flies, guinea pigs, bacteriophage, and zebra fish shaped the quest to unlock the secrets of heredity, evolution, and development. **Prerequisite:** upper-division standing or consent of instructor.

HISC 109. Science in Western Civilization (4)

An introduction to scientific thought as it relates to Western culture. Among the topics considered: Aristotelian, medieval, and Renaissance science; the scientific revolution; the Newtonian universe; science and the Enlightenment; evolution; science and the modern state; technoscience and biotechnology. **Prerequisite:** upper-division standing or consent of instructor.

HISC 111. The Atomic Bomb and the Atomic Age (4)

Development of nuclear science and weapons—1930s to present—including the discovery of radioactivity and fission, the Manhattan project, the bombings of Hiroshima and Nagasaki and end of WWII, the H-bomb, and legacies of nuclear proliferation, environmental damage, and radioactive waste. **Prerequisites:** upper-division standing or consent of instructor.

HISC 114. The Darwinian Legacy (4)

The Origin of Species by means of Natural Selection, and its scientific, intellectual, and political legacies. Topics include social Darwinism, eugenics, Nazi racial hygiene, population control, neo-Malthusianism in the modern environmental movement. **Prerequisite:** upper-division standing.

HISC 115. History of Modern Medicine (4)

Explores the origin of clinical method, the hospital, internal surgery, and the medical laboratory, as well as the historical roots of debates over health-care reform, genetic determinism, and the medicalization of society. **Prerequisite:** upper-division standing or consent of instructor.

HISC 116. History of Bioethics (4)

The story behind the postwar rise of bioethics—medical scandals breaking in the mass media, the development of novel technologies for saving and prolonging life, the

emergence of new diseases, the unprecedented scope for manipulation opened up by biology. **Prerequisite:** upper-division standing or consent of instructor.

HISC 117. History of the Neurosciences (4)

A survey of the history of the neurosciences from the seventeenth century to the present, exploring the political, philosophical, cultural, aesthetic and ethical aspects of research into the workings of the human brain. **Prerequisite:** upper-division standing or consent of instructor.

HISC 118. History of Sexology (4)

Analyzes the history of sexology as a series of episodes in the science of human difference, from the European reception of the first translation of the Kama Sutra in 1883 to the search for the “gay gene” in the 1990s. **Prerequisite:** upper-division standing or consent of instructor.

HISC 120A. Technology in America I (4)

The role of technology in American history through the Civil War. Indigenous and colonial development, transportation infrastructures, and industrialization are explored to understand the connections among technology, society, and culture. **Prerequisite:** upper-division standing. +

HISC 120B. Technology in America II (4)

The role of technology in the history of the United States since the Civil War. Mass production and consumption, information technologies, and the changing role of inventors and engineers are explored to understand the connections among technology, society, and culture. **Prerequisite:** upper-division standing.

HISC 121. Listening In: Sound, Music, and Noise in America (4)

Explores the cultural meaning of sound by examining the history of the phonograph, radio, movies, Muzak, noise-abatement, and architectural acoustics. What needs did these technologies fulfill? How did they reinforce and challenge the society in which they were developed? **Prerequisite:** upper-division standing.

HISC 130. Technology in the Twentieth Century (4)

Major technological developments in the twentieth century, including the rise and decline of technologies, unexpected hazards and unanticipated consequences, and why some technologies fail. **Prerequisite:** upper-division standing.

HISC 131. Science, Technology, and Law (4)

Science and law are two of the most powerful establishments of modern Western culture. Science organizes our knowledge of the world; law directs our action in it. Will explore the historical roots of the interplay between them. **Prerequisite:** upper-division standing.

Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

HISC 160/260. Historical Approaches to the Study of Science (4)

Major recent publications in the history of science will be discussed and analyzed; the topics will range in period from the seventeenth century to the twentieth, and will deal with all major branches of natural science. Special topics. Topics will vary from year to year. **Prerequisite:** consent of instructor.

HISC 161/261. Seminar in Newton and Newtonianism (4)

This course focuses on the single most important figure of the scientific revolution, Isaac Newton, and on his science and philosophy which set the frame of reference for physics and general science until the twentieth century. Graduate students are required to submit an additional piece of work. **Prerequisite:** upper-division or graduate standing and department stamp.

HISC 163/263. History, Science, and Politics of Climate Change (4)

The complex historical development of human understanding of global climate change, including key scientific work, and the cultural dimensions of proof and persuasion. Special emphasis on the differential political acceptance of the scientific evidence in the U.S. and the world. Graduate students are required to submit an additional paper. **Prerequisite:** upper-division or graduate standing. Department stamp required.

HISC 164/264. Topics in the History of the Physical Sciences (4)

Intensive study of specific problems in the physical (including chemical and mathematical) sciences, ranging in period from the Renaissance to the twentieth century. Topics vary from year to year, and students may therefore repeat the course for credit.

HISC 165. Topics in Twentieth-Century Science and Culture (4)

This seminar explores topics at the interface of science, technology, and culture, from the late nineteenth century to the present. Topics change yearly; may be repeated for credit with instructor's permission. **Prerequisite:** upper-division standing or consent of instructor.

HISC 166/266. The Galileo Affair (4)

Galileo's condemnation by the Catholic Church in 1633 is a well-known but misunderstood episode. Was Galileo punished for holding dangerous scientific views? Personal arrogance? Disobedience? Religious transgressions? Readings in original sources, recent historical interpretations. Graduate students will be expected to submit a more substantial piece of work. +

HISC 167/267. Gender and Science (4)

Why have women been traditionally excluded from science? How has this affected scientific knowledge? How have scientists constructed gendered representations not only of women, but also of science and nature? We will address these questions from perspectives including history, philosophy, and psychoanalytic theory. **Prerequisite:** upper-division standing or consent of instructor.

HISC 168/268. The Extraterrestrial Life Question (4)

The changing fortunes of the belief in the existence of life beyond the Earth (pluralism) from 1750–present as it evolved from a marginal speculation to a central scientific question with wide-ranging consequences for traditional religious belief-systems. Graduate students will be expected to submit a more substantial piece of work. **Prerequisite:** upper-division or graduate standing or consent of instructor.

HISC 170/270. Topics in the History of Science and Technology (4)

This seminar explores topics at the interface of science, technology, and society, ranging from the seventeenth century to the twentieth. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students are required to submit an additional paper. **Prerequisite:** upper-division standing or consent of instructor.

HISC 172/272. Building The history of the built environment in the United States, from skyscrapers to suburbs, canals and railroads to factories and department stores. The technological history of structures and infrastructures, and the social and cultural values that have been "built into" our material environment. Graduate students are required to submit an additional paper. **Prerequisite:** upper-division standing or consent of instructor.

HISC 173/273. Seminar on Darwin and Darwinisms (4) Examines evolutionary theory before Darwin, the development of the theory of natural selection, the ongoing challenge from Lamarckism, nineteenth-century social Darwinism, the emergence of the neo-Darwinist synthesis, and the recent controversies over evolutionary psychology and creationism. Graduate students are expected to submit an additional paper. **Prerequisite:** upper-division or graduate standing and department stamp.

HISC 174/274. History of Localization of Brain Function (4)

From the beginnings of brain anatomy in the 1660s to the current rage for functional magnetic resonance imaging

studies, this class investigates philosophical, ethical, and cultural dimensions of the quest to localize psychological phenomena in the physical brain. Graduate students are required to submit an additional paper. **Prerequisite:** upper-division or graduate standing and department stamp.

HISC 175/275. The Historical Sciences in the Nineteenth Century (4)

A critical analysis of the host of "historical sciences" that developed over the course of the long nineteenth century, from archaeology and paleontology to psychoanalysis and craniotomy, including the science of history itself. Graduate students will be required to submit an additional paper. **Prerequisite:** upper-division or graduate standing and department stamp.

HISC 199. Independent Study in the History of Science (4)

Directed readings for undergraduates under the supervision of various faculty members. **Prerequisite:** consent of instructor.

TOPICS

Courses

HITO 87. Special Freshman Seminar (1)

A seminar intended for exposing undergraduate students, especially freshmen, to exciting research programs conducted by department faculty. Enrollment is limited. Topic will vary quarter by quarter.

HITO 99. Independent Study on

History Topics (1, 2, 3, 4)

Independent study for undergraduates with lower-division standing under the supervision of a member of the faculty on a topic not generally included in the regular curriculum. Students must make arrangements with individual faculty members. **Prerequisites:** lower-division standing, completion of thirty units of UCSD undergraduate study, a minimum UCSD G.P.A. of 3.0, and a completed and approved Special Studies form.

HITO 102. Religious Traditions: East Asian Religious Traditions (4)

Introduction to the major religious traditions of Asia: Hinduism, Buddhism, Taoism, Shinto, and Confucianism. The course will focus on one religion each year. Since special topics will vary from year to year the course may be repeated for credit three times. **Prerequisite:** upper-division standing. +

HITO 104. The Jews and Judaism in the Ancient and Medieval Worlds (4)

The political and cultural history of the Jews through the early modern period. Life under ancient empires, Christianity and Islam. The post-biblical development of the Jewish religion and its eventual crystallization into the classical, rabbinic model. +

HITO 105. The Jews and Judaism in the Modern World (4)

Topics include the political emancipation of the Jews of Europe; the emergence of Reform, Conservative, and Modern Orthodox Judaism; hasidism; modern anti-semitism; Jewish socialism; zionism; the Holocaust; the American Jewish community; the State of Israel.

HITO 106. Love and Family in the Jewish Past (4)

Jewish women's experiences from the seventeenth century to the present, covering Europe, the United States, and Israel. We examine work, marriage, motherhood, spirituality, education, community, and politics across three centuries and three continents. **Prerequisite:** upper-division standing.

HITO 111/211. Marxian Theory (4)

A survey and examination of the principal writings of Marx concerning economic theory and analysis. Emphasis on the theory of value, production, technical change, reproduction and accumulation. Some consideration will also be made of certain neo-Marxist contributions and critiques. **Prerequisite:** introductory economics or consent of instructor.

HITO 117. World History 1200–1800 (4)

This course examines the interaction between sections of the globe after 1200. It emphasizes factors operating on a transcontinental scale (disease, climate, migration) and historical/cultural phenomena that bridge distance (religion, trade, urban systems). This is not narrative history, but a study of developments that operated on a global scale and constituted the first phase of globalization. **Prerequisite:** upper-division standing or consent of instructor. +

HITO 119/HMNR 100. Human Rights I: History and Theory (4)

Explores where human rights come from and what they mean by integrating them into a history of modern society, from the Conquest of the Americas and the origins of the Enlightenment, to the Holocaust and the contemporary human rights regime. **Prerequisite:** upper-division standing or consent of instructor.

HITO 126. A History of Childhood (4)

This course will examine the different ways that attitudes toward children have changed throughout history. By focusing on the way that the child was understood, we will examine the changing role of the family, the role of culture in human development, and the impact of industrialization and modern institutions on the child and childhood.

HITO 133. War and Society: The Second World War (4)

An examination of the Second World War in Europe, Asia, and the United States. Focus will be on the domestic impact of the war on the belligerent countries as well as on the experiences of ordinary soldiers and civilians. **Prerequisite:** upper-division standing or consent of instructor.

HITO 134. International Law—War Crimes and Genocide (4)

Comparative study of genocide and war crimes, stressing European developments since 1900 with reference to cases elsewhere. Topics include historical precedents; evolving legal concepts; and enforcement mechanisms. Emphasis on the Holocaust, the USSR under Stalin, ex-Yugoslavia, and the Armenian genocide. Students may not receive credit for both HITO 134 and ERC 102. **Prerequisite:** upper-division standing or consent of instructor.

HITO 135. Historical Anthropology (4)

This course will give an interdisciplinary introduction to anthropological thought in the nineteenth and twentieth centuries. Secondly, it will deal with different fields of historical anthropology. Central questions and approaches will be discussed by presenting selected case studies. **Prerequisite:** upper-division standing or consent of instructor.

Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course. Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

HITO 166/266. Death Penalty Global Perspectives Since 1492 (4)

From early modern witches, rebels, and heretics to hyper-modern gangsters, terrorists, and serial killers, applying capital punishment to foreign nationals and ethnic minorities has sustained a global conversation about the sanctity of human life and the meaning of citizenship in the Americas and Europe. Graduate students must complete an additional paper. **Prerequisite:** upper-division or graduate standing and department stamp.

HITO 172/272. War in the Twentieth Century: A Psychological Approach (4)

Reckoning by novelists, essayists, and biographers with the phenomenon of contemporary warfare as an unprecedented experience and an abiding threat. Graduate students are required to submit a more substantial piece of work. **Prerequisite:** upper-division or graduate standing and department stamp.

HITO 174. The Foundations of Constitutional Law (4)
Medieval and early modern origins of constitutional ideas and institutions. The question of the course is: Where did the ideas and institutions embodied in the constitutions of the U.S. (1787) and France (1791) come from? Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students are required to submit a more substantial piece of work. **Prerequisite:** department stamp or consent of instructor.

HITO 180/280. Housing in the Developing World (4)
The majority of the world's citizens now live in cities; this course examines the evolution of housing architecture and finance in the twentieth-century context of rapid urbanization, dissolving empire, industrialization, and globalization. Graduate students will submit a more substantial piece of work with in-depth analysis and with an increased number of sources cited. A typical undergraduate paper would be ten pages, whereas a typical graduate paper would require engagement with primary sources, more extensive reading of secondary material, and be about twenty pages. **Prerequisites:** upper-division or graduate standing and consent of instructor.

HITO 192. Senior Seminar in History (1)
The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in history (at the upper-division level). Topics will vary from quarter to quarter. Senior Seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

HITO 193/POLI 194/COM GEN 194/USP 194. Research Seminar in Washington, D.C. (6)
Course attached to six-unit internship taken by student participating in the UCDC program. Involves weekly seminar meetings with faculty and teaching assistant and a substantial historical research paper. **Prerequisites:** department stamp required; participating in UCDC program.

HITO 194. History Honors (4)
A program of independent study providing candidates for history honors an opportunity to develop, in consultation with an advisor, a preliminary proposal for the honors essay. An IP grade will be awarded at the end of this quarter. A final grade will be given for both quarters at the end of HITO 195. **Prerequisite:** consent of instructor. Department stamp required.

HITO 195. The Honors Essay (4)
Independent study under the supervision of a faculty member leading to the preparation of an honors essay. A letter grade for both HITO 194 and 195 will be given at the completion of this quarter. **Prerequisite:** consent of instructor. Department stamp required.

HITO 196. Honors Seminar (4)
The nature and uses of history are explored through the study of the historian's craft based on critical analysis of historical literature relating to selected topics of concern to all historians. Required of all candidates for history honors and open to other interested students with the instructor's consent. Department stamp required.

HITO 198. Directed Group Study (1–4)
Directed group study on a topic not generally included in the regular curriculum. Students must make arrangements with individual faculty members. (P/NP grades only.) **Prerequisites:** upper-division standing, completion of at least ninety units of UCSD undergraduate study, a minimum G.P.A. of 2.5, and a completed and approved Special Studies form.

HITO 199. Independent Study for Undergraduates (4)
Independent study on a topic not generally included in the regular curriculum. Students must make arrangements with individual faculty members. (P/NP grades only.) **Prerequisites:** upper-division standing and consent of instructor.

UNITED STATES

See History of Science for more U.S. courses (HISC 105, HISC 108, HISC 111).

Lecture Courses

HIUS 100. Colonial Period to 1763 (4)
Political and social history of the thirteen colonies: European background, settlement and expansion, beginnings of culture, and the imperial context. **Prerequisite:** upper-division standing. +

HIUS 101. The American Revolution (4)
Causes and consequences of the revolution: intellectual and social change, the problems of the new nation, the Constitution, and the origins of political parties. **Prerequisite:** upper-division standing. +

HIUS 103. The World We Have Lost: Social History of Early America (4)
Selected themes in early American social history—including race, gender, faith, economy, and age—from an anthropological perspective. What distinguished it from our own world? **Prerequisite:** upper-division standing. +

HIUS 104. The Revolutionary Atlantic (4)
The upheavals that transformed the early modern Atlantic emphasizing the United States, Caribbean, and Great Britain. Topics: struggles to define democracy, the reorganization of the Atlantic state system, the Enlightenment, and international responses to the American and French Revolutions. **Prerequisite:** upper-division standing. +

HIUS 106B. American Foreign Relations, since 1900 (4)
Examines foreign relations of the United States from acquisition of a formal overseas empire in the aftermath of the Spanish-American War to the end of the Cold War. Topics cover a range of public and private interactions with the world. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 107. The Early Republic (4)
This course will examine the transformation of American society and politics between the American Revolution and the Jacksonian period. Topics to be considered include the emergence of domesticity, the development of political parties, the expansion of capitalist relations, the debate over slavery, the early labor movement, and the origins and motivations of middle-class reform. +

HIUS 108A/ETHN 112A. History of Native Americans in the United States I (4)
This course examines the history of the Native Americans in the United States with emphasis on the lifeways, mores, warfare, cultural adaptation, and relations with the European colonial powers and the emerging United States until 1870. **Prerequisite:** upper-division standing or consent of instructor. +

HIUS 108B/ETHN 112B. History of Native Americans in the United States II (4)
This course examines the history of the Native Americans in the United States with emphasis on the lifeways, mores, warfare, cultural adaptation, and relations with the United States from 1870 to the present. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 109. Intellectual History: From Contact to Civil War (4)
An exploration of cultural, political, religious, and social thought in early America. Emphasis will be placed on the trans-Atlantic context and on the relationships between intellectuals and authority. **Prerequisite:** upper-division standing or consent of instructor. +

HIUS 114. California History (4)
This course examines California history from 1800 onward, with an emphasis on social, economic, and political change. The course will explore the effect of national and international events as well as the ways in which California—the ideal and the real—shapes the American experience.

HIUS 115. History of Sexuality in the United States (4)
Constructions of sex and sexuality in the United States from the time of pre-contact Native America to the present,

focusing on sexual behaviors, sexual ideologies, and the uses of sexuality for social control.

HIUS 116. War and American Society (4)
The connection between social relations and America's wars. Ways that American society has influenced decisions to prepare for or go to war as well as the impact of war on class relations and ideologies of race and gender. **Prerequisite:** upper-division standing.

HIUS 117. History of Los Angeles (4)
This course examines the history of Los Angeles from the early nineteenth century to the present. Particular issues to be addressed include urbanization, ethnicity, politics, technological change, and cultural diversification.

HIUS 120. Peace Movements in America (4)
Topics will include Quaker origins of the American peace movements and examples of opposition to wars in the twentieth century from World Wars I and II, Vietnam, anti-nuclear movements, and intervention in Central America to Iraq. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 122. History and Hollywood: America and the Movies Since the Great Depression (4)
A lecture-discussion course utilizing written texts and films to explore major themes in American politics and culture from the Great Depression through the 1990s. Topics will include the wars of America, McCarthyism, the counter-culture of the 1960s, and the transformation of race and gender relations. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 123/USP 167. History of New York City (4)
New York City breathes history. Whether it is in the music, the literature, or the architecture, the city informs our most basic conceptions of American identity. This course examines the evolution of Gotham from the colonial era to today. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 124/ETHN 125. Asian American History
Explore how Asian Americans were involved in the political, economic, and cultural formation of United States society. Topics include migration; labor systems; gender, sexuality and social organization; racial ideologies and anti-Asian movements; and nationalism and debates over citizenship.

HIUS 128. African-American Legal History (4)
This course sketches the shifting experience persons of African descent have had with the law in the United States. Films, cases, articles, and book excerpts are used to convey the complex nature of this four hundred year journey. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 130. Cultural History from 1607 to the Civil War (4)
This course will explore connections between American culture and the transformations of class relations, gender ideology, and political thought. Topics will include the transformations of religious perspectives and practices, republican art and architecture, artisan and working class culture, the changing place of art and artists in American society, antebellum reform movements, antislavery and proslavery thought. **Prerequisite:** upper-division standing or consent of instructor. +

HIUS 131. Cultural History from the Civil War to the Present (4)
This course will focus on the transformation of work and leisure and the development of consumer culture. Students will consider connections between culture, class relations, gender ideology, and politics. Topics will include labor radicalism, Taylorism, the development of organized sports, the rise of department stores, the transformation of middle-class sexual morality, the growth of commercial entertainment, and the culture of the cold war.

HIUS 132. Civil War–Reconstruction in Pop Culture (4)
This course considers how cultural processes have shaped histories of the Civil War and Reconstruction. Students will analyze the relationship between popular culture and major themes of the era through the use of literature, texts, film, television, and print. Students may not receive

credit for both HIUS 132 and HIUS 132S. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 133. The Golden Age of Piracy (4)

This interdisciplinary lecture course focuses on the history and literature of global piracy in the English-speaking world from Sir Francis Drake to Blackbeard and how this Golden Age was remembered in the popular fiction of the nineteenth and twentieth centuries. **Prerequisite:** upper-division standing or consent of instructor. +

HIUS 134. From Be Bop to Hip Hop: African American Cultural History Since 1945 (4)

Explore the politics of black culture in the postwar period. Topics include: the dynamic interplay of social factors (migration, civil rights, black power, deindustrialization, globalization) and the production of African American culture, including music, film, and literature. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 135A/ETHN 170A. Origins of the Atlantic World, c. 1450–1650 (4)

An examination of interactions among the peoples of western Europe, Africa, and the Americas that transformed the Atlantic basin into an interconnected "Atlantic World." Topics will include maritime technology and the European Age of Discovery, colonization in the Americas, the beginnings of the transatlantic slave trade and the early development of plantation slavery in the New World. **Prerequisite:** upper-division standing or consent of instructor. +

HIUS 135B/ETHN 170B. Slavery and the Atlantic World (4)

The development of the Atlantic slave trade and the spread of racial slavery in the Americas before 1800. Explores the diversity of slave labor in the Americas and the different slave cultures African Americans produced under the constraints of slavery. **Prerequisite:** upper-division standing or consent of instructor. +

HIUS 138/ETHN 167. African-American History in War and Peace: 1917 to the Present (4)

The social, political, economic, and ideological pressures generated during the international conflicts of the twentieth century have had an enormous impact on American life. The course examines how the pressures of "total war" and "cold war" shaped the African-American experience in both war and peacetime. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 139/ETHN 149. African-American History in the Twentieth Century (4)

This course examines the transformation of African America across the expanse of the long twentieth century: imperialism, migration, urbanization, desegregation, and deindustrialization. Special emphasis will be placed on issues of culture, international relations, and urban politics. **Prerequisite:** upper-division standing.

HIUS 140/Econ 158A. Economic History of the United States I (4)

The United States as a raw materials producer, as an agrarian society, and as an industrial nation. Emphasis on the logic of the growth process, the social and political tensions accompanying expansion, and nineteenth- and early twentieth-century transformations of American capitalism.

HIUS 141/Econ 158B. Economic History of the United States II (4)

The United States as modern industrial nation. Emphasis on the logic of the growth process, the social and political tensions accompanying expansion, and twentieth-century transformations of American capitalism.

HIUS 142. Great Trials of the Anglo-American World (4)

Examines important constitutional, criminal, and civil trials in English and American courts from the early modern period to the present. The topics will vary from year to year. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 142A. United States in the Twentieth Century, 1900–1945 (4)

Examines the political, economic, and social history of the American people from the turn of the twentieth century to the end of World War II. Topics: progressive movement,

impact of the Great Depression, and the consequences of two world wars. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 142B. United States in the Twentieth Century, 1945 to the Present (4)

Examines the political, economic and social history of the American people from the end of World War II to present. Topics: origins of the Cold War, struggle for racial justice and the rise of American conservatism since the 1980s. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 146. Race, Riots, and Violence in the U.S (4)

Examining the history of urban riots in the U.S. since the late nineteenth century. Exploring how different groups of Americans have constructed competing notions of race, gender, labor, and national belonging by participating in street violence. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 147/USP 165. History of the American Suburb (4)

This lecture explores the development of suburbs in America, from the early nineteenth century to the contemporary era. Topics include suburban formation, class, ethnic and racial dimensions, government influences, social life, and cultural responses to suburbia. The class will explore competing theories of suburbanization as it surveys the major literature.

HIUS 148/USP 103. The American City in the Twentieth Century (4)

This course focuses on the phenomenon of modern American urbanization. Case studies of individual cities will help illustrate the social, political, and environmental consequences of rapid urban expansion, as well as the ways in which urban problems have been dealt with historically.

HIUS 149. The United States in the 1960s (4)

An overview of the social and political developments that polarized American society in the tumultuous decade of the 1960s. Themes include the social impact of the post-war "baby boom," the domestic and foreign policy implications of the Cold War; the evolution of the civil rights and women's movements; and the transformation of American popular culture.

HIUS 150. American Legal History to 1865 (4)

The history of American law and legal institutions. This quarter focuses on crime and punishment in the colonial era, the emergence of theories of popular sovereignty, the forging of the Constitution and American federalism, the relationship between law and economic change, and the crisis of slavery and Union. **Prerequisite:** upper-division standing. +

HIUS 151. American Legal History since 1865 (4)

The history of American law and legal institutions. This course examines race relations and law, the rise of big business, the origins of the modern welfare state during the Great Depression, the crisis of civil liberties produced by two world wars and McCarthyism, and the Constitutional revolution wrought by the Warren Court. HIUS 150 is not a prerequisite for HIUS 151. **Prerequisite:** upper-division standing.

HIUS 152A. A Constitutional History of the United States to 1865 (4)

The historical development of constitutional thought and practice in the United States from the era of the American Revolution through the Civil War, with special attention to the role of the Supreme Court under Chief Justices Marshall and Taney. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 152B. A Constitutional History of the United States Since 1865 (4)

The historical development of constitutional thought and practice in the United States since 1865, with special attention to the role of the Supreme Court from Chief Justices Chase to Rehnquist. **Prerequisite:** upper-division standing or consent of instructor. +

HIUS 153. American Political Trials (4)

Survey of politicized criminal trials and impeachments from Colonial times to the 1880s. Examines politically-motivated

prosecutions and trials that became subjects of political controversy, were exploited by defendants for political purposes, or had their outcomes determined by political considerations. +

HIUS 154. Western Environmental History (4)

This course examines human interaction with the western American environment and explores the distinction between the objective environmental understanding of science and the subjective views of history and historians. The course will also analyze the most compelling environmental issues in the contemporary West.

HIUS 155. From Zoot Suits to Hip Hop: Race and Popular Culture since World War II (4)

Tracing popular cultural production and consumption in the U.S. since World War II. It historicizes popular culture as an arena where social relations are negotiated and where race, class, and gender identities are constructed, transformed, and contested. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 155A. Religion and Law in American History: Foundations to the Civil War (4)

Selected problems in the history of the relationship between religious beliefs and practice and legal institutions in the Anglo-American world. Topics include the English background, religion in the age of the American Revolution and the antebellum period. **Prerequisite:** upper-division standing or consent of instructor. +

HIUS 155B. Religion and Law in American History: Civil War to the Present (4)

Selected problems in the history of the relationship between religious beliefs and practice and legal institutions in America from the Civil War to the present. Topics include the religion and government aid; sacred duties and the law; and religion and cultural politics. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 156. American Women, American Womanhood (4)

This course explores the emergence of a dominant ideology of womanhood in America in the early nineteenth century and contrasts the ideal with the historically diverse experience of women of different races and classes, from settlement to 1870. Topics include witchcraft, evangelicalism, cult of domesticity, sexuality, rise of industrial capitalism and the transformation of women's work, Civil War, and the first feminist movement. **Prerequisite:** upper-division standing. +

HIUS 157. American Women, American Womanhood 1870 to Present

This course explores the making of the ideology of womanhood in modern America and the diversity of American women's experience from 1870 to the present. Topics include the suffrage movement, the struggle for reproductive rights and the ERA; immigrant and working-class women, women's work, and labor organization; education, the modern feminist movement and the contemporary politics of reproduction, including abortion and surrogate motherhood. **Prerequisite:** upper-division standing. +

HIUS 158/ETHN 130. Social and Economic History of the Southwest I (4)

This course examines the history of the Spanish and Mexican borderlands (what became the U.S. South-west) from roughly 1400 to the end of the U.S.-Mexico War in 1848, focusing specifically on the area's social, cultural, and political development. +

HIUS 159/ETHN 131. Social and Economic History of the Southwest II (4)

(Cross-listed as Ethnic Studies 131.) This course examines the history of the American Southwest from the U.S.-Mexican War in 1846–48 to the present, focusing on immigration, racial and ethnic conflict, and the growth of Chicano national identity.

Colloquia

The following courses are available to both undergraduate and graduate students. Undergraduates must receive a departmental stamp or permission of the instructor to register for the course.

Requirements for each course will differ for undergraduate, M.A., and Ph.D. students.

HIUS 160/260. Colloquium on the American Empire (4)

Course explores the concept of an American Empire by examination of the literature on the topic. Particular attention will be on the work since 9/11/01. Students are expected to produce original work concerning the definition and/or existence of an American Empire. Graduate students are expected to submit an additional piece of work. **Prerequisite:** upper-division standing or consent of instructor. Department stamp required.

HIUS 162/262. The American West (4)

This seminar will trace major themes in the history of the American West. Topics will include ethnicity, the environment, urbanization, demographics, and shifting concepts surrounding the significance of the West. Graduate students will be required to submit additional work in order to receive graduate credit for the course. **Prerequisite:** department stamp required.

HIUS 164/264/ETHN 181. Topics in Comparative History of Modern Slavery (4)

Slavery was both a thread of continuity in the history of the Americas and a distinctive institution in specific social settings. The purpose of this course is to examine and discuss readings that explore topics of the Caribbean and the United States. Because topics will vary, the seminar may be taken more than once for credit, with consent of the instructor. Requirements vary for undergraduates, M.A., and Ph.D. students. Graduate students are required to submit a more substantial piece of work. **Prerequisite:** upper-division standing or consent of instructor. +

HIUS 166/266. Topics in Southern History (4)

Specific topics will vary from year to year, including slavery, Civil War and Reconstruction, the Afro-American experience, race relations. +

HIUS 167/267/ETHN 180. Topics in Mexican-American History (4)

This colloquium studies the racial representation of Mexican Americans in the United States from the nineteenth century to the present, examining critically the theories and methods of the humanities and social sciences. **Prerequisite:** upper-division standing.

HIUS 168/268. Race, Resistance, and Cultural Politics (4)

The course investigates race, resistance, and culture in the U.S. since the late nineteenth century. It interrogates how working-class whites, African Americans, Latinos, Asian Americans, and others have simultaneously challenged, shaped, and assimilated into U.S. society. Graduate students are required to submit an additional paper. **Prerequisite:** upper-division standing or consent of instructor. Department stamp required.

HIUS 169/269. Topics in American Legal and Constitutional History (4)

A reading and discussion course on topics that vary from year to year, including American federalism, the history of civil liberties, and the Supreme Court. **Prerequisite:** consent of instructor.

HIUS 173/273. Topics in American Women's History (4)

The specific content of the course will vary from year to year but will always analyze in depth a limited number of issues in American women's history. Special topics. Requirements will vary for undergraduate, M.A., Ph.D. students. Graduate students will be required to submit a more substantial piece of work. **Prerequisite:** consent of instructor or department stamp.

HIUS 176/276. Race and Sexual Politics (4)

This seminar will explore the histories of sexual relations, politics, and cultures that both cross and define racial boundaries in the nineteenth and twentieth centuries. Reading will focus on the United States as well as take up studies sited in Canada and Latin America. Graduate students are expected to submit a more substantial piece of work. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 178/278 The Atlantic World, 1400–1800 (4)

This course explains the origin of the Atlantic as a zone of interaction for Europeans, indigenous Americans, and Africans, and evaluates the consequences of the interaction over several centuries by exploring contests over political power and economic/demographic change. Graduate students will submit a more substantial piece of work with in-depth analysis and with an increased number of sources cited. A typical undergraduate paper would be ten pages, whereas a typical graduate paper would require engagement with primary sources, more extensive reading of secondary material, and be about twenty pages. **Prerequisites:** upper-division or graduate standing and departmental stamp. +

HIUS 180/ETHN 134. Immigration and Ethnicity in Modern American Society (4)

Comparative study of immigration and ethnic-group formation in the United States from 1880 to the present. Topics include immigrant adaptation, competing theories about the experiences of different ethnic groups, and the persistence of ethnic attachments in modern American society. **Prerequisite:** upper-division standing.

HIUS 181/281. Topics in Twentieth Century United States History (4)

A colloquium dealing with special topics in U.S. history from 1900 to the present. Themes will vary from year to year. **Prerequisite:** department stamp or consent of instructor.

HIUS 183/283/ETHN 159. Topics in African American History (4)

A colloquium dealing with special topics in the history of people of African descent in the United States. Themes will vary from quarter to quarter. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students will be required to submit a more substantial piece of work. **Prerequisite:** upper-division standing or consent of instructor.

HIUS 187/287. Topics in American Social History (4)

Colloquium on selected topics in American social history. Topics will vary from year to year, and the course may therefore be repeated for credit.

HIUS 188/288. Topics in Culture and Politics (4)

Colloquium on select topics in culture and politics in the United States. Topics will vary from quarter to quarter. Graduate students will be required to submit an additional piece of work. **Prerequisite:** upper-division or graduate standing and department stamp.

HIUS 189/289. The Social History of Seafaring in Early America (4)

All American colonies were originally maritime colonies. This seminar examines the history of fishing, whaling, shipping, and freebooting during the age of sail and investigates through primary and secondary sources the experience of living in communities that followed the sea. Graduate students are required to submit an additional paper. **Prerequisites:** upper-division standing or consent of instructor and department stamp. +

HIUS 199. Independent Study in United States History (4)

Directed readings for undergraduates under the supervision of various faculty members. **Prerequisite:** consent of instructor and department stamp required.

GRADUATE

Graduate standing is a prerequisite for all graduate-level courses. For more graduate courses (200+), look at history undergraduate colloquia (courses numbered 160–190).

HIGR 200. History and Theory (4)

An introductory graduate course for students in all fields. Themes include cross-field historiography and theory, interdisciplinary approaches to history and historical method. (May be taken twice for credit, if the reading list is significantly different.)

HIGR 204A-B. The History of the University (4-4)

Traces the history and idea of the university from its medieval origins, with emphasis on its post-WWII incarnation as an engine of scientific investigation, economic growth, socio-cultural analysis, and artistic experimentation. Research project will utilize original sources in UCSD's archives. Students must complete both HIGR 204A and 204B in order to get credit for both. HIGR 204A focuses on the research portion of the class.

HIGR 205. Feminist Historical Studies (4)

An introduction to feminist historical studies, this course is designed for interested graduate students from all history field groups. Graduate students from other disciplines are also encouraged to participate. The course will provide students a rigorous training in women's history, in the feminist theories that undergird that scholarship, and in the emergent field of gender analysis. The particular content of the course will change from year to year, but each course will include theoretical texts, historical case studies, and primary sources. Readings will be drawn from different times and places. This course is strongly recommended for those preparing minor fields in women's history. The course can be repeated twice for credit.

HIGR 210. Historical Scholarship on Modern Chinese History (4)

This course will introduce students to the monographic literature and the main historiographic controversies of modern Chinese history.

HIGR 211. Historical Scholarship on Modern Japanese History (4)

This course will introduce students to the monographic literature and the main historiographic controversies of modern Japanese history.

HIGR 212. Historical Scholarship on Modern East Asian History (4)

This course will introduce students to the monographic literature and the main historiographic controversies of modern East Asian history.

HIGR 213. Sources on Modern Chinese History (4)

An introduction to Chinese documentary sources and collections on Qing and Republican History. This course will introduce students to the language of Qing documents, and to the contents and uses of imperial documents and archives, documentary collections, periodicals, gazetteers, etc.

HIGR 215A-B. Research Seminar in Modern Chinese History (4-4)

A two-quarter research seminar in Chinese history. A paper, based on original research, will be due in the second quarter. Seminar topics will vary. Reading knowledge of Chinese is expected. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. **Prerequisite:** 215A is a prerequisite for 215B.

HIGR 216A-B. Research Seminar in Modern Japanese History (4-4)

A two-quarter research seminar in Japanese history. A paper, based on original research, will be due in the second quarter. Seminar topics will vary. Reading knowledge of Japanese is expected. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. **Prerequisite:** 216A is a prerequisite for 216B.

HIGR 217A. Historical Scholarship on Pre-Modern Chinese History: Foundations—China before Buddhism (4)

Ancient society differed dramatically from the imperial, bureaucratic, commercial, Buddhist China of later times. Yet the texts and artifacts of antiquity echoed powerfully through the centuries. We will study foundational texts, practices, and objects in their own contexts and also consider their later uses.

HIGR 217B. Historical Scholarship on Pre-Modern Chinese History: Han Dynasty through the Song Dynasty (4)

Course introduces history and society during the Chinese Middle Ages (c. 200 BCE–1200 CE), including the Han, Six, Tang, and Song Dynasties. Examination of the birth and

development of China's great religions, Buddhism and Daoism, and the international culture of the Silk Road, and political and cultural systems that still resonate in China today.

HIGR 217C. Historical Scholarship on Pre-Modern Chinese History: Late Imperial Chinese History, 1200–1800 (4)

Course introduces major topics in scholarship on the Yuan, Ming, and Qing periods. It is intended to prepare graduate students to teach the history of late imperial China.

HIGR 218A. Graduate Seminar in Pre-Modern Chinese History (4)

Course subject varies among periods before 1900. 218A includes secondary scholarship studied for content, method, and structure; research methods and resources; and development of the research topic. In 218B students write an original research paper using primary sources. **Prerequisites:** graduate standing or consent of instructor. Reading knowledge of Chinese.

HIGR 218B. Graduate Seminar in Pre-Modern Chinese History (4)

Course subject varies among periods before 1900. 218A includes secondary scholarship studied for content, method, and structure; research methods and resources; and development of the research topic. In 218B students write an original research paper using primary sources. **Prerequisites:** graduate standing or consent of instructor. Reading knowledge of Chinese. HIGR 218A.

HIGR 220. Historical Scholarship on European History, 1500–1715 (4)

Introduction to the historiography on Renaissance, Reformation, and early modern Europe: an overview of methodologies with emphasis on sources and critical approaches. Required for all beginning European history graduate students.

HIGR 221. Historical Scholarship on European History, 1715–1850 (4)

Selected topics in European history from the early modern to the modern era. Readings and discussions focus on issues of methodology and interpretation. Required for all beginning European history graduate students.

HIGR 222. Historical Scholarship on European History, since 1850 (4)

Critical evaluation of selected topics in the period of modern Europe from the mid-nineteenth century to the present. Required for all beginning European history graduate students.

HIGR 230A-B. Research Seminar in Early Modern Europe (4-4)

Selected topics in the period from the sixteenth century through the early nineteenth, with an emphasis on the theory and practice of socio-economic history. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. **Prerequisite:** 230A is a prerequisite for 230B.

HIGR 231A-B. Research Seminar in Modern European History (4-4)

Selected topics in the period of the nineteenth and twentieth centuries. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. **Prerequisite:** 231A is a prerequisite for 231B.

HIGR 235. Science, Empire, and Exploration (4)

Examines links between scientific work, particularly expeditions and exploration, and political programs of empire in the seventeenth to twentieth centuries. Topics: collecting expeditions as expressions of empire; role of colonial administrative networks in facilitating field-based investigations; relation between European and non-European knowledge systems.

HIGR 236A-B. Research Seminar in History of Science (4-4)

A two-quarter research seminar comprising intensive study of a specific topic in the history of science. The first quarter will be devoted to readings and discussions; the second chiefly to the writing of individual research papers. Topics vary from year to year, and students may therefore repeat

the course for credit. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter.

HIGR 237. Topics in the History of Ocean Sciences (4)

(Cross-listed with SIO 201.) Intensive study of specific problems in the history of the ocean sciences, and of related earth and atmospheric sciences, in the modern period. Topics vary from year to year, and students may therefore repeat the course for credit.

HIGR 238. Introduction to Science Studies (4)

(Cross-listed as Communication 225A, Philosophy 209A, and Sociology 255A.) Study and discussion of classic work in history of science, sociology of science and philosophy of science, and of work that attempts to develop a unified science studies approach. Required for all students in the Science Studies Program. **Prerequisite:** enrollment in Science Studies Program.

HIGR 239. Seminar in Science Studies (4)

(Cross-listed as Communication 225B, Philosophy 209B, and Sociology 255B.) Study and discussion of selected topics in the science studies field. Required for all students in the Science Studies Program. May be repeated as course content changes annually. **Prerequisite:** enrollment in Science Studies Program.

HIGR 240. Colloquium in Science Studies (4)

(Cross-listed as Communication 225C, Philosophy 209C, and Sociology 255C.) A forum for the presentation and discussion of research in progress in science studies, by graduate students, faculty, and visitors. Required for all students in the Science Studies Program. May be repeated as course content changes annually. **Prerequisite:** enrollment in the Science Studies Program.

HIGR 241. Advanced Approaches to Science Studies (4)

(Cross-listed as COGR 225D, PHIL 209D, SOCG 255D.) Focus on recent literature in the history, philosophy, and sociology of science, technology, and medicine. Required for all students in the Science Studies Program. **Prerequisites:** HIGR 238 is a prerequisite for HIGR 241; enrollment in Science Studies Program or instructor's permission.

HIGR 242. Topics in the History of Earth and Life Sciences (4)

Intensive study of specific problems in the history of the life sciences and earth sciences, ranging in period from the Renaissance to the twenty-first century. May be repeated for credit as topics will vary annually. **Prerequisites:** graduate standing and department stamp required.

HIGR 243. Historical Scholarship in Technology (4)

An introduction to the historiography of technology. This reading seminar provides an overview of scholarly approaches to the history of technology by critically examining classic and contemporary works in the field. **Prerequisite:** graduate-standing or consent of instructor.

HIGR 244. Introduction to Sound Studies (4)

Study and discussion of classic and recent scholarship on sound production and cultures of listening. Emphasizes historical literature but also includes works in literary studies, art history, music, and other fields. **Prerequisite:** graduate standing or consent of instructor.

HIGR 245A-B-C. Historical Scholarship on Latin American History (4-4-4)

Introduction to the literature of Latin American history. A three-quarter sequence of readings and discussions taught each quarter by members of the staff. Required for all beginning students for a graduate degree specializing in Latin American history; open and strongly recommended to other students using Latin American history as a secondary field for a graduate degree. HIGR 245A covers the colonial period, from conquest to independence to today; HIGR 245B covers South America from independence to today; HIGR 245C covers Mexico, Cuba, and Central America from independence to today. The three quarters need not be taken in sequence. Reading knowledge of Spanish is required.

HIGR 247A-B. Research Seminar in Colonial Latin America (4-4)

A two-quarter course involving readings and research on sixteenth- through eighteenth-century Latin America. Students are expected to compose a paper based on original research that is due in the second quarter. Reading knowledge of Spanish required. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter.

HIGR 248A-B. Research Seminar in Latin America, National Period (4-4)

A two-quarter course involving readings and research; the first quarter is devoted to the nineteenth and the second quarter to the twentieth century. Students are expected to compose a paper based on original research that is due in the second quarter. An IP grade will be awarded at the end of the first quarter. Final grade will not be given until the end of the second quarter. Reading knowledge of Spanish and/or Portuguese is helpful but not required.

HIGR 252. History, Social Evolution, and Intellectuals in the Andes: Mariátegui, Haya de la Torre, and Arguedas (4)

The course will study three major twentieth-century interpreters of Andean history and society. Mariátegui is Latin America's most original socialist intellectual; Haya de la Torre is the founder of Peru's most important party; and Arguedas was the most profound interpreter of the role of Indian peasants in the Andean nations.

HIGR 255. The Literature of Ancient History (4)

An introduction to the bibliography, methodology, and ancillary disciplines for the study of ancient history together with readings and discussion on selected topics within the field. May be repeated for credit, topic will vary year to year.

HIGR 257A. Historical Scholarship on Modern Middle East, Eighteenth to Twentieth Century (4)

Readings in the historiographical literature on the late Ottoman Empire (eighteenth to twentieth century). **Prerequisite:** graduate standing or consent of instructor.

HIGR 257B. Historical Scholarship on Modern Middle East, Colonial Period (4)

Readings in the historiographical literature on Middle Eastern states in the colonial period. **Prerequisite:** graduate standing or consent of instructor.

HIGR 257C. Historical Scholarship on Modern Middle East, Post-Colonial Eras (4)

Readings in the historiographical literature on the Middle East in the national/post-colonial eras. **Prerequisite:** graduate standing or consent of instructor.

HIGR 260A-B-C. Historical Scholarship on Judaic Studies (4-4-4)

Weekly graduate seminar. Faculty and students present results of research. Student research may be towards course work on thesis.

HIGR 265A-B-C. Historical Scholarship on American History (4-4-4)

A three-quarter sequence of readings and discussions on the bibliographical and monographic literature of American history from the colonial period to the present. Taught by different members of the staff each quarter, the course is required of all beginning graduate students in American history.

HIGR 267A-B. Research Seminar in United States History (4-4)

Readings and discussion in selected areas of American history for advanced graduate students. An IP (in progress) grade will be awarded the first quarter. The second quarter will be devoted to the presentation, discussion, and evaluation of work in progress. A final grade will be awarded at the end of the second quarter. **Prerequisite:** 267A is a prerequisite for 267B.

HIGR 271. New Research Directions in U.S. History (4)

Students will develop skills in presenting and assessing new research and offering feedback to work in progress by senior students and faculty. Course is required to be taken twice by third-year students and highly recommended for audit by all students in U.S. History. (S/U grades only.)

HIGR 275A. Research Seminar in Middle Eastern History (4)

HIGR 275A is the first quarter of a two-quarter research seminar in Middle Eastern history. Seminar topics will vary. Reading knowledge of Arabic or Turkish is expected. A paper, based on original research, will be due at the end of the second quarter. Final grade will not be given until the end of the second quarter. **Prerequisite:** graduate standing or consent of instructor.

HIGR 275B. Research Seminar in Middle Eastern History (4)

HIGR 275B is the second quarter of a two-quarter research seminar in Middle Eastern history. Seminar topics will vary. Reading knowledge of Arabic or Turkish is expected. A paper, based on original research, will be due at the end of the quarter. Final grade will be awarded for HIGR 275A and B at the end of the second quarter. **Prerequisites:** 275A and graduate-standing or consent of instructor.

HIGR 295. Thesis Seminar (4)

For students advanced to candidacy to the doctorate. Discussion, criticism, and revision of drafts of chapters of theses and of work to be submitted for publication.

HIGR 298. Directed Reading (1–12)

Guided and supervised reading in the literature of the several fields of history. This course may be repeated for an indefinite number of times due to the independent nature of the content of the course. (S/U grades permitted.)

HIGR 299. Ph.D. Thesis Direction (1–12)

Independent work by graduate students engaged in research and writing of doctoral theses. This course may be repeated for an indefinite number of times due to the independent nature of thesis writing and research. (S/U grades only.)

HIGR 500. Apprentice Teaching in History (1–4)

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty: handling of discussions, preparation and grading of examinations and other written exercises, and student relations. (S/U grades only.)

Human Development Program

PROFESSORS

Farrell Ackerman, Ph.D., *Linguistics*
Mark Appelbaum, Ph.D., *Psychology*
Ursula Bellugi, Ph.D., *Adjunct/Psychology (Salk Institute)*
Sandra Brown, Ph.D., *Psychology and Psychiatry*
Aaron V. Cicourel, Ph.D., *Emeritus, Cognitive Science/Sociology*
Michael Cole, Ph.D., *University Professor, Communication*
Eric Courchesne, Ph.D., *Neurosciences*
Karen Dobkins, Ph.D., *Psychology*
Gail Heyman, Ph.D., *Psychology*
Jean M. Mandler, Ph.D., *Emeritus, Cognitive Science*
Hugh B. Mehan, Ph.D., *Sociology/CREATE*
Carol Padden, Ph.D., *Communication*
Laura Schreiberman, Ph.D., *Psychology*
Nicholas Spitzer, Ph.D., *Biology*
Joan Stiles, Ph.D., *Director, Cognitive Science*

ASSOCIATE PROFESSORS

Leslie J. Carver, Ph.D., *Psychology*
Gedeon Deak, Ph.D., *Cognitive Science*
James Moore, Ph.D., *Anthropology*
Olga A. Vasquez, Ph.D., *Communication*

ASSISTANT PROFESSORS

Sarah Creel, Ph.D., *Cognitive Science*
David Liu, Ph.D., *Psychology*

SENIOR LECTURER WITH SECURITY OF EMPLOYMENT

Paula Levin, Ph.D., *Education Studies Program*

LECTURERS

Stephen Potts, Ph.D., *Literature*
Clarissa J. Reese, Ph.D., *Human Development Program*

OFFICE: 5320 AP&M, Muir College
<http://hdp.ucsd.edu>

THE HUMAN DEVELOPMENT MAJOR

The scientific study of human development focuses on issues of growth, development, and behavioral change across the lifespan. The Human Development Program is interdisciplinary, incorporating courses from the Departments of Anthropology, Biology, Cognitive Science, Communication, Ethnic Studies, History, Linguistics, Literature, Psychology, Sociology, Education Studies Program, and Urban Studies and Planning Program. The curriculum is designed to emphasize the idea of development as an essential perspective from which to understand human behavior. The courses cover

a broad spectrum of issues in human development: from brain and perceptual development, to reasoning and problem solving, to social interaction and the evolution of cultural systems. The Human Development Program unifies and coordinates the excellent research and teaching resources currently available on campus in this area and profiles the factors that influence the ways in which humans develop and change.

Human development is a very large field, but there is a set of basic questions which serve to define and integrate it: What underlies the development of human knowledge? To what extent is the capacity to know, indeed the concepts themselves, encoded in the genes? How is the role of learning and environmental influences accounted for? How do we learn? What are the ways in which children become competent participants in their social groups? What is the origin and nature of social interaction and organization?

The study of human development has become increasingly central to a wide range of important issues affecting infants, young children, and adolescents, as well as the changing structure of the American family and public policy on children and education. An understanding of the processes that underlie human development is crucial to our evaluation of these issues and to our ability to offer avenues for remediation of the attendant problems. The three major areas of study within the Human Development Program are: Biological Development, Ontogenetic Development, and Socio-Cultural Development. These areas consider issues that pertain to development of specific neural and cognitive processes and development within a larger social and cultural context.

CAREER GUIDANCE

A degree in human development offers training of special interest to those considering admission to graduate or professional schools and careers in medicine, law, education, counseling, clinical psychology, public health, public policy, public administration, or social work. Students who are interested in these areas are advised to see a Human Development Program advisor for assistance in selecting elective and major courses. A major in human development is designed to impart fundamental skills in critical thinking, comparative analysis, research analysis, and written expression.

A human development major can offer preparation for teaching in elementary schools. However, if you are interested in earning a California teaching credential from UC San Diego, contact the Education Studies Program (EDS) for information about prerequisite and professional preparation requirements. It is recommended you contact EDS as early as possible in your academic career.

EDUCATION ABROAD

Students are often able to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP) while still making progress towards the major. Students interested in studying abroad should see a Human Development Program advisor to discuss curriculum plans and appropriate courses. It is strongly recommended that students obtain HDP pre-approval

for EAP courses that are intended to count toward the major. Information on EAP/OAP is detailed in the Education Abroad Program section of the *UC San Diego General Catalog*. Interested students should contact the Programs Abroad Office in the International Center and visit the Web site at <http://programsabroad.ucsd.edu/>. Financial aid is applicable and special study abroad scholarships are available.

PREREQUISITES FOR HUMAN DEVELOPMENT MAJORS

A bachelor of arts degree in human development will be given to students who satisfactorily complete the general-education and graduation requirements of Marshall, Muir, Revelle, Roosevelt, Sixth, or Warren College in addition to the Human Development Program requirements. In accordance with UCSD academic regulations, upper-division courses used to satisfy major requirements cannot be applied towards minors (please note there is some overlap permitted for double majors). See college advisor and major advisor for questions and restrictions.

APPLYING FOR THE HDP MAJOR

Students who wish to declare the Human Development Program major must meet premajor requirements and apply for entrance into the major. All lower-division requirements must be fulfilled before applying for the major. All lower-division courses must be completed with a grade of C or better. The cumulative GPA for the eight lower-division courses must equal or exceed 2.75. Students must meet with an HDP advisor and obtain approval to declare the human development major, no later than the second quarter of the student's junior year.

GRADE REQUIREMENTS FOR THE MAJOR

A minimum grade-point average of 2.0 is required in the major. Students must receive a grade of C- or better in any course counted toward fulfillment of the major requirements. **All courses taken to satisfy the program's lower- and upper-division requirements must be taken for a letter grade.** *HDP 1, HDP 150, HDP 181, and HDP 191 must be taken in residence.* No substitutions will be approved.

LOWER-DIVISION REQUIREMENTS

- 1. Introduction to Human Development: HDP1**
- 2. One statistics course** selected from the approved list: PSYC 60, COGS 14, BIEB 100, ECON 120A, POLI 30, or MATH 11
- 3. One formal skills course** selected from the approved list: PHIL 10, PHIL 12, LIGN 17, or one course from the MATH 10 sequence or MATH 20 sequence
- 4 & 5. Two biological sciences courses** selected from the approved list: ANTH 2, BILD 1, BILD 2, BILD 3, BILD 7, BILD 10, BILD 12, BILD 18, BILD 20, BILD 26, COGS 11, COGS 17, PSYC 2
- 6 & 7. Two social sciences courses** selected from the approved list: ANTH 1, ANTH 3, CAT 1, CAT 2, COGN 20, COGS 1, One course from the HILD 7A, B, or C sequence (only one allowed), LIGN 4, LIGN 7, LIGN 8, LIGN 101, MMW 1, MMW 2, PSYC 1, PSYC 3, PSYC 6, PSYC 7, SOCI 1, SOCI 20

8. **One computer literacy course** selected from the approved list: MAE 5, COGS 3, COGS 8, COGS 18, CSE 3, CSE 5A, CSE 11

UPPER-DIVISION REQUIREMENTS FOR THE HDP MAJOR

1. **Two Methods courses**
2. **Four Core Series courses**
3. **Six Development courses**
4. **HDP 150**
(Full information follows)

A. Methods Courses

1. **HDP 181** (Students are encouraged to take this course their junior year.)
2. **HDP 191** (Students are encouraged to take this course their junior year.)

B. Core Series Courses

(Four courses selected from the approved list required, one from each DOMAIN)

Domain 1: The biological basis of human development

HDP 110. Brain and Behavioral Development
ANBI 111. Advanced Principles of Human Evolution
BIPN 144. Developmental Neurobiology

Domain 2: Ontogenetic—the social-cognitive and linguistic basis of human development (Two required—one from each area)

A. Social-Cognitive Development (One required)

HDP 121/COGS 110. The Developing Mind
HDP 122. Social Development
PSYC 187. Development of Social Cognition

B. Language Development (One required)

HDP 120. Language Development
COGS 156. Language Development
LIGN 171. Child Language Acquisition

Domain 3: The socio-cultural basis of human development

HDP 133. Socio-cultural Foundations of Human Development
ANSC 126. Childhood and Adolescence
HITO 126. History of Childhood

C. Development Courses

(Six courses required; at least one from each area of focus)

Biological Development

ANBI 116. The Evolution of Primate Reproduction
ANBI 140. The Evolution of the Human Brain
ANBI 159. Biological and Cultural Perspectives on Intelligence
ANBI 173. Cognition in Animals and Humans
ANTH 102. Humans are Cultural Animals
BICD 100. Genetics
BICD 130. Embryos, Genes, and Development
BICD 131. Embryology Laboratory
BICD 134. Human Reproduction and Development
BIPN 144. Developmental Neurobiology

COGS 115. Neurological Development and Cognitive Change
COGS 184. Modeling the Evolution of Cognition
PSYC 168. Psychological Disorders of Childhood
Ontogenetic Development

COGS 113. Cognitive Development
COGS 154. Communication Disorders in Children and Adults
COGS 156. Language Development
COHI 100. Introduction to Communication and the Individual
COHI 114. Bilingual Communication
COHI 119. Learning to Read
COHI 121. Literacy, Social Organization, and the Individual
EDS 119/LIGN 119. First and Second Language Learning: From Childhood through Adolescence
LIGN 171. Child Language Acquisition
LIGN 179. Second Language Acquisition
PSYC 101. Introduction to Developmental Psychology
PSYC 136. Cognitive Development
PSYC 146. Language and Conceptual Development
PSYC 156. Cognitive Development in Infancy
PSYC 168. Psychological Disorders of Childhood
PSYC 172. Psychology of Human Sexuality
PSYC 180. Adolescence
PSYC 187. Development of Social Cognition
PSYC 190. Parenting
Socio-Cultural Development

ANBI 159. Biological and Cultural Perspectives on Intelligence
ANSC 125. Gender, Sexuality, and Society
ANSC 126. Childhood and Adolescence
ANSC 127. Discourse, Interaction, and Social Life
COHI 123. Children and Media
EDS 115. Cognitive Development and Education
EDS 117. Language, Culture, and Education
HDP 115/COMT 115. Media and Design of Social Learning Contexts
HDP 135/COMT 116. Practicum in Child Development
LTWL 114. Children's Literature
LTWL 116. Adolescent Literature
PSYC 180. Adolescence
PSYC 190. Parenting
SOC 117. Language, Culture, and Education
SOC 116 / LIGN 174. Gender and Language in Society
SOC 129. The Family
SOC 131. Sociology of Youth
SOC 159. Special Topics in Organizations and Institutions (Only when topic is approved for HDP major)
SOC 161. Sociology of The Life Course
USP 145. Aging—Social and Health Policy Issues

D. HDP 150. Advanced Human Development

(HDP students should enroll in this course in their senior year.)

ADVANCED HUMAN DEVELOPMENT REQUIREMENT HDP 150

Seminar for graduating HDP seniors. Readings and discussion of special topics in human

development. Provides advanced-level study on subfields of human development. Topics vary quarterly. **Prerequisites:** HDP1, HDP 181, HDP 191, senior standing, and department approval one quarter prior to enrollment.

FIELD RESEARCH REQUIREMENT HDP 191

This course provides students with the opportunity to participate jointly in a research project in conjunction with a mentor/collaborator from a local service site. This applied research experience allows students to design and conduct research projects in a variety of settings ranging from laboratory research settings to service oriented placements. In addition to literature research and a final paper at the end of the quarter, students will participate at an off-campus site for a minimum of four hours per week. Research sites are prearranged one academic year in advance (see the student affairs office or the HDP Web site for enrollment information). Students' interests and future career plans are considered for site placement. Various research orientations and methodologies are reviewed in class. **Prerequisites:** HDP 1 and department approval one academic year prior to enrollment.

HONORS IN HUMAN DEVELOPMENT HDP 194A-B-C

The Human Development Program offers an honors option for those students who have demonstrated excellence in the human development major. The honors program allows eligible undergraduates to explore advanced issues in the field through an honors thesis on a topic of their choice and under faculty supervision. In order to be admitted to the honors program, students must have 1) junior standing and 2) maintained a minimum cumulative grade-point average of 3.2, and a 3.5 GPA for courses taken in the human development major. Interested students need to apply for departmental honors in spring quarter of their junior year. Students in the honors program are expected to complete the following additional requirements:

1. An advanced course in statistics or methods design (see the HDP student affairs office for more information).
2. HDP 194A-B-C, a year-long independent research project, which results in an Honors Thesis.
3. Weekly attendance of the Center for Human Development Seminar and participation.

PETITIONING COURSES

There are three circumstances under which petitions to receive credit for courses not explicitly approved for the major will be considered (all approved courses are detailed in the *UC San Diego General Catalog*, HDP section): Requests from transfer students, requests from students planning to study abroad, and exceptional courses identified by a student. In all cases, students are required to submit a petition **in writing** that clearly describes the course for which they wish to receive HDP major credit, and to attach to the petition as much information as possible about the content of the course (e.g., syllabus, course description, etc.). With the exception of courses petitioned by transfer students, ALL REQUESTS FOR APPROVAL OF COURSES NOT

EXPLICITLY LISTED IN THE UC San Diego General Catalog SHOULD BE SUBMITTED BEFORE THE COURSE IS TAKEN BY THE STUDENT.

Transfer students. Students transferring from a community college or other university must petition for HDP credit for courses taken at their previous institution. For students transferring from the California Community College System, articulation agreements for many courses have been developed that facilitate the petition process. Transfer students should make an appointment with an HDP advisor to review courses for which they will most likely receive credit and fill out a written petition for each course.

Education Abroad. Students planning to study abroad may receive credit toward the major for courses taken in another country. IT IS STRONGLY RECOMMENDED THAT STUDENTS RECEIVE PRELIMINARY APPROVAL (BEFORE LEAVING THE COUNTRY) FOR COURSES THEY ARE CONSIDERING TAKING DURING THEIR TIME ABROAD. While the preliminary approval does not guarantee that the actual course will be approved, the great majority of courses for which preliminary approval has been obtained are approved when the actual petition is submitted upon the student's return.

Other courses. Occasionally students identify a UCSD course that has the potential to fulfill an HDP requirement. Students may petition **in writing** to request credit for such courses. However, it is important to note that very few such petitions are successful, and students are strongly cautioned to petition and receive approval for such a course BEFORE ENROLLING IN THE COURSE.

Note: Courses are not officially approved for credit until the written petition has been approved by the HDP Executive Committee and signed by the HDP director.

THE MINOR PROGRAM

(Courses must be discussed with and approved by a Human Development academic advisor.) A total of **seven** courses are required to complete a minor in human development. These include **Introduction to Human Development** (HDP 1), and **six** developmental courses, one from each major area of study from the developmental course list. All courses for the HDP minor must be taken for a letter grade.

Finish-in-Four Plan

Students interested in a particular career field should see the student affairs office for more specific Finish-in-Four plans for their particular college.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

HDP 1. Introduction to Human Development (4)

This course introduces students to the central issues in the basic areas in human development. The course will explain relationships between biological, cognitive, social, and cultural aspects of development. Offered once per year. (F)

HDP 87. Freshman Seminar (1)

This seminar is designed to provide new students with the opportunity to explore an intellectual topic in a small seminar setting. Topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

HDP 98. Directed Group Study (1-2)

Directed group study, on a topic or in a field not included in the department curriculum, by arrangement with a faculty member. Topics will vary from quarter to quarter. Pass/Not Pass grades only. Enrollment requires prior consent of the instructor; students must have at least thirty units completed and a minimum 3.0 GPA. Student may enroll for no more than a total of two units in one quarter. Cannot be used towards HDP major credit. **Prerequisites:** 3.0 GPA and at least thirty units completed.

HDP 99. Independent Study in Human Development (2-4)

Independent study and research under the direction of a human development program, or affiliated, faculty member. Pass/Not Pass only. Cannot be used towards HDP major credit. **Prerequisites:** lower-division standing, completion of thirty units of UCSD undergraduate study, a minimum UCSD GPA of 3.0, and a completed and approved Special Studies form: UCSD Application for Enrollment Special Studies Courses 97, 98, 99.

UPPER-DIVISION

HDP 110. Brain and Behavioral Development (4)

The purpose of this course is to familiarize students with basic mechanisms of brain and behavioral development from embryology through aging. Multiple levels of analysis will be discussed, including the effects of hormones on behavior, developmental events at the level of cells, structures, and neural systems, and the neural basis of cognition, social, perceptual, and language development. **Prerequisite:** HDP 1 or PSYC 101.

HDP 115. Media and Design of Social Learning Contexts (6)

(Same as COMT 115) A combined lecture/lab course cross-listed in communication and human development. Students attend lecture, write field notes, and spend three hours per week in specially designed after-school setting working with children and designing new educational media and producing special projects. **Prerequisite:** HDP 1 or COHI 100. (F,W,S)

HDP 120. Language Development (4)

Examination of children's acquisition of language from babbling to the formation of sentences. Topics covered include: pre-linguistic gestures, relationships between babbling and sound systems, speech perception, linking words with objects, rule overgeneralization, bilingualism, nature vs. nurture, individual differences, cultural differences. **Prerequisite:** HDP 1.

HDP 121. The Developing Mind (4)

(Same as COGS 110.) This course examines changes in thinking and perceiving the physical and social world from birth through childhood. Evidence of significant changes in encoding information, forming mental representations, and solving problems is culled from psychological research, cross-cultural studies, and cognitive science. **Prerequisite:** HDP 1 or COGS 1.

HDP 122. Social Development (4)

This course covers topics in social development research. Content will address general principles such as the mutual influences of caregivers and children upon each other and the interplay of person and context. Discussion areas will include attachment, parenting styles, gender differences, aggression, social cognition, social components of achievement motivation, and development of conscience. **Prerequisite:** HDP 1.

HDP 133. Socio-cultural Foundations of Human Development (4)

This course will provide students with an understanding of the social and cultural foundations of human development. The topics will be explored with both national and inter-

national comparisons from infancy through adolescence. **Prerequisite:** HDP 1 or PSYC 1.

HDP 135. Practicum in Child Development (6)

(Same as COMT 116) A combined lecture and laboratory course for students in psychology, communication, and human development. Student backgrounds should include a background in general psychology or communication. Students will be expected to spend four hours a week in a supervised practical after-school setting at one of the community field sites involving children. Additional time will be devoted to readings and class prep, as well as six hours a week transcribing field notes and writing a paper on some aspect of the fieldwork experience as it relates to class lectures and readings. **Prerequisite:** HDP 1 or COHI 100 or PSYC 101. (F,W,S)

HDP 150. Advanced Human Development (4)

Seminar for graduating HDP seniors. Readings and discussion of special topics in human development. Provides advanced-level study on subfields of human development. Topics vary quarterly. **Prerequisites:** HDP 1, HDP 181, HDP 191, senior standing, and department approval. (F,W,S)

HDP 160. Special Topics Seminar in Human Development (4)

Special topics in human development are discussed. (May repeat when topics vary.) **Prerequisite:** department approval.

HDP 181. Experimental Projects in Human Development Research (6)

This laboratory course in human development is designed around a variety of intensive experimental projects. With lectures providing background information on research methods and child development, each assignment will include data collection and/or analysis, and a written laboratory report. **Prerequisites:** HDP 1, Statistics, and must be a declared HDP major. (F,W,S)

HDP 191. Field Research in Human Development (6)

This course combines lectures on research methodology (three hours/week) with an applied field research experience (four hours/week) conducted at a pre-approved study site. Required: Completion of a field notebook, review paper, oral presentation, and final paper. **Prerequisites:** HDP 1. Students must submit the pre-enrollment questionnaire one academic year prior to enrollment. See HDP Web site for details. (F,W,S)

HDP 193. Advanced Research in Human Development (4)

Specialized research project under the direction of a human development affiliated faculty member. May be taken for one or two quarters of credit. **Prerequisites:** declared HDP major, overall GPA of 2.8, ninety units completed, three HDP core courses completed, and consent of instructor.

HDP 194A-B-C. Honors Thesis (4-4-4)

Students will take part in a weekly research seminar. In addition, they will plan and carry out a three-quarter research project under the guidance of a faculty member. The project will form the basis for their senior honors thesis. **Prerequisites:** overall GPA of 3.2, and a 3.5 GPA for courses taken in the human development major; an advanced course in statistics or experimental design, and consent of instructor.

HDP 195. Instructional Apprentice in Human Development (4)

Introduction to teaching within the discipline of human development. Students will attend lecture, be responsible for assisting the instructor with course preparation, and will lead a discussion section of one of the lower-division courses in the human development program. Limited to upper-division students majoring in human development with consent of instructor. Pass/Not Pass only. **Prerequisites:** Declared HDP major, overall GPA of 3.0, 90 units completed, and consent of instructor.

HDP 199. Independent Study in Human Development (4)

Independent study and research under the direction of a faculty member. Pass/Not Pass only. **Prerequisites:** consent of the instructor, completion of at least ninety undergraduate units with a minimum of 2.5 GPA, and a completed and approved Special Studies Form.

Humanities

OFFICE: Galbraith Hall, Room 180, Revelle College
<http://humanities.ucsd.edu>

The Humanities Program offers interdisciplinary courses in history, philosophy, and literature, with a focus on major aspects of the Western humanistic tradition. In these courses, students examine the development of a wide variety of ideas and forms of expression that exert a major influence on modern America. Through lectures and class discussions, and through the writing of essays, students learn to interpret literary, historical, and philosophical texts and to conduct independent critical assessments of documents and ideas.

The sequence of courses, Humanities 1 through 5, meets the humanities and writing requirement of Revelle College. Instruction in university-level writing is part of all five courses, but students in Humanities 1 and 2 (six units each) receive intensive writing instruction.

Students must have satisfied the UC Entry Level Writing requirement before registering for any part of the humanities sequence. Humanities 1 and 2 must be taken before Humanities 3-4-5.

For detailed description of the Revelle College humanities requirement, see "[Revelle College, General-Education Requirements, Humanities](#)."

THE HUMANITIES MINOR

The humanities minor consists of at least seven courses chosen from the listings of the Departments of History, Philosophy, Literature, Visual Arts, Music, and Theatre. All seven courses may be selected from the upper-division offerings, but at least five upper-division courses must be included. Students for whom Humanities 1-5 fulfill general-education requirements may use two of these courses towards fulfillment of requirements for the humanities minor.

For students who entered UC San Diego before January 1, 1998, the required number of courses for the minor is six courses, at least three of which must be upper-division.

Courses selected for the minor must be selected from the offerings of more than one department. They must concern themselves with more than one historical, national, or ethnic culture; and they must offer broad treatment of centrally important topics in the humanities. Thus, a course on the history of the United States since the Civil War would be appropriate for the humanities minor, while a course in the history of California would not.

Here are some examples of study lists appropriate for the present humanities minor:

Example 1

History HILD 2AB. United States

History HILD 11. East Asia and the West 1279-1911

History HIEU 143. European Intellectual History, 1870-1945

Literature LTEA. 110B: Modern Chinese Fiction in Translation

Philosophy 160. Ethical Theory

Philosophy 177. Philosophy and Literature

Theatre and Dance TDHT 116. Old Myths in New Films

Example 2

Theatre and Dance TDGE 11. Great Performance on Film

History HILA 102. Latin America in the Twentieth Century

History HIAF 111. Modern Africa since 1880

Literature LTAM 110. Latin American Literature in Translation

Literature LTEN 184. African American Poetry

Music 114. Music of the Twentieth Century

Visual Arts 126J. African and Afro-American Art

Example 3

Humanities HUM 1. The Foundations of Western Civilization: Israel and Greece

Humanities HUM 2. Rome, Christianity and the Middle Ages

Literature LTEN 145. The English Novel in the Twentieth Century

Literature LTEN 146. Women and English/American Literature

Literature LTNE 101. The Bible: The Narrative Books

Philosophy 175. Aesthetics

Philosophy 177. Philosophy and Literature

Students should review their plans for the minor with the humanities advisor as well as with the advisors in their college. Before undertaking the minor, students must submit a study list for approval to the humanities office.

THE HUMANITIES MAJORS

Normally, students interested in majoring in humanities must choose a specific major in the humanities departments, i.e., history, literature, or philosophy. But students from Revelle and Muir Colleges may request to graduate with an approved individual/special project major in the humanities.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010-11, please contact the department for more information.

LOWER-DIVISION

1. The Foundations of Western Civilization: Israel and Greece (6)

Texts from the Hebrew Bible and from Greek epic, history, drama, and philosophy in their cultural context. Revelle students must take course for letter grade. **Prerequisite:** satisfaction of the UC Entry Level Writing requirement. (W)

2. Rome, Christianity, and the Middle Ages (6)

The Roman Empire, the Christian transformation of the classical world in late antiquity, and the rise of a European culture during the Middle Ages. Representative texts from Latin authors, early Christian literature, the Germanic tradition, and the high Middle Ages. Revelle students must take course for letter grade. **Prerequisite:** satisfaction of the UC Entry Level Writing requirement. (S)

3. Renaissance, Reformation, and Early Modern Europe (4)

The revival of classical culture and values and the reaction against medieval ideas concerning the place of human beings in the world. The Protestant Reformation and its intellectual and political consequences. The philosophical background to the scientific revolution. Revelle students must take course for letter grade. **Prerequisite:** satisfaction of the UC Entry Level Writing requirement. (F)

4. Enlightenment, Romanticism, Revolution (1660-1848) (4)

The enlightenment's revisions of traditional thought; the rise of classical liberalism; the era of the first modern political revolutions; romantic ideas of nature and human life. Revelle students must take course for letter grade. **Prerequisite:** satisfaction of the UC Entry Level Writing requirement. (W)

5. Modern Culture (1848-present) (4)

Challenges to liberalism posed by such movements as socialism, imperialism, and nationalism; the growth of new forms of self-expression and new conceptions of individual psychology. Revelle students must take course for letter grade. **Prerequisite:** satisfaction of the UC Entry Level Writing requirement. (S)

195. Methods of Teaching Humanities (4)

An introduction to teaching humanities. Students are required to attend weekly discussions on methods of teaching humanities, and will teach discussion sections of one of the humanities courses. Attendance at lecture of the course in which the student is participating is required. (P/NP grades only.) **Prerequisite:** consent of instructor. (W, S)

199. Special Studies (2-4)

Individually guided readings or projects in area of humanities not normally covered in standard curriculum. **Prerequisite:** upper-division standing or consent of instructor.

200. Seminar in the Humanities (4)

Selected topics in the history, literature, and thought of Mediterranean antiquity and its successor-cultures. Emphasis on identifying both common themes and cultural distinctiveness. Discussion of pedagogical approaches to this material. Required of all graduate instructional assistants in the humanities sequence. **Prerequisite:** graduate standing. (F)

International Migration Studies Minor

AFFILIATED FACULTY AND STAFF

Marisa Abrajano, Ph.D., *Political Science*
Robert Alvarez, Ph.D., *Ethnic Studies*
William Chandler, Ph.D., *Political Science*
Wayne Cornelius, Ph.D., *Political Science, Emeritus*
Yen Espiritu, Ph.D., *Ethnic Studies*
David Fitzgerald, Ph.D., *Sociology*
David Gutiérrez, Ph.D., *History*
Zoltan Hajnal, Ph.D., *Political Science*
Gordon Hanson, Ph.D., *IR/PS and Economics*
John Haviland, Ph.D., *Anthropology*
April Linton, Ph.D., *Sociology*
Jorge Mariscal, Ph.D., *Literature*
Everard Meade, Ph.D., *History*
David Pedersen, Ph.D., *Anthropology*
John Skrentny, Ph.D., *Sociology*
Elana Zilberg, Ph.D., *Communication*

OFFICE: 329 Eleanor Roosevelt College
Administration Building
(858) 534-9864

<http://roosevelt.ucsd.edu/int-migrat-studies/index.html>

THE MINOR

The minor in International Migration Studies is administered by Eleanor Roosevelt College (ERC). It is designed to provide students with an in-depth understanding of the causes, politics, and social consequences of international migration from a broad comparative perspective. This program of study helps to prepare students for a career in research and teaching, immigrant service-providing organizations, government agencies, or law. The unique research and writing opportunities offered by this minor also make it an excellent preparation for graduate school.

This interdisciplinary minor covers a wide range of topics, including the economic, cultural, demographic, and political impacts of immigration; laws and government policies for controlling immigration and refugee flows; ethnic, gender, citizenship, and transnational dimensions of immigration; the integration of immigrant minorities in receiving societies; and immigrant history and literature. Students learn about other countries of immigration (especially in Western Europe and East Asia) in order to place the U.S. experience in comparative perspective.

REQUIREMENTS

The minor consists of a total of seven courses (twenty-eight units). The requirements can be fulfilled by courses at the lower- and upper-division levels or a combination of course work and either field research in immigrant communities or internships with local immigrant service organizations.

For more information about minor requirements, visit <http://roosevelt.ucsd.edu/int-migrat-studies/index.html>.

1. All students in the minor are required to take one lower-division U.S. ethnic diversity course from the following list:

ANLD 23. Debating Multiculturalism: Race, Ethnicity, and Class in American Societies (4)

DOC 2. Dimensions of Culture: Justice (6)

ETHN 1A. Introduction to Ethnic Studies: Population Histories of the United States (4)

ETHN 1B. Introduction to Ethnic Studies: Immigration and Assimilation in American Life (4)

HILD 7A. Race and Ethnicity in the United States (4)

HILD 7B. Race and Ethnicity in the United States (4)

HILD 7C. Race and Ethnicity in the United States (4)

POLI 40. Introduction to Law and Society (4)

USP 3. The City and Social Theory (4)

2. Students must also take one of the following upper-division overview courses on comparative immigration:

POLI 150A. The Politics of Immigration: The U.S. in Comparative Perspective (4)

SOC B 125. Sociology of Immigration (4)

3. Students complete the minor (twenty more required units) by pursuing one of two separate tracks.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Track A: Additional Course Work

Students choosing this track will take five additional courses from the following list, four of which must be upper-division. Students in the course work track may not take more than a total of four courses from any one department for this minor.

ANLD 23. Debating Multiculturalism: Race, Ethnicity, and Class in American Societies (4)
(if not taken as a required course above)

COHI 114. Bilingual Communication (4)

COHI 175. Advanced Topics: Communication and the Borderlands (4)

COCU 164. Representing Race, Nation, and Violence in Multicultural California (4)

COCU 168. Latino Space, Place, and Culture (4)

COCU 175. Advanced Topics in Communication, Culture: A Discussion of Migrant's Survival Strategies in the Southwest (4)

COCU 175 E00. Advanced Topics in Built Environment: Space, Place, and Culture: The Politics and Poetics of the Latino Barrio (4)

CO 175. Special Topics: Transnationalism and Globalization (4) (proposed course)

ECON 114. Economics of Immigration (4)

ETHN 1A. Introduction to Ethnic Studies: Population Histories of the United States (4)
(if not taken as a required course above)

ETHN 1B. Introduction to Ethnic Studies: Immigration and Assimilation in American Life (4)
(if not taken as a required course above)

ETHN 116. The United States-Mexico Border in Comparative Perspective (4)

ETHN 118. Contemporary Immigration Issues (4)

ETHN 121. Contemporary Asian-American History (4)

ETHN 122. Asian-American Culture and Identity (4)

ETHN 123. Asian-American Politics (4)

ETHN 144. Bilingual Communities in the U.S.A. (4)

ETHN 151. Ethnic Politics in America (4)

ETHN 189. Special Topics: Chicana/Latina Identities (4)

ETHN 189. Special Topics: Comparative Vietnamese and Filipino American Identities and Communities (4)

ETHN 189. Special Topics: Work and Family in Immigrant Communities (4)

HIEU 181. Immigration, Ethnicity, and Identity in Contemporary European Society (4)

HIEU 182. The Muslim Experience in Contemporary European Society (4)

HILA 162. Topics in Latin American History: The United States and El Salvador (4)

HILD 7A. Race and Ethnicity in the United States (4)
(if not taken as a required course above)

HILD 7B. Race and Ethnicity in the United States (4)
(if not taken as a required course above)

HILD 7C. Race and Ethnicity in the United States (4)
(if not taken as a required course above)

HIUS 124. Asian-American History (4)

HIUS 140. Economic History of the United States I (4)

HIUS 141. Economic History of the United States II (4)

HIUS 167. Topics in Mexican-American History (4)

HIUS 180. Immigration and Ethnicity in Modern American Society (4)

LTAM 100. Latino/a Cultures in the United States (4)

LTAM 102. Contemporary Chicano/a-Latino/a Cultural Production: 1960 to Present (4)

LTAM 105. Gender and Sexuality in Latino/a Cultural Production (4)

LTAM 106. Modern Chicana and Mexican Women Writings (4)

LTAM 107. Comparative Latino/a and U.S. Ethnic Cultures (4)

LTAM 109. Cultural Production of the Latino/a Diasporas (4)

LTSP 150A. Early Latino/a-Chicano/a Cultural Production: 1848 to 1960 (4)

LTSP 150B. Contemporary Latino/a-Chicano/a Cultural Production: 1960 to Present (4)

LTSP 151. Topics in Chicano/a-Latino/a Cultures (4)

LTSP 177. Literary and Historical Migrations (4)

LLEN 178. Comparative Ethnic Literature (4)

LLEN 181. Asian-American Literature (4)

POLI 100H. Race and Ethnicity in American Politics (4)

POLI 150A. Politics of Immigration (4)
(if not taken as a required course above)

SOC B 114. Culture and Ethnicity (4)

SOC B 125. Sociology of Immigration (4)
(if not taken as a required course above)

SOC B 127. Immigration, Race, and Ethnicity (4)

**SOC B 133. Immigration in
Comparative Perspective (4)**

**SOC C 139. Social Inequality:
Class, Race, and Gender (4)**

SOC C 140F. Law and Workplace (4)

SOC C 163. Migration and the Law (4)

**SOC D 151. Comparative Race
and Ethnic Relations (4)**

SOC D 169. Citizenship, Community, and Culture (4)

SOC D 175. Nationality and Citizenship (4)

SOC D 183. Minorities and Nations (4)

THHS 111. Hispanic-American Dramatic Literature (4)

**USP 135. Asian and Latina Immigrant
Workers in the Global Economy (4)**

Track B: Field Research or Internship

Students choosing this track will receive intensive training in field research methods appropriate for studying international migration and then conduct field research in immigrant communities or do an academic internship in a local immigrant/refugee service-providing organization.

(A) Field Research Methods, Practicum, and Data Analysis

Students who choose this option will take the following three-course sequence:

**Sociology 122A. Field Research Methods
for Migration Studies (Fall Quarter)**

**Sociology 122B. Field Research
Practicum (Winter Quarter)**

**Sociology 122C. Data Analysis/
Write-up (Spring Quarter)**

These courses provide students with field research methods training and allow them to go to Mexico for two weeks to conduct research in a rural community that sends migrant workers to the United States. They will also analyze and write up the data that is collected. Participants must be proficient in Spanish.

(B) Independent Field Research

Students who choose this option are required to take one upper-division research-methods course from the following:

ETHN 190. Studying Racial and Ethnic Communities

SOC 104. Field Research–Participant Observation

SOC 108A. Survey Research Design

Students will complete the remaining sixteen units of the research track for this minor through a combination of courses from the list under Track A and by completing one or two 199, Independent Studies courses (four units each), in order to pursue a field research project with a faculty member. They will be required to conduct field research in a

local immigrant community and write a substantial research paper based on this research.

(C) Internship

Students who choose this option are required to take one upper-division research-methods course from the following:

ETHN 190. Studying Racial and Ethnic Communities

SOC 104. Field Research–Participant Observation

SOC 108A. Survey Research Design

Students will then do an academic internship in a nongovernmental organization or government agency that serves immigrants or refugees in the San Diego/Tijuana area. Internships for up to eight units will be arranged by the UCSD Academic Internship Program (AIP). The remaining units needed to complete the minor will consist of courses from the list under Track A.

Graduate School of International Relations and Pacific Studies (IR/PS)

PROFESSORS

Roger E. Bohn, Ph.D.
Marsha A. Chandler, Ph.D.
Peter F. Cowhey, Ph.D., *Dean*
Richard E. Feinberg, Ph.D.
Peter A. Gourevitch, Ph.D.
Stephan M. Haggard, Ph.D.
Gordon H. Hanson, Ph.D.
Takeo Hoshi, Ph.D.
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THE MASTER OF PACIFIC INTERNATIONAL AFFAIRS (M.P.I.A.)

REQUIREMENTS FOR ADMISSION

Students interested in pursuing the M.P.I.A. degree program at UCSD's Graduate School of International Relations and Pacific Studies (IR/PS) must have earned a B.A., or its equivalent, from an institution of comparable standing to the University of California. A minimum grade-point average of 3.0 or better in undergraduate course work or prior graduate study is required for admission. Undergraduate preparation that includes one or more of the following areas is strongly encouraged: the social sciences (specifically economics and political science), quantitative methods (such as calculus and statistics), foreign language, and related area studies courses. The admissions committee looks for students with previous professional employment, a history of meaningful international experience, and demonstrated leadership ability.

Applicants are required to submit the following: an online UCSD application for graduate study (<http://graduateapp.ucsd.edu>); two official transcripts from each college or university attended; three letters of recommendation; a résumé or curriculum vitae; a personal statement; a Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) score report. Test of English as a Foreign Language (TOEFL) scores are also required of international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. A minimum score of 550 on the paper/pencil version and a minimum score of 213 on the computer-based version of the TOEFL is required. For further details regarding the application process, procedures, and deadlines please visit the IR/PS Web site, <http://irps.ucsd.edu>, and click on "Programs."

Orientation tours are available for all prospective applicants who would like further information about the M.P.I.A. program. Tours assist prospective applicants in becoming better acquainted with IR/PS's M.P.I.A. program and in understanding how the program might relate to their long-term career goals. To sign up for a tour, please contact the IR/PS Office of Admissions at (858) 534-5914 or e-mail irps-apply@ucsd.edu.

The M.P.I.A. is a two-year, full-time program.

THE M.P.I.A. CURRICULUM

The M.P.I.A. curriculum (ninety-eight units) is made up of a set of core disciplinary and skill-oriented courses (thirty-eight units), a regional specialization (eight units), the foreign language requirement (up to twenty-four units), a professional career track (twenty-four units), and unstructured electives.

Core Curriculum

The core curriculum is designed to integrate diverse subject areas such as international management, international relations, applied economics, and comparative public policy. It comprises the following courses:

Globalization, the World System and the Pacific (IRCO 412)
Managerial Economics (IRCO 401)
Policy Making Processes (IRCO 400)
Quantitative Methods (IRCO 453 and IRCO 454)
International Politics and Security (IRCO 410)
International Economics (IRCO 403)
Finance (IRCO 421)
Accounting (IRCO 420)
Capstone course—choices include Managerial Decision Making (IRCO 460), Business and Government in the Global Economy (IRCO 461), Public Policy Workshop (IRCO 462), Strategy and Negotiation (IRCO 463)
The Corporation in the Global Economy (IRCO 464)

The Regional Specialization

The regional specialization is made up of two designated courses on the economy and political system of a student's chosen country or region. All students must complete a regional specialization, and may choose from among the following five options: Latin America, Japan, Korea, China, and Southeast Asia.

The Foreign Language Requirement

IR/PS considers foreign language competency to be an indispensable skill for international relations professionals. The foreign language requirement is designed to ensure that students achieve a level of competency to assist in their global interactions. The foreign language requirement may be satisfied in any one of three ways: (a) native speaker ability; (b) completing six quarters (four semesters) of college-level language instruction from UCSD or a comparable institution, with a grade of B or better in the final course; or (c) passing a special IR/PS-administered language exam, which is the equivalent of the final exam administered in the sixth-quarter course in the selected language. The foreign language requirement may be partially or wholly completed prior to matriculation at IR/PS. Please contact the IR/PS Student Affairs for additional information.

Students must fulfill the foreign language requirement in a language that corresponds to their elected region of specialization. Students may select either Brazilian Portuguese or Spanish when studying Latin America. Students specializing in China, Japan, or Korea, must study Mandarin Chinese, Japanese, or Korean, respectively. Students electing to specialize in Southeast Asia may study Bahasa Indonesia, Chinese, Thai, French, or other approved language. Please contact the IR/PS Student Affairs for further information.

Beyond the basic language requirement, IR/PS also offers the option of certification of more advanced language proficiency for students who choose to pursue further language study. Students pursuing advanced language skills are strongly

encouraged to undertake significant language study prior to coming to IR/PS.

Students on the Country and Regional Studies track are subject to a different foreign language requirement. These students must pass both the speaking and the reading proficiency examination in their selected language. The writing proficiency examination is optional. The minimum required level of proficiency is equivalent to a Foreign Service Institute (FSI) Scale 2+ for Spanish, 2 for Portuguese, and 2- for most other languages.

The proficiency examination is administered by appointment throughout the academic year. Students not following the Country and Regional Studies track may take the exam once free of charge in a language that IR/PS currently provides instructional support. Those students on the Country and Regional Studies track may take the exam twice free of charge, regardless of language selection. Please consult with the IR/PS Student Affairs for additional information.

A variety of language courses are offered by UCSD. IR/PS offers four-unit language courses for international relations professionals in Japanese, Mandarin Chinese, and Spanish at the intermediate or advanced levels. In addition, subject to demand, courses in Bahasa Indonesia or other Pacific Rim languages may be offered. Students electing to study a foreign language where IR/PS instructional support is not offered must secure their own language instruction and funding. Course credit for self-supported language learning may be given upon evaluation and approval of the IR/PS faculty. Please contact the IR/PS Student Affairs for additional information.

Students are placed in foreign language courses based on prior preparation and on the results of a placement test administered during orientation.

Career Tracks

Beyond the core curriculum, the regional specialization, and the foreign language requirement, students are offered an array of career tracks from which to choose. The career tracks provide an opportunity to focus on a specialized professional career path and to work closely with other students and faculty who share similar interests. A career track consists of six courses (twenty-four units). Each track combines some designated requirements and a range of relevant electives from which to choose. All students must complete a career track. A student whose interests do not fall within the existing range of tracks may complete the Self-Design track, and create a tailor-made package of courses in consultation with their faculty advisor. Currently, IR/PS offers the following career tracks:

International Management

International Politics

International Environmental Policy

Public Policy

International Economics

International Development and Non-Profit Management

Country and Regional Studies

Electives

Students may use remaining units to take electives across the range of IR/PS courses in management, political science, economics, regional studies, and language, as well as (with approval) courses offered elsewhere on campus. The number of elective units available to a student will vary, depending on factors such as prior language study. Prospective students are advised to consult the IR/PS Office of Admissions for a full list of elective courses currently offered.

EDUCATION ABROAD PROGRAM

Students are encouraged to participate in the Education Abroad Program (EAP) in their second year of study. Though this may necessitate a third year of study to meet M.P.I.A. requirements, the opportunity provides unparalleled experience in the selected regional study area and language. By petition, certain credits earned through EAP may be applied to the M.P.I.A. degree requirements.

CAREER SERVICES

The IR/PS Career Services office provides students on-going guidance, expertise, and resources to successfully manage their careers. This personalized process begins before school starts with Career Management Orientation, and continues during the two-year program and throughout the students' careers as alumni.

The Career Services team offers IRPSCAREERS, an online system available twenty-four hours a day, seven days a week, which has a calendar of events, student profiles, online resumes, and a specialized database of employers with job/internship opportunities. Career consultants are available for daily scheduled appointments or quick consultations for resume writing, cover letters, effective job search strategies, interviewing skills (including videotaped mock interviews), labor market trends, job offer evaluation, and negotiation of total compensation packages. Alumni return to campus often for panels, information sessions, and employer interviews.

INTERNSHIPS

Students are strongly encouraged to participate in a variety of internship programs aligned with their career goals in business and industry, federal and state government, and nonprofit and multilateral organizations. The Career Services office works closely with students and alumni to make connections with global employers in the nonprofit, public, and private sectors based on the students' interests.

To enhance students' professional skills, IR/PS strongly recommends each student participate in an internship during the summer between the first and second year. Students with unpaid summer internships may receive financial support from IR/PS donors. Internships offer opportunities to explore career options, apply theoretical knowledge to real work situations, and gain experience important to potential future employers.

MASTER OF ADVANCED STUDIES IN INTERNATIONAL AFFAIRS (M.A.S.-I.A.)

REQUIREMENTS FOR ADMISSION

Students interested in pursuing the M.A.S.-I.A. degree program at UCSD's Graduate School of International Relations and Pacific Studies must have earned a B.A., or its equivalent, from an institution of comparable standing to the University of California and have a minimum of five years of relevant work experience and/or graduate-level studies and relevant international experience including demonstrated proficiency in a regional language.

A minimum grade-point average of 3.0 or better in undergraduate course work or prior graduate study is required for admission. Undergraduate preparation that includes one or more of the following areas is strongly encouraged: the social sciences (specifically economics and political science), quantitative methods (such as calculus and statistics), foreign language, and related area studies courses.

Applicants are required to submit the following: an online UCSD application for graduate study (<http://graduateapp.ucsd.edu>); two official transcripts from each college or university attended; three letters of recommendation; a résumé or curriculum vitae; a personal statement. Test of English as a Foreign Language (TOEFL) scores are also required of international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. A minimum score of 550 on the paper/pencil version, a minimum score of 80 for the Internet-based test, and a minimum score of 213 on the computer-based version of the TOEFL is required. For further details regarding the application process, procedures, and deadlines please visit the IR/PS Web site, <http://irps.ucsd.edu>, and click on "Programs."

Orientation tours are available for all prospective applicants who would like further information about the M.A.S.-I.A. program. Tours assist prospective applicants in becoming better acquainted with IR/PS's M.A.S.-I.A. program and in understanding how the program might relate to their long-term career goals. To sign up for a tour, please contact the IR/PS Office of Admissions at (858) 534-5914 or e-mail irps-apply@ucsd.edu.

The M.A.S.-I.A. is a nine-month, full-time course of study.

THE M.A.S.-I.A. CURRICULUM

The M.P.I.A. curriculum (forty-eight units) is made up of two core courses (eight units), a regional specialization (eight units), three M.A.S.-I.A. career track courses (twelve units), four elective courses from the IR/PS curriculum (sixteen units), and a four-unit capstone course.

Core Curriculum

The core curriculum is designed to provide a solid foundation in the study of international affairs and is devoted to the politics and economics of the region. It comprises the following courses:

The Politics of International and National Policy Making (IRCO 481)

Comparative Economies of the Pacific Region (IRCO 482)

The Regional Specialization

The regional specialization is made up of two designated courses on the economy and political system of a student's chosen country or region. All students must complete a regional specialization, and may choose from among the following five options: Latin America, Japan, Korea, China, and Southeast Asia.

Foreign Language Proficiency

IR/PS considers foreign language competency to be an indispensable skill for international relations professionals. The M.A.S.-I.A. language proficiency requirement may be satisfied in any one of three ways: (a) native speaker ability; (b) completing six quarters (four semesters) of college-level language instruction from UCSD or a comparable institution, with a grade of B or better in the final course; or (c) passing a special IR/PS-administered language exam, which is the equivalent of the final exam administered in the sixth-quarter course in the selected language. The foreign language proficiency requirement may be completed prior to matriculation at IR/PS. Please contact IR/PS Student Affairs for additional information.

Career Tracks

Beyond the core curriculum and the regional specialization, M.A.S.-I.A. students are offered three career tracks from which to choose. The career tracks provide an opportunity to focus on a specialized professional career path and to work closely with other students and faculty who share similar interests. A career track consists of three courses (twelve units). Currently, IR/PS offers the following career M.A.S.-I.A. tracks:

International Security
International Political Economy
International Public Policy

Electives

Students may use remaining units to take electives across the range of IR/PS courses in management, political science, economics, regional studies, and language, as well as (with approval) courses offered elsewhere on campus. Prospective students are advised to consult the IR/PS Office of Admissions for a full list of elective courses currently offered.

THE PH.D. IN ECONOMICS AND INTERNATIONAL AFFAIRS

REQUIREMENTS FOR ADMISSION

Applicants who seek admission to the highly competitive joint Ph.D. program must have earned a B.A., or its equivalent, from an institution of comparable standing to the University of California. Preference will be given to students with prior academic records of distinction and to those who have a background in one of the fields of emphasis and/or geographical areas covered by the program.

Applicants are required to submit the following: an online UCSD application for graduate

study (<http://graduateapp.ucsd.edu>); two official transcripts from each college or university attended; three letters of recommendation; a résumé or curriculum vitae; a personal statement; a writing sample; a Graduate Record Examination (GRE) score report. Test of English as a Foreign Language (TOEFL) scores are also required of all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. A minimum score of 550 on the paper/pencil version and a minimum score of 213 on the computer-based version of the TOEFL is required.

The minimum criteria required for admission to the extremely selective joint Ph.D. program can be found on the following Web site: <http://irps.ucsd.edu/academics/phd-program.htm>. Admission is offered to a very small number of applicants.

THE PH.D. CURRICULUM

Program of Study

The Ph.D. in economics and international affairs prepares students for research careers in economics, with an emphasis on international affairs and the Pacific region. The program combines the analytical skills of economics with political economy, institutional analysis, and region/empirical knowledge.

Program Advisory Committee

Each student is assigned a Program Advisory Committee of four economics and IR/PS faculty, at least one must be from economics, one from IR/PS and one outside member from another UCSD department. With this committee, the student works out a plan of study that the committee must approve. The student must make satisfactory progress in a coherent program of course work and reading courses, which meet the approval of the Program Advisory Committee.

Course Requirements

The Ph.D. curriculum in economics and international affairs is designed to provide students with basic training in the techniques of modern economics, as well as empirical and institutional knowledge of the Pacific region. The first year will consist of the three sequences of microeconomics, macroeconomics, and econometrics, taught in the Department of Economics. The second year will consist of continuation of the three series plus seven electives. Two of these electives will be an IR/PS sequence in political economy. In subsequent years, courses will consist of the regional sequence, an empirical project, and two third-year papers.

Regional Requirement

Students must take at least three courses, one of which may be a reading course on policy processes and issues in the Pacific region. These courses may consider the Pacific region as a whole, as a sub-region, or examine individual countries. The courses may be in both IR/PS and, with prior permission, related departments. Some students may choose to take more than the minimum three courses to deepen their knowledge of a particular country or

area. Comprehensive examination on regional areas is not required.

Language Requirement

Students are expected to achieve a level appropriate to the student's dissertation topic of reading proficiency in at least one foreign language. Proficiency may be verified by examination or by certification by thesis supervisor.

Comprehensive Examinations

Students must pass written comprehensive exams in microeconomics, macroeconomics, and econometrics, which will be administered and graded by the economics department.

Dissertation

Candidates must present a dissertation prospectus no later than March of their third year in the doctoral program. They will be examined on their prospectus by their dissertation committee and must complete a dissertation, which makes a substantial and original contribution to knowledge commensurate with the standards of the University of California in order to receive the Ph.D. degree.

Oral Defense

Students will defend their dissertation at a final oral examination, which will be open to the public.

Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of five years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

THE DOCTORATE OF PHILOSOPHY IN POLITICAL SCIENCE AND INTERNATIONAL AFFAIRS (PH.D.)

REQUIREMENTS FOR ADMISSION

Applicants who seek admission to the highly competitive joint Ph.D. program must have earned a B.A., or its equivalent, from an institution of comparable standing to the University of California. Preference will be given to students with prior academic records of distinction and to those who have a background in one of the fields of emphasis and/or geographical areas covered by the program.

Applicants are required to submit the following: an online UCSD application for graduate study (<http://graduateapp.ucsd.edu>); two official transcripts from each college or university attended; three letters of recommendation; a résumé or curriculum vitae; a personal statement; a writing sample; a Graduate Record Examination (GRE) score report. A minimum score of 550 on the paper/pencil version and 213 on the computer-based version of the Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English.

The minimum criteria required for admission to the extremely selective joint Ph.D. program can be

found on the following Web site: <http://irps.ucsd.edu/programs/phd-program/apply.htm>. Admission is offered to zero to two applicants per year.

THE PH.D. CURRICULUM

Program of Study

The Ph.D. in political science and international affairs prepares students for research careers in political science, with an emphasis in either international policy analysis or comparative policy analysis. The program combines the analytical skills of political science with political economy, institutional analysis, policy analysis (especially economic policy) and regional training, with special attention to East Asia and/or Latin America.

Course Requirements

The Ph.D. curriculum in political science and international affairs is designed to provide students with basic training in the techniques of modern political science, as well as applications to specific policy areas and countries or regions.

Seventeen courses are required prior to advancement to candidacy. There is a common core sequence, consisting of comparative public policy, two courses in comparative politics, two courses in international relations and research design. Each student must declare a primary field of either international policy analysis (I.P.A.) or comparative policy analysis (C.P.A.), consisting of three specialized courses. There is also a regional focus of five courses. Three additional courses must be taken from a set of electives.

Regional Requirement

The regional focus consists of international relations of Asia Pacific or international relations of the Americas (depending on which region is the student's primary region), three additional courses in the student's primary region, and one course in another region offered by either IR/PS or the Department of Political Science are required. By petition, students may count a region other than one of the IR/PS offerings (currently China, East Asia, Japan, Latin America, or South-east Asia) as their primary region.

Language Requirement

All students in the program are required to meet a high standard of proficiency in a foreign language before being advanced to candidacy. The language must be linked to the student's region.

Seminar Papers

Each student must submit two seminar papers, one in each field. The penultimate draft of each seminar paper must be completed prior to taking the appropriate field exam, and the final draft must be completed by the end of the quarter in which the exam is taken. Both papers must demonstrate knowledge of the student's regional focus, as well as knowledge of relevant theory in the field. At least one of the papers must also demonstrate knowledge of a substantive policy area, related to the student's primary focus field.

Comprehensive Examinations

Each student must pass two comprehensive examinations, one in international relations and one in comparative politics. Each exam will be graded by a joint committee consisting of three permanent faculty members, with at least one from political science and at least one from IR/PS.

The primary field exam contains a focus field, which may be either a substantive field of policy analysis (e.g. trade, environment, international finance) or the student's chosen primary region. Regardless of focus field, that part of the exam will test the student's knowledge of theoretical literature and ability to apply it to a policy issue of relevance to the region.

Dissertation

Candidates must present a dissertation prospectus to be examined by their dissertation committee, and must complete a dissertation which makes a substantial and original contribution to knowledge commensurate with the standards of the University of California in order to receive the Ph.D. Degree. The dissertation committee shall consist of four faculty members chosen from the Department of Political Science and IR/PS, with at least one from each unit. A fifth member must be from outside these two departments.

Oral Defense

Students will defend their dissertation at a final oral examination, which will be open to the public.

Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of the fourth year. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

BACHELOR OF ARTS IN INTERNATIONAL STUDIES AND MASTER OF INTERNATIONAL AFFAIRS B.A./M.I.A.

REQUIREMENTS FOR ADMISSION

Students interested in pursuing the B.A./M.I.A. degree program at UCSD's School of International Relations and Pacific Studies (IR/PS) must be currently enrolled in UCSD's International Studies (IS) undergraduate major. Students who meet the admissions requirements listed below may apply for admission to the combined degree track of the International Studies major in the fourth quarter prior to receipt of the B.A. degree.

1. Completion of fall and winter quarters of junior year with a minimum overall GPA of 3.00 and a minimum 3.4 GPA in International Studies upper-division course work.
2. Satisfactory completion of the foreign language requirement for the undergraduate International Studies major. The foreign language must be one of the Pacific Rim languages required by IR/PS.
3. Satisfactory completion of the International Studies core courses, INTL 101 and 102.

4. Two letters of recommendation from individuals who can attest to the applicant's academic promise and depth of interest in professional training in international affairs.
5. Students will also be required to complete a noncredit, professional internship in the field of international affairs during the summer prior to matriculation in the M.I.A. degree program.

Applicants will be admitted to the combined degree program on the basis of demonstrated academic excellence in upper-division course work in the International Studies major, Pacific Rim language proficiency, strong support from UCSD faculty in letters of recommendation, international experience, leadership, and community involvement.

THE B.A./M.I.A. CURRICULUM

International Studies (IS) students are required to declare a primary track (eight upper-division courses) and a secondary track (five upper-division courses). In addition, IS majors must successfully complete two upper-division gateway courses (INTL 101 and 102) and a senior research seminar (INTL 190). In addition to these required courses, IS majors admitted to the combined degree program must also complete two quantitative methodology courses (IRCO 453 and 454).

IS majors admitted to the combined degree program will complete all of these requirements for the International Studies degree in either Economics or Political Science in years one through four of their study at UCSD.

B.A. in International Studies–Economics

Economics Primary Track (eight courses)

The following courses are required:
IRCO 401: Managerial Economics
IRCO 403: International Economics
IRCO 420: Accounting
IRCO 421: Finance

In addition, students are required to take four additional Economics courses chosen from the IS-Economics course list or from IR/PS Economics courses, for a total of eight courses.

Political Science Secondary Track (five courses)

The following courses are required:
IRCO 400: Policymaking Processes
IRCO 410: International Politics and Security
IRCO 412: Globalization, the World System, and the Pacific

Two additional courses from the approved IS-Political Science course list or IR/PS electives in regional politics, comparative public policy, or international politics. Of the thirteen track courses, three must focus on one country or region.

B.A. in International Studies–Political Science

Political Science Primary Track (eight courses)

The following courses are required:
IRCO 412: Globalization, the World System, and the Pacific
IRCO 400: Policymaking Processes
IRCO 410: International Politics and Security

Five additional courses selected from the approved IS-Political Science course list or from IR/PS electives in regional politics, comparative public policy, or international politics.

Economics Secondary Track (five courses)

The following courses are required:

IRCO 401: Managerial Economics
IRCO 403: International Economics
IRCO 420: Accounting
IRCO 421: Finance

In addition, students are required to take one additional Economics course chosen from the IS-Economics course list or from IR/PS Economics courses, for a total of five courses. Of the thirteen track courses, three must focus on one country or region.

Additional Requirements

In the fifth year of the combined degree program, students will complete the requirements for the one-year M.I.A. degree. The M.I.A. requires a minimum of forty-eight units of 400-level course work complete at IR/PS, including a regional specialization (two four-unit courses), a professional career track (six four-unit courses), a capstone requirement (one four-unit course), elective course work (three four-unit courses), and an internship requirement (noncredit).

The combined degree program includes the following additional requirements:

1. Language requirement: All International Studies majors must complete a language requirement equivalent to four quarters of undergraduate training in a Pacific Rim language (as defined by IR/PS prior to admission to the combined degree program. In order to receive the M.I.A. degree at the end of the fifth year, students must complete at least two additional quarters in the same Pacific Rim language, for a total of six quarters. As an alternative to the six-quarter language requirement, students may demonstrate proficiency at the level currently required by IR/PS.
2. All students in the combined degree program will declare a special primary and secondary track in their International Studies major. These combined degree tracks will be Economics (primary track)/ Political Science (secondary track) or Political Science (primary track)/Economics (secondary track). Students will complete the existing lower-division requirements for the Economics primary or secondary track (Mathematics 10A-8-C or Mathematics 20A-8-C, Economics 1-2-3).

PROGRAMS AND RESEARCH CENTERS

GLOBAL LEADERSHIP INSTITUTE PROGRAM

The Global Leadership Institute (GLI) is a graduate-level, executive education program. Since 1989, GLI has served as an executive training program for mid-career professionals seeking to expand their knowledge and experience in various aspects of international affairs including politics, public policy, management, and economics. Participants also have the opportunity to learn English or other languages of countries located in the Pacific region.

Professional tours are offered throughout the quarter, thereby allowing GLI Fellows the opportunity to see industry-related operations firsthand in a cross-section of public and private sector organizations. The duration of each participant's program may range from one quarter (eleven weeks) up to two years. For international applicants, in addition to participating under the Exchange Visitor (J) Visa program as a short-term Fellow enrolled in courses, GLI also hosts research scholars exclusively interested in gaining access to UCSD's extensive resources. Both working professionals and graduate students in study abroad programs may opt for either Exchange Visitor (J) Visa category. GLI also offers customized courses in a variety of disciplines for organizations sending a group of professionals in a specialized field; these courses can be integrated with regularly scheduled course work during the academic quarter. Custom group programs ranging in duration from one to thirty days are also available. A certificate of study is presented upon successful completion of a GLI program.

For more information, please contact the Global Leadership Institute via e-mail at irps-gli@ucsd.edu or call (858) 822-3875 or (858) 534-4019.

THE KOREA-PACIFIC PROGRAM

The Korea-Pacific Program was formed in September 1989 in recognition of the growing importance of Korea in the world, of Korean-U.S. relationships, and of the Korean model of social and economic development.

Directed by IR/PS Professor Stephan Haggard, the program promotes the understanding of Korea in an international context and encourages the study of Korea by offering courses on the country's economics and politics. Research is supported on contemporary Korean political economy. Outreach to the community is offered through seminars, lectures, courses, and cultural events.

In comparison with other Korean studies programs in the United States, the IR/PS Korea-Pacific Program is distinctive in several respects: it concentrates on contemporary Korea, focuses on policy questions, stresses the foundations of Korean economic growth, explores Korea's international relations, and seeks to understand Korea in a broad regional context.

THE ASEAN-PACIFIC PROJECT

The ASEAN-Pacific Project is one of several major regional and theme-based nodes of activity within the Graduate School of International Relations and Pacific Studies. Its mandate is to support students and to serve as a catalyst for the development of Southeast Asia-related teaching and research activities within the school.

The ASEAN-Pacific Project extends the success of the school's original Vietnam-Pacific Project, with scope being broadened to embrace the other countries of Southeast Asia.

The project is built upon private donations to the school, with this resource being supplemented by resources obtained from external grant agencies and the university. The project supports the activities of students at IR/PS with an interest in Southeast Asia through fellowships (for summer travel and internships) and visiting guests speakers.

The project also serves as a catalyst and facilitator for research projects within the school relating to Southeast Asia. It seeks to promote disciplinary-driven work on political and economic topics pertaining to Southeast Asia, as distinct from more traditional area studies scholarship. Examples of this include recent work on national political institutions and policy-making, the dynamics of regional cooperation, food and agricultural policies, and the relocation of the global magnetic disk-drive industry to Southeast Asia. Other recent research-related initiatives include a major international workshop for Ph.D. students in political science working on Southeast Asia, and a workshop for the U.S. Agency for International Development on political conflict in Indonesia.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010-11, please contact the department for more information.

IRPS 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to 15-20 students, with preference given to entering freshmen.

IRGN 199. Independent Research/Study (2-4)

Independent research/study under the guidance of a faculty member of IR/PS. **Prerequisite:** consent of undergraduate advising office and instructor.

M.P.I.A. CORE CURRICULUM

IRCO 400. Policy-Making Processes (4)

This course is designed to teach students how to "read" a country's political and economic system. The course will examine how the evolution of different institutional frameworks in the countries of the Pacific region influences the way in which political choices are made. **Prerequisite:** IR/PS students only.

IRCO 401. Managerial Economics (4)

Survey of basic tools in economics. Examination of how commodity demand is determined, what affects supply of the commodity, how price is determined, when optimal market allocation of resources and failure occur, and basic topics concerning the aggregate economy.

IRCO 403. International Economics (4)

The theory and mechanics of international economics. Included will be such topics as real trade theory, international movements of capital, the effects of trade and capital flows on domestic economies, and policies toward trade and foreign investment.

IRCO 410. International Politics and Security (4)

Development of analytic tools for understanding international relations with applications to contemporary problems such as the environment, nuclear proliferation, human rights, humanitarian interventions, and the roots of conflict and cooperation among countries.

IRCO 412. Globalization,

This course examines globalization and other economic and political factors that shape the international relations of the Pacific Rim. Specific topics include financial market integration, state cooperation and intervention, and case studies of individual countries.

IRCO 420. Accounting (4)

An introduction to financial accounting designed to prepare students to understand their own organizations' international operations and interpret information from outside organizations. The emphasis will be on understanding the

potential uses and limitations of accounting information for various management purposes, and the procedural aspects of accounting will be introduced only to the extent necessary to explicate the basic concepts.

IRCO 421. Finance (4)

This course surveys the financial problems facing managers and analyzes financial institutions, financial instruments, and capital markets. Tools acquired will prepare students to analyze international financial topics such as exchange rate behavior, the management of international risk, and international financing. **Prerequisites:** IRCO 420, 453, and 454.

IRCO 453. Quantitative Methods I (2)

This course is designed to provide proficiency in quantitative methods that are used for optimization and decision making. The use of spreadsheets is applied to data analysis and problem solving. Statistical theory and regression analysis are introduced.

IRCO 454. Quantitative Methods II (4)

This course covers elements from statistics that are central to business decision-making under uncertainty. In particular, regression analysis and estimation will be applied to problems of forecasting and optimization.

IRCO 460. Managerial Decision Making (4)

This course develops practical decision-making skills useful in a management setting. It stresses identifying relevant information and presenting it effectively. Skills include strategic analysis, negotiation, and application of quantitative methods. **Prerequisites:** IRCO 400, 401, 410, 412, 420, 421, 453 and 454, or consent of instructor.

IRCO 461. Business and Government in the Global Economy (4)

Business and government interaction in the world economy are examined from both public policy and private sector management perspectives. Topics include competitive advantage, the challenging boundaries of private and public, and the influence of private interests on public sector regulation. **Prerequisites:** IRCO 400, 401, 410, 412, 420, 421, 453, and 454, or consent of instructor.

IRCO 462. Public Policy Workshop (4)

Presents tools for analysis of public policies. Students collaborate on term-long projects analyzing public policy formation, implementation, and outcomes. **Prerequisites:** IRCO 400, 401, 410, 412, 420, 421, 453, and 454, or consent of instructor.

IRCO 463. Strategy and Negotiation (4)

This class introduces the fundamentals of corporate strategy, based on case studies requiring corporate analysis; and the principles of negotiation, based on exercises and class learning. Both sections of this class are highly applied, and require intensive out-of-class preparation and teamwork that help students acquire skills in analytical thinking, strategic action planning, and hands-on negotiations. **Prerequisites:** IRCO 400, 401, 403, 410, 412, 420, 421, 453, and 454.

IRCO 464. The Corporation in the Global Economy: The Interaction of Business and Government (4)

What can countries, firms, and individuals do to position themselves effectively in the world economy? This course uses case studies to explore the global division of labor in the production value chain, government policy and the micro-organization of the firm. **Prerequisites:** IRCO 400, 401, 410, 412, 420, 421, 453, and 454, or consent of instructor.

GENERAL COURSES

Not all general courses are offered each year.

IRGN 400. International Relations of Asia-Pacific (4)

International relations and developing international political economies of nations bordering the Pacific. Topics include: the "Pacific Basin" concept; the U.S. and "hegemonic-stability" theory; legacies of the Korean War and Sino-Soviet dispute; immigration patterns and their consequences; and Japan's foreign policy.

IRGN 401. Ethnic Conflict (4)

Explanations for why ethnic conflicts break out, why they are difficult to resolve, and what effect outside intervention has on them. Introduce students to the major theories of ethnic and internal conflict. Policy debates regarding how the international community can best respond to these conflicts. **Prerequisite:** admission to program or consent of instructor.

IRGN 402. International Political Economy: Money and Finance (4)

Examination of effects of national policies and international collaboration on public and private international financial institutions, in particular the management of international debt crises, economic policy coordination, and the role of international lender of last resort. **Prerequisite:** IRCO 411 or consent of instructor. Conjoined with Political Science 144D and 262.

IRGN 404. Chinese Politics (4)

This course will analyze post-1949 Chinese politics, including political institutions, the policy making process, and citizen political behavior. Special attention will be given to the prospects for political reform in China.

IRGN 405. U.S.–China Relations (4)

Can the United States and China manage to develop a constructive relationship or are they headed toward a hostile relationship? This course addresses this question by examining the domestic and international influences on the foreign policies of both countries and key issues in the bilateral relationship. Students also do policy projects.

IRGN 406. Financial Institutions (4)

This course analyzes the roles of money and financial institutions in the economy. The first part of the course focuses on microeconomics and the financial system. The topics include money, financial markets, financial intermediaries, banking regulations, and bank runs. The second part of the course focuses on the microeconomics aspects of financial institutions. The topics include financial development, financial liberalization, and their effects on the economy, especially economic growth and development. **Prerequisite:** IRCO 403 and IRCO 421 or consent of instructor.

IRGN 407. Policy Implementation Process (4)

Course builds on Policy-Making Processes class by focusing on nonelected officials' role in setting and implementing policy. Ideally, elected officials make policies that unbiased, technically proficient bureaucrats carry out. Course provides insight into why the real world departs from this. **Prerequisite:** IRCO 400.

IRGN 408. Internal Conflict after the Cold War (4)

Will examine the causes of civil wars and the problems with resolution and state reconstruction. Theoretical approaches discussed will then be applied to three recent case studies: Cambodia, Rwanda, and Bosnia. Policy implications for the international community will be discussed. **Prerequisite:** IRCO 410.

IRGN 409. Economic Policy in Latin America (4)

This course seeks to enhance the students' understanding of the main policy alternatives open to the largest Latin American countries. Development and stabilization policies are analyzed, emphasizing the current debate between conventional and heterodox policy packages and their impact on decisionmaking. **Prerequisites:** IRCO 401, IRCO 403.

IRGN 410. Corporate Governance (4)

Why do corporate governance systems—the way firms are run, the relationships among managers, stockholders, and workers—differ widely around the world? This course examines the various explanations for these striking differences and the consequences. **Prerequisite:** graduate level or consent of instructor.

IRGN 411. Business and Management in Japan (4)

This course introduces the main aspects of Japanese business and industrial organization (keiretsu), Japanese management practices, and the representation and influence of business interests in the Japanese political economy.

IRGN 412. International Competitiveness and the Globalized Value Chain (4)

This course explores the strategies countries pursue in the highly competitive world economy. It examines the global value chain and public policy toward education, labor, corporate social responsibility, free markets and global trade, finance and shareholding, and the political process.

IRGN 413. Corporate Strategy and the Environment (4)

This seminar examines the ability of firms to increase shareholder value through improved environmental performance. Topics include product differentiation, strategic use of regulations, the "Porter hypothesis," and environmental management systems. Readings include case studies and research articles. **Prerequisites:** IRCO 401, 421, 453, and 454.

IRGN 416. Post-War Politics in Japan (4)

Overview of post-war politics in Japan, including American Occupation reforms, political institutions, major political factors, mass and elite, and political behavior. Special attention will be paid to the issue of Japan's changing democracy.

IRGN 417. Microfinance (4)

This course will begin by examining financial markets in poor countries. Investigates how microfinance contracts overcome problems which had previously barred the extension of business credit in many environments. **Prerequisite:** admission to program or consent of instructor.

IRGN 419. Risk Management (4)

This course provides an introduction to derivative assets such as options, futures, and swap contracts. The main emphasis is on their valuation, use in hedging, and role as components of liabilities that mitigate risk and agency problems in business firms. **Prerequisite:** IRCO 421.

IRGN 420. Strategic Marketing Planning (4)

This course develops the microeconomic foundations of market exchange by explicitly examining the marketing details of transactions: demand and product differentiation, incomplete and incorrect information, search costs and promotion costs. It is argued that within this theoretical framework (i.e., model) most observed marketing behavior can be reconciled. The primary objective of this course is to learn to deduce firm and consumer motives from observed behavior. **Prerequisites:** IRCO 401 and 403, or consent of instructor.

IRGN 422. Investments (4)

An analysis of the risk/return characteristics of different assets as perceived by different investors and their implications for security price behavior, emphasizing real world capital market behavior. International aspects include the role of exchange rate risk and international diversification. **Prerequisites:** IRCO 421, 453, and 454.

IRGN 424. Corporate Finance (4)

The topics covered are dividend policy and capital structure, options, debt financing, and short and long-term in financial planning. Course format will be mostly lectures, with occasional cases. Some international aspects of corporate finance will also be discussed. **Prerequisites:** IRCO 401, 403, 420, 421, 453, and 454.

IRGN 429. The Globalization of Production (4)

This course examines how trade policy, information technology, and other factors shape the production strategies of multinational enterprises. Topics include foreign direct investment and the mode of entry into foreign markets, global outsourcing and the globalization of work, and the impact of trade and investment policy on the world location of production. **Prerequisites:** IRCO 401 and 403, or consent of instructor.

IRGN 431. Fiscal and Monetary Policy (4)

Effects of fiscal and monetary policies on aggregate variables such as output, nominal and real interest rates, price level, and employment. Additional topics include the inflation/ unemployment trade-off, budget deficit, and economic growth.

IRGN 432. Immigration and Immigration Policy (4)

This course examines the role of immigration in the globalization of Pacific Rim economies. Topics include the economic forces behind immigration; the impact of immigration on wages, employment, and industry structure in sending and receiving countries; and the nature, scope, and political economy of immigration policy. **Prerequisite:** IRCO 401 or consent of instructor.

IRGN 434. Strategic Analysis (4)

This course analyzes competitive interactions, surveying the modern economic analysis of relationships between and within organizations. The foundations of the course are game theory and the economics of information. Topics include bargaining and contracting, principal agent models, and bidding models. **Prerequisite:** graduate standing or consent of instructor.

IRGN 435. Topics in International Trade (4)

This course develops new analytical models of international trade and examines their relevance for trade policy. Topics include setting trade policy where firms have global market power; the interaction between international trade, innovation, and economic growth; regional economic policy, dynamic industry clusters, and information technology; and new trade theory and the world distribution of income. **Prerequisites:** IRCO 401 and 403, or consent of instructor.

IRGN 436. Information and Management (4)

This is a seminar course on the use of information by organizations in strategic and tactical decision-making. Actual content varies, and currently includes doing business on the Internet and supply chain management. **Prerequisite:** IRGN 438 or consent of instructor.

IRGN 437. Policy Design (4)

Course teaches how to make strong, reasoned cases for new policy initiatives. Covers cost-benefit analysis, cost-effectiveness evaluation, multigoal analysis, and how these are used in policymaking. Covers tools to predict policy impact, like drawing on "best practice" and related experiences.

IRGN 438. Management: Analysis and Control (4)

This course provides a comprehensive introduction to the fundamental decisions and trade-offs associated with the control of a firm's operations function. It analyzes production processes, quality control, inventory and materials planning, kanban and just-in-time principles. **Prerequisites:** IRCO 453 and 454, or consent of instructor.

IRGN 439. Policy Evaluation (4)

Research-design class focusing on strategies for evaluating policies' effectiveness with data in small quantities. Skills taught: understanding limits of what data say, and using information optimally. The emphasis is on qualitative analysis. The concepts taught are similar to those presented in QM3. **Prerequisites:** IRCO 453 and IRCO 454.

IRGN 440. Managerial Accounting and Control (4)

Focus on planning, managing, controlling and evaluating costs for competitive advantage in global markets. Key topics will include cost structure, cost-based managerial decision making, strategic cost management, JIT/TQC cost management, and accounting control systems. **Prerequisite:** IRCO 420 or consent of instructor.

IRGN 443. Economics of Telecommunications (4)

This course will focus on the underlying economics of the telecommunications and public policy rationale of regulations applied to this industry. Both theoretical models and case studies will be used to provide better understanding of the telecommunication marketplace and the nature of competition between service providers in the industry. **Prerequisite:** IRCO 401 or consent of instructor.

IRGN 444. Product Development (4)

This course examines how high-tech companies develop successful products. Emphasizes interplay between business and technology issues, including marketing, finance, manufacturing, prototyping, testing, and design. Student teams develop novel products, from concept to working prototype, including a business plan for launching the product. Discussion of concurrent engineering, rapid prototyping, industrial design, and other design methodologies.

IRGN 446. Applied Data Analysis and Statistical Decision Making (4)

The goal of the course is to teach how to evaluate quantitative information in business and economics contexts, and to make sound managerial decisions in complex situations. Much of the problems and the course work will involve statistical software and spreadsheet analysis of data. The course covers various applied multivariate statistical methods beyond basics. **Prerequisites:** IRCO 453 and 454, or consent of instructor.

IRGN 447. Organizations (4)

A seminar course based on the modern economics of organization. Covers an eclectic set of readings on a diverse range of organizations, looking at how incentives for collective action are structured. **Prerequisites:** IRCO 401 and 403 or consent of instructor.

IRGN 448. Civil Society and Development (4)

To explore the roles that civil society/NGOs/the third sector can play in advancing political, social, and economic progress in developing countries. To consider the strengths and weaknesses, capacities, and limitations of NGOs in developing countries. To provide students with experience in evaluating NGOs and in making professional recommendations to enhance their ability to make a difference. To prepare students to take leadership roles—whether in government, the private sector, or NGOs—in promoting civil-society participation in development.

IRGN 449. Making U.S. Foreign Policy (4)

Analysis of the interests, structure and procedures of the main executive branch agencies involved in the formulation of foreign policy, and of the roles of Congress, the media, public opinion, and non-governmental actors. Case studies and "daily briefings" to prepare students to perform professionally in the foreign policy arena. **Prerequisite:** IRCO 410 or consent of instructor.

IRGN 451. Economic Development (4)

This course examines comparative patterns of industrialization and agricultural modernization with a focus on certain common features of the modernization process and widely varying endowments, policies, and experiences, of different countries. **Prerequisites:** IRCO 401 and 403, or consent of instructor.

IRGN 452. Quantitative Methods for Advanced Analysts (4)

This course caters to the needs of those who routinely face a variety of advanced data-analysis challenges, such as international marketing and sales managers, consulting analysts, or international business development and intelligence specialists. Knowledge of introductory optimization and statistics, including linear regression, is assumed. The course is entirely practical in that it is organized around in-depth case studies, requiring students to work extensively with data. Methods covered include cluster, factor, and discriminate analysis, and modeling and simulation.

IRGN 453. Sustainable Development (4)

The course will cover the concept of sustainable development, ways in which sustainable development can be measured, evaluation of environmental damages and benefits, and the role of discounting, and will analyze cases demonstrating failure of the market.

IRGN 454. Current Issues in U.S.-Latin American Relations (4)

Issues to be actively debated include the collective defense of democracy, coping with revolutionary change, counter-narcotics, anti-corruption, international finance, trade, and U.S.-Mexican and U.S.-Brazilian relations. In each case, students analyze the strengths and weaknesses of current U.S. policy and advocate alternative options. **Prerequisite:** IRCO 410 or consent of instructor.

IRGN 455. Economic Theories of Regional Integration (4)

The first part of the course covers the basic economics of trading blocs and proceeds to more complicated topics in the theory of preferential trading arrangements, customs unions, and currency unions. In the second part we use the formal theory to compare economic integration in different parts of the world. **Prerequisites:** IRCO 401 and 403 or consent of instructor.

IRGN 456. Program Design and Evaluation (4)

Introduction to elements of program design and evaluation. Examines principles and guidelines used in creating a program and evaluating its success or failure. International case studies are explored. Students have the opportunity to develop their own program and evaluate projects.

IRGN 457. Cost Benefit Analysis (4)

Examination of public policy analysis, such as cost-benefit analysis and project evaluation, for use in policy formation. Sustainable development will receive particular attention. Case studies emphasizing the environment, agriculture and food, and economic development will be included.

IRGN 458. International Environmental Policy and Politics (4)

This course analyzes multilateral environmental agreements and negotiating positions of key countries on climate change, biodiversity conservation, sustainable development, and other subjects. It explores the challenges countries face to balance economic development objectives with global environmental concerns.

IRGN 459. Conflict Resolution of Environmental Issues (4)

Use of bilateral negotiations (U.S.-Canada), regional organizations (ECE and acid rain in Europe), and United Nations' specialized agencies (UNEP and WMO on ozone depletion and climate change) to mediate environmental disputes. Consideration of nontraditional approaches resolving international environmental problems. **Prerequisite:** graduate standing.

IRGN 460. The Politics of U.S.-Japan Economic Relations (4)

This course will analyze how the domestic politics of each country, their international negotiations, and their interaction concerning economic issues have affected the U.S.-Japan relationship. Both the politics of cooperation and integration, and trade friction and conflict will be addressed in part through study of specific cases.

IRGN 461. Doing Business in China (4)

This course describes the Chinese commercial, organizational, and cultural environment. Case studies of foreign businesses in China are examined, and the opportunities and pitfalls of operation in China are considered. Negotiation with Chinese counterparts is covered through a negotiation exercise. The focus is on mainland China, but some attention is given to business in Hong Kong and Taiwan as well. Students are required to prepare business plans for proposed Chinese ventures.

IRGN 462. Economies in Southeast Asia (4)

This course focuses on the long-run and current economic issues of Southeast Asia. The topics are economic growth, human capital, inequality and poverty, social institutions, the business sector, the financial sector, government, the external sector, and regional and interregional economic relations. For each topic, we will discuss the issues from selected countries in the region in more detail. **Prerequisites:** IRCO 401 and IRCO 403 or consent of instructor.

IRGN 463. Politics of Southeast Asia (4)

This course provides an introduction to five Southeast Asian countries: Indonesia, Thailand, Malaysia, the Philippines, and Vietnam. The focus will be on national level of political and economic issues in these countries. In addition, a number of region-wide issues will also be examined such as: Chinese business groups and networks; clientelism and corruption; regional trade and investment linkages; democratization; and the implications of political change for future economic development. **Prerequisite:** Graduate standing or consent of instructor.

IRGN 464. Strategies and Skills for Effective Consulting (4)

This course will provide an introduction to the field of consulting. It will focus both on effective consulting strategies and on skills and tools that are helpful in the process. Technical, cultural, economic, and political issues will be considered, as the various aspects of consultant work are examined

IRGN 465. Management of Non-profit Organizations (4)

Analyzes the particular environment in which non-profit organizations define and achieve their objectives. Management tools are applied to existing non-profits and to student projects.

IRGN 466. Public Finance (4)

Describes principles of taxation and expenditure analysis; public budgeting; and assessment of budget priorities.

IRGN 467. Policymaking and Political Economy in Japan (4)

Examines the policymaking process in Japan, the interaction and role of state and non-state actors in shaping Japan's economy. Analysis and comparison, through case studies of industrial policies (toward high-tech and declining industries), and non-industrial policies and their consequences.

IRGN 470. International Business Strategy (4)

This course analyzes corporate strategies and management issues in their international dimensions. Based on numerous case studies, the class examines the strategic opportunities and problems that emerge when companies transfer corporate skills and competence to other countries.

IRGN 471. Japanese Economy (4)

A broad survey of the Japanese economy, together with in-depth examination of some distinctively Japanese phenomena such as savings behavior, financial structure, industrial organization, and labor markets. **Prerequisites:** IRCO 401 and 403, or consent of instructor.

IRGN 472. Japanese Corporate Culture (4)

This course examines Japanese culture values and social relations in the context of business organizations. The central focus will be on the integration of individuals into their organizations and on the human relations characteristic of their work environments.

IRGN 475. International Negotiation (4)

This course attempts to reach a broad audience of students who seek in-depth understanding of how states and other international actors attempt to achieve specific objectives through give-and-take of the negotiation process. Cases include Northern Ireland and Middle East peace processes, negotiations leading to Dayton accords, and negotiations over Antibalistic Missile Treaty.

IRGN 478. Japanese Foreign Policy (4)

Examines the domestic and strategic sources of Japan's foreign policy in the postwar era. Unlike IRGN 460, this course emphasizes Japan's foreign economic policy in regional and global multilateral organizations, and the major security issues it confronts with its Asian neighbors.

IRGN 479. Politics and Institutions in Latin America (4)

Overview of Latin American politics and the "rules of the game," both formal and informal. Key topics include military rule, presidentialism, and clientelism in the region as a whole, with special emphasis on Argentina, Brazil, Chile, and Mexico. **Prerequisite:** IRCO 400 or consent of instructor.

IRGN 481. Managing Country Risk in the Modern Multinational Corporation (4)

Examines ways to analyze, assess, and reduce country risk.

IRGN 483. Business and Policy in Southeast Asia (4)

Surveys various dimensions of business in Southeast Asia, with particular attention to the policy context. Special focus on technological capabilities of business organizations in Southeast Asia.

IRGN 484. Korean Politics (4)

This course will examine characteristics and distinctive aspects of contemporary Korean society and politics. Emphasis will be placed on continuity and change in social values, political culture and leadership, economic growth and its impact, and democratization and its future prospects. **Prerequisite:** consent of instructor.

IRGN 485. The Korean Economy (4)

Analytical review of South Korea's economic performance. Examination of major policy changes (e.g., shifts toward export promotion, heavy and chemical industries

promotion); Korea's industrial structure including the role of large enterprises (chaebol); role of government; links between Korea and other countries.

IRGN 486. Economic and Social Development of China (4)

This course examines China's development experience from a generally economic standpoint. Contents include: patterns of traditional Chinese society and economy; geography and resource constraints, impact of the West and Japan; development since 1949 and contemporary problems and options.

IRGN 487. Applied Environmental Economics (4)

This course teaches students how to analyze environmental and natural resource policy issues in developing countries using economic concepts and methods. Weekly spreadsheet exercises based on real-world data provide hands-on practice. **Prerequisites:** IRCO 401, 453, 454, or consent of instructor.

IRGN 490. Special Topics in Pacific International Affairs (4)

A seminar course at an advanced level on a special topic in Pacific international affairs. May be repeated for credit.

IRGN 492. Special Topics in Pacific Studies (2)

A seminar course at an advanced level on a special topic in Pacific Studies.

IRGN 497. Internship (2)

Independent research that draws on an internship with an organization relevant to career track and/or regional specialization. Nature of the required product to be determined by professor supervising the course. May be repeated for credit.

IRGN 498. Directed Group Study (2)

Directed reading in a selected area. The content of each course is to be decided by the professor directing the course with the approval of the student's faculty advisor. May be repeated for credit.

IRGN 499. Independent Research (2-12)

Independent research under the guidance of a faculty member of IR/PS. May be repeated for credit.

LANGUAGE COURSES**IRLA 400A-B-C. Chinese Language for Professional Proficiency (4-4-4)**

This course is designed to enable students at a low-intermediate level of proficiency to maintain and improve their Chinese language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 401A-B-C. Chinese Language for Professional Proficiency (4-4-4)

This course is designed to enable students at an intermediate level of proficiency to maintain and improve their Chinese language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 402A-B-C. Chinese Language for Professional Proficiency (4-4-4)

This course is designed to enable students at an advanced-intermediate level of proficiency to maintain and improve their Chinese language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 403A-C. Chinese Language for Professional Proficiency (4-4)

This course is designed to enable students at an advanced level of proficiency to maintain and improve their Chinese language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 410A-B-C. Japanese Language for Professional Proficiency (4-4-4)

This course is designed to enable students at a low-intermediate level of proficiency to maintain and improve their Japanese language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only or by consent of instructor.

IRLA 411A-B-C. Japanese Language for Professional Proficiency (4-4-4)

This course is designed to enable students at an intermediate level of proficiency to maintain and improve their Japanese language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 412A-B-C. Japanese Language for Professional Proficiency (4-4-4)

This course is designed to enable students at an advanced-intermediate level of proficiency to maintain and improve their Japanese language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 413A-B-C. Japanese Language for Professional Proficiency (4-4-4)

This course is designed to enable students at an advanced level of proficiency to maintain and improve their Japanese language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 417. Introduction to Kanji (2)

Introduction to the characteristics and usage of Chinese characters (Kanji) used in Japanese language: history, structure, cognitive aspects, their relationship with hiragana and katakana, policy issues, learning strategies, and technology. **Prerequisite:** basic knowledge of Japanese grammar and consent of instructor, IR/PS majors.

IRLA 430A-B-C. Portuguese Language for Spanish Speakers (4-4-4)

This course is designed to enable Spanish-speaking students to acquire proficiency in the Portuguese language through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only or by consent of instructor.

IRLA 431A-B-C. Second Year Portuguese Language for Spanish Speakers (4-4-4)

A continuation of first-year Portuguese for Spanish speakers. This course is designed to enable Spanish speaking students to be introduced to an intermediate level of Portuguese language through a combination of classes, language, laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only or by consent of instructor.

IRLA 440A-B-C. Spanish Language for Professional Proficiency (4-4-4)

This course is designed to enable students at a low-intermediate level of proficiency to maintain and improve their Spanish language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only or by consent of instructor.

IRLA 441A-B-C. Spanish Language for Professional Proficiency (4-4-4)

This course is designed to enable students at an intermediate level of proficiency to maintain and improve their Spanish language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 442A-B-C. Spanish Language for Professional Proficiency (4-4-4)

This course is designed to enable students at an advanced-intermediate level of proficiency to maintain and improve their Spanish language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 443A-B-C. Spanish Language for Professional Proficiency (4-4-4)

This course is designed to enable students at an advanced level of proficiency to maintain and improve their Spanish language skills through a combination of classes, language laboratories, exercises, and other language experiences. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 444A-B-C. Spanish Language for Professional Proficiency (4-4-4)

This course is designed to enable students at a superior level of proficiency to maintain and improve their Spanish language skills through individual training with an instructor. **Prerequisite:** IR/PS majors only, or by consent of instructor.

IRLA 445A-B-C. Spanish Language for Professional Proficiency (4-4-4)

This course is designed to enable student at a superior level of proficiency to maintain and improve their Spanish language skills through individual training with an instructor.

IRLA 460A-B-C. Bahasa Indonesia for Professional Proficiency (4-4-4)

This course is designed to enable students with basic knowledge and skills of Bahasa Indonesia to further develop communicative skills through a combination of classes, exercises, and other language experiences. **Prerequisite:** IR/PS majors only or consent of instructor.

IRLA 500. Apprentice Teaching of Language (1-4)

This course, designed for graduate students serving as teaching assistants, includes discussion of teaching theories, techniques, and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. **Prerequisite:** graduate standing.

PH.D. LEVEL COURSES

IRGN 200. Theory of International Relations: International System (4)

This course examines the concepts of international structure and system in the field of international relations. It covers the literature on realism, neorealism, world systems theory, and other system-level explanations of patterns of international conflict and cooperation, continuity, and change.

IRGN 201. Ethnic Conflict (4)

Explanations for why ethnic conflicts break out, why they are difficult to resolve, and what effect outside intervention has on them. Introduce students to the major theories of ethnic and internal conflict. Policy debates regarding how the international community can best respond to these conflicts. **Prerequisite:** admission to program or consent of instructor.

IRGN 202. International Political Economy: Money and Finance (4)

Examination of effects of national policies and international collaboration on public and private international financial institutions, in particular the management of international debt crises, economic policy coordination, and the role of international lender of last resort.

IRGN 204. International Relations of the Pacific (4)

International relations and developing international political economies of nations bordering the Pacific. Topics include: the "Pacific Basin" concept; the U.S. and "hegemonic-stability" theory; legacies of the Korean War and Sino-Soviet dispute; immigration patterns and their consequences; and Japan's foreign policy.

IRGN 205. U.S.-China Relations (4)

Can the United States and China manage to develop a constructive relationship or are they headed toward a hostile relationship? This course addresses this question by examining the domestic and international influences on the foreign policies of both countries and key issues in the bilateral relationship. Students also do policy projects.

IRGN 206. Corporate Strategy and the Environment (4)

This seminar examines the ability of firms to increase shareholder value through improved environmental

performance. Topics include product differentiation, strategic use of regulations, the "Porter hypothesis," and environmental management systems. Readings include case studies and research articles. **Prerequisites:** IRCO 401, 421, 453, 454, or consent of instructor.

IRGN 207. Policy Implementation Process (4)

This course builds on the core Policy-Making Processes class by focusing on nonelected officials' role in setting and implementing policy. Ideally, elected officials make policies that unbiased, technically proficient bureaucrats carry out. This course provides some insights into why the real world departs from this. **Prerequisite:** IRCO 400.

IRGN 209. Strategic Marketing Planning (4)

This course develops the microeconomics foundations of market exchange by explicitly examining the marketing details of transactions: demand and product differentiation, incomplete and incorrect information, search costs and promotion costs. It is argued that within this theoretical framework (i.e., model) most observed marketing behavior can be reconciled. The primary objective of this course is to learn to deduce firm and consumer motives from observed behavior. **Prerequisites:** IRGN 221 and 243, or consent of instructor.

IRGN 210. International Politics and Security (4)

Development of analytic tools for understanding international relations with applications to contemporary problems such as the environment, nuclear proliferation, human rights, humanitarian interventions, and the roots of conflict and cooperation among countries.

IRGN 211. Financial Institutions (4)

This course analyzes the roles of money and financial institutions in the economy. The first part of the course focuses on microeconomics and the financial system. The topics include money, financial markets, financial intermediaries, banking regulations, and bank runs. The second part of the course focuses on the microeconomics aspects of financial institutions. The topics include financial development and financial liberalization, and their effects on the economy, especially economic growth and development. **Prerequisite:** graduate level or consent of instructor.

IRGN 212. International Competitiveness and the Globalized Value Chain (4)

This course explores the strategies countries pursue in the highly competitive world economy. It examines the global value chain and public policy toward education, labor, corporate social responsibility, free markets and global trade, finance and shareholding, and the political process.

IRGN 212. The Politics of International Competitiveness (4)

Examination of policy debates concerning international economic relations: what policies promote or encourage effective participation in the international economy, and what political factors support or oppose such policies. Examples drawn from the experiences of the U.S., Japan, Europe, Latin America, and East Asia.

IRGN 213. Risk Management (4)

This course provides an introduction to derivative assets such as options, futures, and swap contracts. The main emphases is on their valuation, use in the hedging, and role as components of liabilities that mitigate risk and agency problems in business firms. **Prerequisite:** IRCO 421.

IRGN 214. Corporate Governance (4)

Why do corporate governance systems—the way firms are run, the relationship among managers, stockholders, and workers—differ widely around the world? This course examines the various explanations for these striking differences and the consequences. **Prerequisite:** graduate level or consent of instructor.

IRGN 216. Post War Politics in Japan (4)

Overview of postwar politics in Japan, including American Occupation reforms, political institutions, major political factors, mass and elite, and political behavior. Special attention will be paid to the issue of Japan's changing democracy.

IRGN 217. Microfinance (4)

This course will begin by examining financial markets in poor countries. Investigates how microfinance contracts

overcome problems that had previously barred the extension of business credit in many environments. **Prerequisite:** admission to program or consent of instructor.

IRGN 218. Globalization, the World System, and the Pacific (4)

This course examines globalization and other economic and political factors that shape the international relations of the Pacific Rim. Specific topics include financial market integration, state cooperation and intervention, and case studies of individual countries.

IRGN 221. Managerial Economics (4)

Survey of basic tools in economics. Examination of how commodity demand is determined, what affects supply of the commodity, how price is determined, when optimal market allocation of resources and failure occur, and basic topics concerning the aggregate economy.

IRGN 222. Investments (4)

An analysis of the risk/return characteristics of different assets as perceived by different investors and their implications for security price behavior, emphasizing real world capital market behavior. International aspects include the role of exchange rate risk and international diversification. **Prerequisites:** IRCO 421, 453, and 454.

IRGN 223. The Globalization of Production (4)

This course examines how trade policy, information technology, and other factors shape the production strategies of multinational enterprises. Topics include foreign direct investment and the mode of entry into foreign markets, global outsourcing and the globalization of work, and the impact of trade and investment policy on the world location of production. **Prerequisites:** IRGN 221 and IRGN 243, or consent of instructor.

IRGN 224. Corporate Finance (4)

The topics covered are dividend policy and capital structure, options, debt financing, and short and long-term in financial planning. Course format will be mostly lectures with occasional cases. Some international aspects of corporate finance will also be discussed. **Prerequisites:** IRGN 221, 243, IRCO 420, 421, 453 and 454, or consent of instructor.

IRGN 225. Managing Service Operations (4)

This course covers (1) strategic issues such as service vision, market positioning, growth, and globalization; (2) process design, facility design, and capacity planning; (3) system control and performance measurement; and (4) human resources, information technology, and other service media. **Prerequisites:** IRCO 460 and either IRGN 438 or consent of instructor.

IRGN 226. Management of Technology (4)

How companies choose and develop new technology. Case studies, lectures by executives. National technology policy, including the roles of intellectual property. This course emphasizes technology strategy at corporate/national level; the Product Development course emphasizes tactics for development teams.

IRGN 227. Organizations (4)

A seminar course based on the modern economics of organization. Covers an eclectic set of readings on a diverse range of organizations, looking at how incentives for collective action are structured. **Prerequisites:** IRGN 221 and 243 or consent of instructor.

IRGN 229. Business and Management in Japan (4)

This course introduces the main aspects of Japanese business and industrial organization (keiretsu), Japanese management practices, and the representation and influence of business interests in the Japanese political economy.

IRGN 231. Fiscal and Monetary Policy (4)

Effects of fiscal and monetary policies on aggregate variables such as output, nominal and real interest rates, price level, and employment. Additional topics include the inflation/unemployment trade-off, budget deficit, and economic growth.

IRGN 232. Immigration and Immigration Policy (4)

This course examines the role of immigration in the globalization of Pacific Rim economics. Topics include the economic forces behind immigration; the impact of immigration on wages, employment, and industry structure in

sending and receiving countries; and the nature, scope, and political economy of immigration policy. **Prerequisites:** IRCO 401 or consent of instructor.

IRGN 235. Topics in International Trade (4)

This course develops new analytical models of international trade and examines their relevance for trade policy. Topics include setting trade policy where firms have global market power; the interaction between international trade, innovation, and economic growth; regional economic policy, dynamic industry clusters, and information technology; and new trade theory and the world distribution of income.

IRGN 237. Policy Design (4)

Course teaches how to make strong, reasoned cases for new policy initiatives. Covers cost-benefit analysis, cost-effectiveness evaluation, multigoal analysis, and how these are used in policymaking. Covers tools to predict policy impact, like drawing on "best practice" and related experiences.

IRGN 238. Production and Operations Management: Analysis and Control (4)

This course provides a comprehensive introduction to the fundamental decisions and trade-offs associated with the control of a firm's operations function. It analyzes production processes, quality control, inventory and materials planning, kanban, and just-in-time principles. **Prerequisites:** IRCO 453 and 454, or consent of instructor.

IRGN 239. Policy Evaluation (4)

Research-design class focusing on strategies for evaluating policies' effectiveness with data in small quantities. Skills taught: understanding limits of what data say, and using information optimally. The emphasis is on qualitative analysis. The concepts taught are similar to those presented in QM3. **Prerequisites:** IRCO 453 and 454.

IRGN 240. Applied Data Analysis and Statistical Decision Making (4)

The goal of the course is to teach how to evaluate quantitative information in business and economics contexts, and to make sound managerial decisions in complex situations. Much of the problems and the course work will involve statistical software and spreadsheet analysis of data. The course covers various applied multivariate statistical methods beyond basics. **Prerequisites:** IRCO 453 and 454, or consent of instructor.

IRGN 242. Economics of Telecommunications (4)

This course will focus on the underlying economics of the telecommunications and public policy rationale of regulations applied to this industry. Both theoretical models and case studies will be used to provide better understanding of the telecommunication marketplace and the nature of competition between service providers in the industry. **Prerequisite:** IRGN 221 or consent of instructor.

IRGN 243. International Economics (4)

The theory and mechanics of international economics. Included will be such topics as real trade theory, international movements of capital, the effects of trade and capital flows on domestic economies, and policies toward trade and foreign investment.

IRGN 244. Product Development (4)

This course examines how high-tech companies develop successful products. Emphasizes interplay between business and technology issues, including marketing, finance, manufacturing, prototyping, testing, and design. Student teams develop novel products, from concept to working prototype, including a business plan for launching the product. Discussion of concurrent engineering, rapid prototyping, industrial design, and other design methodologies.

IRGN 248. Civil Society and Development (4)

To explore the roles that civil society/NGOs/the third sector can play in advancing political, social, and economic progress in developing countries. To consider the strengths and weaknesses, capacities, and limitations of NGOs in developing countries. To provide students with experience in evaluating NGOs and in making professional recommendations to enhance their ability to make a difference. To prepare students to take leadership roles—whether in government, the private sector, or NGOs—in promoting civil-society participation in development.

IRGN 249. Making U.S. Foreign Policy (4)

Analysis of the interests, structure, and procedures of the main executive branch agencies involved in the formulation of foreign policy, and of the roles of Congress, the media, public opinion, and non-governmental actors. Case studies and "daily briefings" to prepare students to perform professionally in the foreign policy arena. **Prerequisite:** IRGN 210 or consent of instructor. Suggested: IRGN 211.

IRGN 250. The Politics of U.S.-Japan Economic Relations (4)

This course will analyze how the domestic politics of each country, their international negotiations, and their interaction concerning economic issues have affected the U.S.-Japan relationship. Both the politics of cooperation and integration, and trade friction and conflict will be addressed in part through study of specific cases.

IRGN 251. Economic Development (4)

This course examines comparative patterns of industrialization and agricultural modernization with a focus on certain common features of the modernization process and widely varying endowments, policies, and experiences of different countries. **Prerequisites:** IRGN 221 and 243, or consent of instructor.

IRGN 252. Quantitative Methods for Advanced Analysts (4)

This course caters to the needs of those who routinely face a variety of advanced data analysis challenges such as international marketing and sales managers, consulting analysts, or international business development and intelligence specialists. Knowledge of introductory optimization and statistics including linear regression, is assumed. The course is entirely practical in that it is organized around in-depth case studies, requiring students to work extensively with data. Methods covered include cluster, factor, and discriminate analysis, and modeling and simulation.

IRGN 256. Program Design and Evaluation (4)

Introduction to elements of program design and evaluation. Examines principles and guidelines used in creating a program and evaluating its success or failure. International case studies are explored. Students have the opportunity to develop their own program and evaluate projects.

IRGN 257. Cost Benefit Analysis (4)

Examination of public policy analysis, such as cost-benefit analysis and project evaluation, for use in policy formation. Sustainable development will receive particular attention. Case studies emphasizing the environment, agriculture and food, and economic development will be included.

IRGN 258. International Environmental Policy and Politics (4)

This course analyzes multilateral environmental agreements and negotiating positions of key countries on climate change, biodiversity conservation, sustainable development, and other subjects. It explores the challenges countries face to balance economic development objectives with global environmental concerns.

IRGN 259. Conflict Resolution of Environmental Issues (4)

Use of bilateral negotiations (U.S.-Canada), regional organization (ECE and acid rain in Europe), and United Nations' specialized agencies (UNEP and WMO on ozone depletion and climate change) to mediate environmental disputes. Consideration of nontraditional approaches resolving international environmental problems.

IRGN 260. Economic and Social Development of China (4)

This course examines China's development experience from a generally economic standpoint. Contents include: patterns of traditional Chinese society and economy; geography and resource constraints, impact of the West and Japan; development since 1949, and contemporary problems and options.

IRGN 261. Chinese Politics (4)

This course will analyze post-1949 Chinese politics, including political institutions, the policy-making process, and citizen political behavior. Special attention will be given to the prospects for political reform in China.

IRGN 263. Political Economy of Southeast Asia (4)

This course provides an introduction to five Southeast Asian countries: Indonesia, Thailand, Malaysia, the Philippines, and Vietnam. The focus will be on national level political and economic issues in these countries. In addition, we will also be examining a number of region-wide issues: Chinese business groups and networks; clientelism and corruption; regional trade and investment linkages; democratization; and the implications of political change for future economic development. **Prerequisite:** graduate standing or consent of instructor.

IRGN 264. Economies in Southeast Asia (4)

This course focuses on the long-run and current economic issues of Southeast Asia. The topics are economic growth, human capital, inequality and poverty, social institutions, the business sector, the financial sector, government, the external sector, and regional and interregional economic relations. For each topic, we will discuss the issues from selected countries in the region in more detail.

IRGN 265. Management of Non-profit Organizations (4)

Analyzes the particular environment in which non-profit organizations define and achieve their objectives. Management tools are applied to existing non-profits and to student projects.

IRGN 266. Public Finance (4)

Describes principles of taxation and expenditure analysis; public budgeting; and assessment of budget priorities.

IRGN 270. International Business Strategy (4)

This course analyzes corporate strategies and management issues in their international dimensions. Based on numerous case studies, the class examines the strategic opportunities and problems that emerge when companies transfer corporate skills and competence to other countries.

IRGN 271. Japanese Economy (4)

A broad survey of the Japanese Economy, together with in-depth examination of some distinctively Japanese phenomena such as savings behavior, financial structure, industrial organization, and labor markets. **Prerequisites:** IRGN 221 and 243, or consent of instructor.

IRGN 273. Current Issues in U.S.-Latin American Relations (4)

Issues to be actively debated include the collective defense of democracy, coping with revolutionary change, counter-narcotics, anti-corruption, international finance, trade, and U.S.-Mexican and U.S.-Brazilian relations. In each case, students analyze the strengths and weaknesses of current U.S. policy and advocate alternative options. **Prerequisite:** IRCO 210 or consent of instructor.

IRGN 274. Economic Policy in Latin America (4)

This course seeks to enhance the students' understanding of the main policy alternatives open to the largest Latin American countries. Development and stabilization policies are analyzed, emphasizing the current debate between conventional and heterodox policy packages and their impact on decision making. **Prerequisites:** IRGN 221 and 243.

IRGN 276. International Negotiation (4)

This course attempts to reach a broad audience of students who seek in-depth understanding of how states and other international actors attempt to achieve specific objectives through give-and-take of the negotiation process. Cases include Northern Ireland and Middle East peace processes, negotiations leading to Dayton accords, and negotiations over Antiballistic Missile Treaty.

IRGN 278. Japanese Foreign Policy (4)

Examines the domestic and strategic sources of Japan's foreign policy in the postwar era. Unlike IRGN 460, this course emphasizes Japan's foreign economic policy in regional and global multilateral organizations, and the major security issues it confronts with its Asian neighbors.

IRGN 281. Managing Country Risk in the Modern Multinational Corporation (4)

Examines ways to analyze, assess, and reduce country risk.

IRGN 284. Korean Politics (4)

This course will examine characteristics and distinctive aspects of contemporary Korean society and politics. Emphasis will be placed on continuity and change in social values, political culture and leadership, economic growth and its impact, and democratization and its future prospects. **Prerequisite:** consent of instructor.

IRGN 285. The Korean Economy (4)

Analytical review of South Korea's economic performance. Examination of major policy changes (e.g., shifts toward export-promotion, heavy and chemical industrial promotion), Korea's industrial structure including the role of large enterprise (chaebol); role of government; links between Korea and other countries.

IRGN 287. Politics and Institutions in Latin America (4)

Overview of Latin American politics and the "rules of the game," both formal and informal. Key topics include military rule, presidentialism, and clientelism in the region as a whole, with special emphasis on Argentina, Brazil, Chile, and Mexico.

IRGN 289. Applied Environmental Economics (4)

This course teaches students how to analyze environmental and natural resource policy issues in developing countries using economic concepts and methods. Weekly spreadsheet exercises based on real-world data provide hands-on practice. **Prerequisites:** IRCO 453, 454, IRGN 221, or consent of instructor.

IRGN 290. Special Topics in Pacific International Affairs (4)

A seminar course at an advanced level on a special topic in Pacific international affairs. May be repeated for credit.

IRGN 292. Special Topics in Pacific Studies (2)

A seminar course at an advanced level on a special topic in Pacific Studies.

IRGN 298. Directed Group Study (2)

Directed reading in selected area. The content of each course is to be decided by the professor directing the course with the approval of the student's faculty advisor. May be repeated for credit. **Prerequisites:** graduate standing and consent of faculty advisor.

IRGN 299. Independent Research (2-12)

Independent research under the guidance of a faculty member in IR/PS. May be repeated for credit. **Prerequisites:** graduate standing and consent of faculty advisor.

International Studies

PROGRAM FACULTY

Eric J. Bakovic, Ph.D., *Associate Professor, Linguistics*
Prashant Bharadwaj, Ph.D., *Assistant Professor, Economics*
Suzanne Brenner, Ph.D., *Associate Professor, Anthropology*
J. Lawrence Broz, Ph.D., *Associate Professor, Political Science*
Robert Cancel, Ph.D., *Associate Professor, Literature*
Marsha A. Chandler, Ph.D., *Professor, International Relations and Pacific Studies*
William Chandler, Ph.D., *Professor, Political Science*
Ellen T. Comisso, Ph.D., *Professor, Political Science*
Ann L. Craig, Ph.D., *Associate Professor, Political Science*
Joseph W. Esherick, Ph.D., *Professor, History*
Karen E. Ferree, Ph.D., *Assistant Professor, Political Science*
James H. Fowler, Ph.D., *Associate Professor, Political Science*
Clark Gibson, Ph.D., *Professor, Political Science; Director, International Studies Program*
Peter A. Gourevitch, Ph.D., *Professor, International Relations and Pacific Studies*
Theodore Groves, Ph.D., *Professor, Economics*
Stephen M. Haggard, Ph.D., *Professor, International Relations and Pacific Studies*
Gordon H. Hanson, Ph.D., *Professor, International Relations and Pacific Studies*
Takeo Hoshi, Ph.D., *Professor, International Relations and Pacific Studies*
Alan C. Houston, Ph.D., *Professor, Political Science; Provost, Eleanor Roosevelt College*
Christine Hunefeldt, Ph.D., *Professor, History; Director, CILAS*
Stephanie H. Jed, Ph.D., *Associate Professor, Literature*
Bennetta W. Jules-Rosette, Ph.D., *Professor, Sociology*
Miles E. Kahler, Ph.D., *Professor, International Relations and Pacific Studies*
Hasan Kayali, Ph.D., *Associate Professor, History*
Todd Kontje, Ph.D., *Professor, Literature*
Nancy H. Kwak, Ph.D., *Assistant Professor, History*
David A. Lake, Ph.D., *Professor, Political Science*
Lisa Lowe, Ph.D., *Professor, Literature*
Victor V. Magagna, Ph.D., *Associate Professor, Political Science*
Meguni Naoi, Ph.D., *Assistant Professor, Political Science*
Nancy G. Postero, Ph.D., *Associate Professor, Anthropology*
Michael T. Provenge, Ph.D., *Associate Professor, History*
Pamela Radcliff, Ph.D., *Associate Professor, History*
James E. Rauch, Ph.D., *Professor, Economics*
Roddey Reid, Ph.D., *Professor, Literature*
Joel Robbins, Ph.D., *Professor, Anthropology*
Akos Rona-Tas, Ph.D., *Associate Professor, Sociology*
Sharon Rose, Ph.D., *Associate Professor, Linguistics*
Christina J. Schneider, Ph.D., *Assistant Professor, Political Science*

Lisa R. Shaffer, Ph.D., *Adjunct Professor, International Relations and Pacific Studies/Director, Sustainability Solutions Institute*
Peter H. Smith, Ph.D., *Professor, Political Science*
Stefan A. Tanaka, Ph.D., *Professor, History*
Christena L. Turner, Ph.D., *Associate Professor, Sociology*
Carlos H. Waisman, Ph.D., *Professor, Sociology*
Lisa Yoneyama, Ph.D., *Associate Professor, Literature*
Leon Zamosc, Ph.D., *Associate Professor, Sociology*

OFFICE: Suite 100, ERC Administration Building
<http://isp.ucsd.edu>

THE INTERNATIONAL STUDIES PROGRAM

Technology and the forces of cultural and economic integration appear to reduce the distances between societies, which now impinge on one another on many dimensions. At the same time, ethnic, religious, and economic conflicts erupt within and between societies, often in violent form. Both the proximity of other societies and the remaining divides within and between them demand a better understanding of their cultures and institutions. Societies cannot be understood in isolation or at a single point in time, however; they are shaped by global and regional environments—political, military, economic, cultural—and their pasts. Individuals and societies in turn shape those environments as they reinterpret their histories.

Using different disciplinary lenses, the international studies major explores the interaction between international and national, global and local, contemporary and historical. The program builds on the strengths of existing international specializations at UC San Diego. International relations and comparative politics are established and distinguished fields of political science. The comparative study of societies and cultures lies at the core of sociology and anthropology. Literature and linguistics offer a rich array of courses dealing with languages and traditions outside the English-speaking societies. Area studies programs provide comprehensive understanding of particular countries and regions.

The international studies major provides students with both a firm grounding in a discipline and the flexibility to permit exploration from alternative perspectives. The primary and secondary tracks chosen by each student contain the disciplinary foundations of the major. International studies majors also complete two core courses that serve as gateways to disciplinary approaches and to central international and comparative issues that cut across disciplines. Among these subjects are cultural boundaries and identities, economic and social development, international and regional integration and their effects, the evolution of political and social institutions, and forms of communication and language. A required capstone seminar permits the completion of a research paper in close association with a member of the faculty. International studies majors benefit throughout from the activities and programs of the Institute for International, Comparative, and Area Studies (IICAS), the home for international studies at UCSD.

Education Abroad

Majors in international studies are encouraged to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP). Subject to approval by the faculty director of the major, up to six courses taken through EAP/OAP will be accepted for credit toward the major. Students are strongly encouraged to complete INTL 101 and INTL 102 before departure. Students interested in studying abroad should see an international studies program advisor to discuss appropriate courses and programs for their plan of study. Information on EAP/OAP is given in the Education Abroad Program section of the UC San Diego General Catalog. Interested students should contact the Programs Abroad Office in the International Center and visit its Web site at <http://programsabroad.ucsd.edu>. Financial aid can be used for EAP/OAP study, and special study abroad scholarships are also available.

For information on study abroad in the ISP, visit <http://isp.ucsd.edu> and <http://programsabroad.ucsd.edu/pao/pdf/newintlabroadmap.pdf>.

Careers

International studies attracts students who are interested in a variety of careers, including government and international organizations, international business, non-governmental organizations, journalism, the arts, and the media. Because of its strong disciplinary core, the major also prepares students who wish to pursue graduate degree programs in international affairs or in one of the participating disciplines.

Honors

The Honors Program in International Studies recognizes academic excellence in the major. The Honors Program allows qualified students to complete an honors thesis on a topic of their choice in close collaboration with a member of the UCSD faculty. Students who wish to participate in the Honors Program in International Studies should indicate their interest in the spring quarter of their junior year. Honors program applications are available on the ISP Web site. Applications are due by Monday of the ninth week, the quarter before you enroll in 190H.

Refer to http://isp.ucsd.edu/content/is_major/honors.php for additional requirements and information pertaining to the ISP Honors Program.

Requirements for the Honors Program

Candidates for honors in any of the International Studies degrees must meet the following requirements:

- A GPA of 3.5 in courses in the International Studies Major (INTL 101, 102, primary track, and secondary track courses)
- Completion of INTL 190H: Senior Honors Seminar in International Studies.
- Completion of a senior honors thesis (INTL 196H). On the recommendation of the student's instructor in INTL 190H and with the approval of the director of the International Studies program, qualified students will enroll in INTL 196H:

Directed Thesis Research (4 units) and complete a senior honors thesis under the direction of a member of the International Studies faculty. The thesis must reflect a research project that is substantially broader in scope and that includes more original research than the research paper required of all International Studies students in INTL 190.

Criteria for "Distinction," "High Distinction," and "Highest Distinction"

- Students must maintain a 3.5 GPA in the major to graduate with distinction.
- Each student whose honor thesis also earns a grade of A– shall be entitled to the designation "with distinction."
- Each student whose honors thesis earns a grade of a A shall be entitled to the designation "with high distinction."
- Each student whose honors thesis earns a grade of a A+ shall be entitled to the designation "with highest distinction."

Please refer to the International Studies Program Web site for additional requirements.

THE INTERNATIONAL STUDIES MAJOR

A student who satisfactorily completes the general-education requirements of Muir, Revelle, Marshall, Warren, Roosevelt, or Sixth College in addition to the international studies requirements described below will be awarded one of the following bachelor of arts degrees based upon selection of the primary track:

International Studies—Anthropology

International Studies—Economics

International Studies—History

International Studies—Linguistics

International Studies—Literature

International Studies—Political Science

International Studies—Sociology

All upper-division courses applied to the requirements of the major must be taken for a letter grade. A 2.0 grade-point average is required in the major, and students must earn at least C– in each course counted for the major. Transfer students should see the international studies advisor to determine whether courses taken elsewhere satisfy international studies program requirements.

LOWER-DIVISION REQUIREMENTS

Foreign language (four quarters of college-level language or equivalent proficiency).

Students majoring in international studies are required to demonstrate basic proficiency in a modern foreign language by completing four quarters of foreign language instruction (or equivalent) with a passing grade. Students may also complete this requirement by demonstrating advanced language ability on a proficiency exam.

College-level language study is a prerequisite for study abroad in most non-English speaking countries and enhances understanding of those

societies. Students who plan to study abroad in non-English speaking countries may need to take additional language classes, and they will need to take all language courses for letter grades.

Students should make substantial progress toward fulfilling college general-education requirements and the foreign language requirement of the international studies major before beginning the core sequence of the international studies major.

UPPER-DIVISION REQUIREMENTS

The upper-division requirements for a major in international studies are

1. Two core courses (INTL 101 and INTL 102)
2. A capstone seminar (INTL 190)
3. Eight 4-unit, upper-division, non-language courses in a primary track
4. Five 4-unit, upper-division, non-language courses in a secondary track (different from primary track)

Core Courses

Two core courses (INTL 101 and INTL 102) provide an intellectual gateway to central issues and disciplinary approaches in international studies. Students may begin the sequence with either course. Sophomore status is a prerequisite for both courses.

INTL 101. Culture and Society in International Perspective (4)

INTL 102. Economics, Politics, and International Change (4)

Capstone Seminar

All majors will complete the capstone seminar during their senior year. Students are required to complete a research paper for this course.

INTL 190. Seminar in International Studies (4)

Regional Requirement

Of the thirteen track courses (eight primary and five secondary), three courses must concentrate on one country or region outside the United States to complete the International Studies Program regional requirement.

Departments Offering Both Primary and Secondary Tracks

Anthropology

Primary Track: Students are required to take at least one course from the following:

ANTH 101. Foundations of Social Complexity

ANTH 102. Human Evolution

ANTH 103. Sociocultural Anthropology

The remaining upper-division courses should be selected from the Anthropology: Sociocultural (ANSC) and Archaeology (ANAR) listings. Up to two approved courses from Anthropology: Biological Anthropology (ANBI) can also be counted toward the major with the approval of the international studies program advisor.

Secondary Track: Students are encouraged to take ANTH 101 and 103; all other courses should be

from the ANTH, ANSC, or ANAR series; one course from the ANBI series will be accepted for credit by petition.

Economics

Primary and Secondary Tracks: Both primary and secondary track IS majors must satisfy the following six lower-division department requirements with a C– or better:

Calculus. Mathematics 10A-B-C or Mathematics 20A-B-20C and Economics 1, 2, 3

Upper-division courses may be selected from **Economics 100A-B-C. Microeconomics**
Economics 110A-B. Macroeconomics
Economics 120A-B-C. Econometrics
Economics 101. International Trade
Economics 103. International Monetary Relations
Economics 114. Economics of Immigration
Economics 116. Economic Development
Economics 117. Economic Growth
Economics 125. Demographic Analysis and Forecasting
Economics 131. Economics of the Environment
Economics 132. Energy Economics
Economics 133. International Environmental Agreements
Economics 144. Economics of Conservation
Economics 145. Economics of Ocean Resources
Economics 161. Global Integration of Latin America
Economics 162. Economics of Mexico
Economics 163. Japanese Economy
Economics 165. Middle East Economics

Both primary and secondary track majors must take at least two of the following courses:

Economics 101. International Trade
Economics 103. International Monetary Relations
Economics 114. Economics of Immigration
Economics 116. Economic Development
Economics 117. Economic Growth
Economics 125. Demographic Analysis and Forecasting
Economics 131. Economics of the Environment
Economics 132. Energy Economics
Economics 133. International Environmental Agreements
Economics 144. Economics of Conservation
Economics 145. Economics of Ocean Resources
Economics 161. Global Integration of Latin America
Economics 162. Economics of Mexico
Economics 163. Japanese Economy
Economics 165. Middle East Economics

At least one of the above must be Economics 101, 103, or 116.

History

Primary Track: At least six of eight courses must be taken in any of the following categories:

History of Africa (HIAF)

History of Europe (HIEU)

History of East Asia (HIEA)

History of the Near East (HINE), with the exception of HINE 151, 152, 153

History of Latin America (HILA)

History of Science (HISC)

History of Religion (HIRE) and/or History Topics (HITO), except HITO 194–199

Up to two courses may be taken in History of the United States (HIUS).

Secondary Track: All courses must be taken in non-U.S. history.

Linguistics

Primary Track: Eight upper-division courses in linguistics, which must include LIGN 101 (Introduction to the Study of Language) and at least three courses from the following list:

LIGN 105. Law and Language
LIGN 108. Languages of Africa
LIGN 141. Language Structures
LIGN 142. Language of Typology
LIGN 143. Structure of Spanish
LIGN 145. Pidgins and Creoles
LIGN 174. Gender and Language in Society
LIGN 175. Sociolinguistics
LIGN 176. Language of Politics and Advertising
LIGN 177. Multilingualism

At most, one of the eight courses can be LIGN 199 (Independent Study in Linguistics) by petition.

Secondary Track: Five upper-division courses in linguistics, which must include LIGN 101 (Introduction to the Study of Language) and at least two courses from the list above. At most, one of the five courses can be LIGN 199 (Independent Study in Linguistics) by petition.

Literature

Primary Track: Eight upper-division courses may be selected from the following:

Literatures in English (LTEN)

LTEN 188. Contemporary Caribbean Literature
LTEN 189. Twentieth-Century Postcolonial Literatures

Literatures of the World (LTWL)

LTWL 140. Novel and History in the Third World
LTWL 141. Islam and Modernity
LTWL 149. The Last Turn of the Century in the West
LTWL 150. Modernity and Literature
LTWL 152. Introduction to Islam

Literature/Cultural Studies (LTCS)

LTCS 133. Globalization and Culture
LTCS 140. Subaltern Studies in Context
LTCS 141. Race and Empire
LTCS 145. National Cultures in Colonial and Postcolonial Contexts

And all courses listed under

African Literatures (LTAF)
Literatures in Chinese (LTCH)
East Asian Literatures (LTEA)
European and Eurasian Literature (LTEU) with exception of LTEU 100, 102, 105
Literatures in French (LTFR) with exception of LTFR 160
Literatures in German (LTGM)
Literatures in Italian (LTIT) with exception of LTIT 161
Korean Literature (LTKO)

Literatures in Portuguese (LTPR)

Russian Literature (LTRU) with exception of LTRU 104 A, B, C

Literatures in Spanish (LTSP) with exception of LTSP 150, 151, 152, 153, 154, 160, 162, 166

With approval of the undergraduate advisor, students may take up to two theory or methods courses selected from Literature/Theory (LTTH) courses LTTH 110, LTTH 115, or LTTH 150, and from among the Literature/Cultural Studies (LTCS) courses LTCS 100, LTCS 102, or LTCS 120.

Secondary Track: Five courses selected from the above.

Political Science

Primary Track: Eight courses selected from the following. All courses numbered POLI 120 through POLI 159:

Comparative Politics: POLI 120A through POLI 139A
International Relations: POLI 140A through POLI 159

Up to three courses may be from the following subfields:

American Politics: POLI 100A through POLI 108
Political Theory: POLI 110A through 119A
Policy Analysis: POLI 160AA through 168
Research Methods: POLI 170A and POLI 181

Secondary Track: Five upper-division courses selected from courses numbered POLI 120 through POLI 159 (see above); one of the five courses may be selected from the following subfields:

American Politics: POLI 100A through POLI 108
Political Theory: POLI 110A through 119A
Policy Analysis: POLI 160AA through 168
Research Methods: POLI 170A and POLI 181

Sociology

Primary Track: Eight upper-division courses selected from the following list:

SOCI 111E. Human Rights—Principles and Problems

SOCI 111F. Human Rights—Practices and Cases

SOCI 125. Sociology of Immigration

SOCI 133. Immigration in Comparative Perspective

SOCI 134. The Making of Modern Medicine

SOCI 136E. Sociology of Mental Illness: An Historical Approach

SOCI 136F. Sociology of Mental Illness in Contemporary Society

SOCI 148. Political Sociology

SOCI 156. Sociology of Religion

SOCI 157. Religion in Contemporary Society

SOCI 158. Islam in the Modern World

SOCI 162R. Religion and Popular Culture in East Asia

SOCI 163. Migration and the Law

SOCI 169. Citizenship, Community, and Culture

SOCI 175. Nationality and Citizenship

SOCI 176. War and Society

SOCI 177. International Terrorism

SOCI 178. The Holocaust

SOCI 179. Social Change

SOCI 180. Social Movements and Social Protest

SOCI 181. Modern Western Society

SOCI 182. Ethnicity and Indigenous Peoples in Latin America

SOCI 183. Minorities and Nations

SOCI 185. Globalization and Social Development

SOCI 187. African Societies through Films
SOCI 188D. Latin America: Society and Politics

SOCI 188E. Community and Social Change in Africa

SOCI 188F. Modern Jewish Societies and Israeli Society

SOCI 188G. Chinese Society

SOCI 188J. Change in Modern South Africa

SOCI 189. Special Topics in Comparative-Historical Sociology

Note: SOCI 189 must be preapproved by program advisor.

Secondary Track: Five upper-division courses selected from the above lists.

DEPARTMENTS AND PROGRAMS OFFERING ONLY SECONDARY TRACKS

Communication

Course Prerequisites: Must take COGN 20 for a letter grade to enroll in upper-division courses.

Secondary Track: Five courses selected from the following lists:

Communication as a Social Force (COSF)

COSF 100. Introduction to Communication as a Social Force
COSF 123. Communication, Dissent, and Social Movements
COSF 124. Black Women, Feminism, and the Media
COSF 140A. Comparative Media Systems: Asia
COSF 140B. Comparative Media Systems: Europe
COSF 140C. Comparative Media Systems: Latin America and the Caribbean
COSF 159. Work and Industry in the New Information Economy
COSF 160. Political Economy/ Global Consumer Culture
COSF 161. Global Economy and National Identity
COSF 181. Political Economy of International Communications
COSF 183. The Politics of World Music
COSF 184. The Mass Media and Politics in Africa
COSF 185. Gender, Labor, and Culture in the Global Economy

Communication and Culture (COCU)

COCU 110. Cinema in Latin America
COCU 126. African Cinema
COCU 130. Tourism: Global Industry and Cultural Form
COCU 131. Cinema of the Cuban Revolution
COCU 162. Popular Culture
COCU 179. Colonialism and Culture

Communication and Human Information Processing (COHI)

COHI 114. Bilingual Communication
COHI 115. Education and Global Citizenship
COHI 121. Literacy, Social Organization, and the Individual
COHI 135. Language and Globalization

Area Studies Secondary Tracks

Five upper-division courses in a single area studies program selected from the following list of programs:

African Studies
Chinese Studies
German Studies
Italian Studies
Japanese Studies
Latin American Studies
Middle East Studies
Russian and Soviet Studies
Third World Studies

Course lists can be found in the *UC San Diego General Catalog*. All courses must be four-unit, upper-division, non-language courses, taken for a letter grade C– or better. Please contact ISP academic advisor with questions.

Students seeking a broader regional focus (e.g., European or East Asian Studies) may elect to combine courses from area studies programs dealing with that region. Courses must be preapproved prior to enrolling.

INTEGRATED BACHELOR OF ARTS/ MASTER IN INTERNATIONAL AFFAIRS

The International Studies Program and the School of International Relations and Pacific Studies have collaborated to create a combined five-year Bachelor of Arts/Master of International Affairs program (B.A./M.I.A.). The combined program is designed specifically for selected UCSD undergraduate majors in international studies who seek advanced training for leadership positions in the Pacific Rim community. In addition to serving the needs of UCSD undergraduate students, the program provides a societal benefit by providing students with advanced training that is suitable for a wide array of careers in government, industry, nonprofit institutions, and other organizations involved in the international affairs of the Pacific Rim.

The B.A./M.I.A. program retains and builds on the interdisciplinary core of the existing international studies degree and adds to it the professional training of a new one-year Master of International Affairs professional degree (year five of the combined program). This streamlined program will permit undergraduates to incorporate graduate-level courses into their final year of the international studies major. The combined degree program will provide an interdisciplinary program of study in the International Studies Program during the first four years. It is expected that up to ten undergraduate students will be accepted into this program each year.

The structure of the program is as follows:

Years 1–3

Undergraduate lower- and upper-division course work; general-education, language courses, INTL courses, major prerequisites, and half the undergraduate track courses.

Year 4

Students are still undergraduates, but the majority of course work is completed at IR/PS at the

graduate level; at end of year 4, students graduate with a B.A. in International Studies.

Summer

Required summer internship between years 4 and 5.

Year 5

Students enter IR/PS and complete remaining graduate course work; upon successful completion, they graduate with a Master of International Affairs (M.I.A.) at end of year 5.

Please note: This program is only open to students whose two tracks are economics and political science, in either order.

Students apply to the program at the end of winter quarter in year 3. Acceptance is tentative until successful completion of year 4 and the required summer internship; student is then officially accepted into the M.I.A. program and begins to pay professional fees.

The B.A./M.I.A. Program is *much* more rigidly structured than the regular IS major. Students will need to meet frequently with the International Studies Program academic advisor from their first year onward to ensure proper course selection each quarter.

The approved course list for the B.A./M.I.A. Program is slightly different than the list for the regular IS major. Please be sure to consult the appropriate list to find approved courses.

Students must study a Pacific Rim foreign language for this program because the language must match the IR/PS region of specialization during the fifth year. Consult the ISP Web site for a complete list of approved B.A./M.I.A. languages and their corresponding IR/PS regions.

Students must complete a minimum of *four* quarters of a Pacific Rim foreign language in order to meet the B.A. requirement. *Two additional* quarters are required for the M.I.A. It is recommended (but not required) that students complete all six quarters at the undergraduate level.

Students choosing to satisfy their language requirement by taking six quarters of course work must earn a grade of C– or better in the fifth quarter and a grade of B or better in the sixth quarter.

For additional information about the B.A./M.I.A. program, please visit our Web site at <http://isp.ucsd.edu>. For application information and admissions criteria, please visit <https://graduateapp.ucsd.edu/>.

THE INTERNATIONAL STUDIES MINOR

The international studies minor is designed to offer students an introduction to the interdisciplinary investigation of other societies and the forces of global integration and conflict. To receive a minor in international studies, a student must complete seven four-unit courses (twenty-eight units).

(A) LANGUAGE REQUIREMENT

ALL minors must demonstrate basic proficiency in a modern foreign language by completing four quarters of foreign language instruction (or equivalent). Students may also complete this requirement by demonstrating advanced language ability on a proficiency exam. Students completing the language

requirement through waiver (700 or better on SAT II language exam or if you attended high school outside the U.S.) or proficiency will fulfill the language component of the minor by completing one of these requirements but no course credit will be applied toward the seven courses required for the minor.

Up to two courses in foreign language can be included in the seven courses required for the minor. These may be lower-division courses but must be taken for a C– or better to apply. The remaining five courses must be upper-division courses in the humanities and social sciences. (See below.)

(B) ADDITIONAL COURSE REQUIREMENTS

1. All minors must take INTL 101 and INTL 102. INTL 101 and 102 may be taken in any order and are offered during different quarters throughout the academic year. You can enroll in INTL 101 and INTL 102 on WebReg if you have sophomore standing and are declared in the IS major or minor program. If you do not meet these requirements and wish to add INTL 101 or 102, contact the International Studies Advising Office. INTL 101 and 102 are gateway courses and should be taken in the sophomore or junior year.

2. The remaining three to five courses (depending on the number of language courses applied to the minor) must be distributed in two broad areas (tracks). Specifically, students must take at least one course in each of two tracks:

Track 1. Economics, Politics, and International Change

Track 2. Culture and Society in International Perspective

(See course listings for each track.)

3. The minor must include courses from at least two departments.

4. All courses applied to the minor (including applicable language courses) must receive a letter grade of C– or better.

5. Minors in international studies are encouraged to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP). Subject to approval by the IS faculty director, up to three courses taken through EAP/OAP or at another university will be accepted for credit toward the minor.

TRACKS IN THE INTERNATIONAL STUDIES MINOR

***Track 1: Economics, Politics, and International Change**

Communication

COSF 123. Communication, Dissent, and Social Movements

COSF 159. Work and Industry in the New Information Economy

COSF 160. Political Economy/ Global Consumer Culture

COSF 161. Global Economy and National Identity

COSF 181. Political Economy of International Communications

COSF 184. The Mass Media and Politics in Africa
COSF 185. Gender, Labor, and Culture in the Global Economy

Economics

Econ 101. International Trade
Econ 103. International Monetary Relations
Econ 114. Economics of Immigration
Econ 116. Economic Development
Econ 117. Economic Growth
Econ 125. Demographic Analysis and Forecasting
Econ 131. Economics of the Environment
Econ 132. Energy Economics
Econ 133. International Environmental Agreements
Econ 144. Economics of Conservation

Econ 145. Economics of Ocean Resources
Econ 161. Global Integration of Latin America
Econ 162. Economics of Mexico
Econ 163. Japanese Economy
Econ 165. Middle East Economics

History

HIAF 111. Modern Africa Since 1880
HIAF 120. History of South Africa
HIEA 111. Japan: Twelfth to Mid-Nineteenth Centuries
HIEA 112. Japan: From the Mid-Nineteenth Century through the U.S. Occupation
HIEA 113. The Fifteen-Year War in Asia and the Pacific
HIEA 116. Japan-U.S. Relations
HIEA 130. History of the Modern Chinese Revolution: 1800–1911
HIEA 131. History of the Modern Chinese Revolution: 1911–1949
HIEA 132. History of the People's Republic of China
HIEA 150. Modern Korea, 1800–1945
HIEA 151. The Two Koreas, 1945–Present

HIEA 165/265. Material Culture in China (requires approval of ISP advisor to apply toward minor)
HIEA 167/267 Special Topics in Modern Chinese History (requires approval of ISP advisor to apply toward minor)
HIEU 101. Greece in the Classical Age
HIEU 102. The Roman Republic
HIEU 104. Byzantine Empire
HIEU 121. Early Modern Italy
HIEU 122. Politics Italian Renaissance Style
HIEU 123. Renaissance Europe
HIEU 126. Age of Expansion: Europe and the World, 1400–1600
HIEU 128. Europe Since 1945
HIEU 131. The French Revolution: 1789–1814
HIEU 132. German Politics and Culture: 1648–1848
HIEU 134. The Formation of the Russian Empire, 800–1855
HIEU 135. European Economy and Society: 1000–1750
HIEU 136. European Society and Social Thought, 1870–1989
HIEU 138. Imperial Spain, 1476–1808
HIEU 139. The Origins of Constitutions
HIEU 141. European Diplomatic History, 1870–1945
HIEU 146. Fascism, Communism, and the Crisis of Liberal Democracy: Europe 1919–1945
HIEU 150. Modern British History

HIEU 151. Spain Since 1808
HIEU 153A. Nineteenth-Century France
HIEU 153B. Twentieth-Century France
HIEU 154. Modern German History: From Bismarck to Hitler
HIEU 155. Modern Austria
HIEU 156. The Russian Empire and the Soviet Union, 1855–1991
HIEU 159. Three Centuries of Zionism from 1648–1948
HIEU 181. Immigration, Ethnicity, and Identity in Contemporary European Society
HIEU 182. The Muslim Experience in Contemporary Europe
HILA 100. Latin America—Colonial Transformations
HILA 101. Latin America: The Construction of Independence 1810–1898
HILA 103. Revolution in Modern Latin America
HILA 104. Modern U.S.–Latin American Relations
HILA 107. State and Society in Nineteenth- and Twentieth-Century Latin America
HILA 120. History of Argentina
HILA 121. History of Brazil
HILA 122. Cuba: From Colony to Socialist Republic
HILA 131. A History of Mexico
HILA 132. A History of Contemporary Mexico
HILA 161. History of Women in Latin America
HINE 114. History of the Islamic Middle East
HINE 116. The Middle East in the Age of European Empires (1798–1914)
HINE 118. The Middle East in the Twentieth Century
HINE 119. Contemporary Middle East Conflicts
HINE 166. Nationalism in the Middle East
HITO 111. Marxian Theory
HITO 117. World History. 1200–1800
HITO 133. War and Society: The Second World War
HITO 134. International Law—War Crimes and Genocide

Linguistics

LIGN 105. Law and Language
LIGN 108. Languages of Africa
LIGN 174. Gender and Language in Society
LIGN 177. Multilingualism

Political Science

Comparative Politics: POLI 120A through POLI 139A
International Relations: POLI 140A through POLI 159

*Track 2: Culture and Society in International Perspective

Anthropology

ANSC 108. Tourism and Global Culture

ANSC 110. Societies and Cultures of the Caribbean
ANSC 130. Hinduism
ANSC 131. Urban Cultures in Latin America
ANSC 132. Modernity in Brazil
ANSC 133. Peoples and Cultures of the Middle East
ANSC 134. Global Islam
ANSC 135. Indigenous Peoples of Latin America
ANSC 136. Traditional Chinese Society
ANSC 137. Chinese Popular Religion
ANSC 142. Anthropology of Latin America
ANSC 165. Contemporary South Asia

ANAR 140. The Foundation for Social Complexity in the Near East
ANAR 141. Prehistory of the Holy Land
ANAR 142. The Rise and Fall of Ancient Israel
ANAR 144. Pharaohs, Mummies, and Pyramids: Introduction to Egyptology
ANAR 145S. Study Abroad: Egypt of the Pharaohs

ANAR 153. The Mysterious Maya
ANAR 154. The Aztecs and Their Ancestors
ANAR 155S. Study Abroad: Ancient Mesoamerica
ANAR 156. The Archaeology of South America
ANAR 157. Early Empires of the Andes: The Middle Horizon
ANAR 157S. Early Empires of the Andes: The Middle Horizon
ANAR 158. The Inca: Empire of the Andes
ANAR 185. Middle East Desert Ecology
ANAR 190. Middle East Archaeological Field School
ANAR 194S. Summer Middle East Archaeological Field School

Communication

COSF 100. Introduction to Communication as a Social Force
COSF 124. Black Women, Feminism, and the Media
COSF 140A. Comparative Media Systems: Asia
COSF 140B. Comparative Media Systems: Europe
COSF 140C. Comparative Media Systems: Latin America and the Caribbean
COSF 183. The Politics of World Music
COCU 110. Cinema in Latin America
COCU 126. African Cinema
COCU 130. Tourism: Global Industry and Cultural Form
COCU 131. Cinema of the Cuban Revolution
COCU 162. Popular Culture
COCU 179. Colonialism and Culture
COHI 114. Bilingual Communication
COHI 115. Education and Global Citizenship
COHI 121. Literacy, Social Organization and the Individual
COHI 135. Language and Globalization

History

HIAF 122. Traditional African Religions
HIEA 115. Social and Cultural History of Twentieth-Century Japan
HIEA 120. Classical Chinese Philosophy and Culture
HIEA 121. Medieval Chinese Culture and Society
HIEA 122. Late Imperial Chinese Culture and Society
HIEA 123. Food in Chinese History
HIEA 124. Science in China and the West from Ancient Times to the Seventeenth Century
HIEA 125. Women and Gender in East Asia
HIEA 133. Twentieth Century China: Cultural History
HIEA 135. Thought and Religion in China: Buddhism
HIEA 137. Women and Family in Chinese History
HIEA 165/265. Material Culture in China (requires approval of ISP advisor to apply toward minor)
HIEA 167/267 Special Topics in Modern Chinese History (requires approval of ISP advisor to apply toward minor)
HIEU 110. The Rise of Europe
HIEU 111. Europe in the Middle Ages

HIEU 113. Rule, Conflict, and Dissent in the Middle Ages
 HIEU 115. The Pursuit of the Millennium
 HIEU 118. Americanization of Europe
 HIEU 120. The Renaissance in Italy
 HIEU 124. The City in Italy
 HIEU 125. Reformation Europe
 HIEU 127. Sport in the Modern World
 HIEU 129. Paris, Past and Present
 HIEU 130. Europe in the Eighteenth Century
 HIEU 133. Gender in Antiquity and the Early Medieval Mediterranean
 HIEU 136A. European Society and Social Thought, 1688–1870
 HIEU 136B. European Society and Social Thought, 1870–1989
 HIEU 142. European Intellectual History, 1780–1870
 HIEU 143. European Intellectual History, 1870–1945
 HIEU 145. The Holocaust as Public History
 HIEU 147. The History of Women in Europe: Middle Ages to the Early Modern Era
 HIEU 148. The History of Women in Europe: The Enlightenment to the Victorian Age
 HIEU 149. History of Women in Europe: 1870 to the Present
 HIEU 152. The Worst of Times: Everyday Life in Authoritarian and Dictatorial Societies
 HILA 115. The Latin American City, a History
 HILA 121. History of Brazil
 HINE 100. The Ancient Near East and Israel
 HINE 104. The Bible and the Near East: The Primary History
 HINE 106. The Bible and the Near East: The Writings
 HINE 108. The Middle East before Islam
 HIRE 115. Women in Chinese Religions
 HIRE 120. Buddhist Thought and Practice
 HISC 100. The Discovery of Deep Time
 HISC 101A. Science in the Greek and Roman World
 HISC 101B. Medieval Science in the Latin West, ca. 500–1500
 HISC 101C. Early Modern Science
 HISC 102. Technology in World History
 HISC 103. Gender and Science in Historical Perspective
 HISC 104. History of Popular Science
 HISC 105. History of Environmentalism
 HISC 106. The Scientific Revolution
 HISC 107. The Emergence of Modern Science
 HISC 108. Science and Technology in the Twentieth Century
 HISC 110. Science in China and the West from Ancient Times to the Seventeenth Century
 HISC 111. Origins of the Atomic Age
 HITO 100. Religious Traditions: Ancient Near Eastern Religions
 HITO 102. Religious Traditions: East Asian Religious Traditions
 HITO 104. The Jews and Judaism in the Ancient and Medieval Worlds
 HITO 105. The Jews and Judaism in the Modern World
 HITO 126. A History of Childhood

Linguistics

LIGN 141. Language Structures
 LIGN 142. Language of Typology
 LIGN 143. Structure of Spanish

LIGN 145. Pidgins and Creoles
 LIGN 175. Sociolinguistics
 LIGN 176. Language of Politics and Advertising

Literature

Literatures in English (LTEN):
 LTEN 188. Contemporary Caribbean Literature
 LTEN 189. Twentieth-Century Postcolonial Literatures

Literatures of the World (LTWL):
 LTWL 140. Novel and History in the Third World
 LTWL 141. Islam and Modernity
 LTWL 149. The Last Turn of the Century in the West
 LTWL 150. Modernity and Literature
 LTWL 152. Introduction to Islam

Literature/Cultural Studies (LTCS):
 LTCS 133. Globalization and Culture
 LTCS 140. Subaltern Studies in Context
 LTCS 141. Race and Empire
 LTCS 145. National Cultures in Colonial and Postcolonial Contexts

And all courses listed under
 African Literatures (LTAF)
 Literatures in Chinese (LTCH)
 East Asian Literatures (LTEA)
 European and Eurasian Literature (LTEU) with exception of LTEU 100, 102, 105
 Literatures in French (LTFR) with exception of LTFR 160
 Literatures in German (LTGM)
 Literatures in Italian (LTIT) with exception of LTIT 161
 Korean Literature (LTKO)
 Literatures in Portuguese (LTPR)
 Russian Literature (LTRU) with exception of LTRU 104 A, B, C
 Literatures in Spanish (LTSP) with exception of LTSP 150, 151, 152, 153, 154, 160, 162, 166

With approval of the undergraduate advisor, students may take up to two theory or methods courses selected from Literature/Theory (LTH) courses LTH 110, LTH 115, or LTH 150, and from among the Literature/Cultural Studies (LTCS) courses LTCS 100, LTCS 102, or LTCS 120.

Sociology
 SOCI 111E. Human Rights—Principles and Problems
 SOCI 111F. Human Rights—Practices and Cases
 SOCI 125. Sociology of Immigration
 SOCI 133. Immigration in Contemporary Perspective
 SOCI 134. The Making of Modern Medicine
 SOCI 136E. Sociology of Mental Illness: An Historical Approach
 SOCI 148. Political Sociology
 SOCI 156. Sociology of Religion
 SOCI 157. Religion in Contemporary Society
 SOCI 158. Islam in the Modern World
 SOCI 162R. Religion and Popular Culture in East Asia
 SOCI 163. Migration and the Law

SOCI 169. Citizenship, Community, and Culture
 SOCI 175. Nationality and Citizenship
 SOCI 176. War and Society
 SOCI 177. International Terrorism
 SOCI 178. The Holocaust
 SOCI 179. Social Change
 SOCI 180. Social Movements and Social Protests
 SOCI 181. Modern Western Society
 SOCI 182. Ethnicity and Indigenous Peoples of Latin America
 SOCI 183. Minorities and Nations
 SOCI 185. Globalization and Social Development
 SOCI 187. African Societies Through Films
 SOCI 188D. Latin America: Society and Politics
 SOCI 188E. Community and Social Change in Africa
 SOCI 188F. Modern Jewish Societies and Israeli Society
 SOCI 188G. Chinese Society
 SOCI 188J. Change in Modern South Africa
 SOCI 189. Special Topics in Comparative-Historical Sociology

Note: SOCI 189 must be preapproved by program advisor.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

UPPER-DIVISION

INTL 101. Culture and Society in International Perspective (4)
 Analysis of the cultural and social developments of the modern era from the perspective of interaction among societies. Particular attention is paid to the definition, representation, and negotiation of social and cultural boundaries over time. **Prerequisites:** International Studies major or minor with sophomore, junior, or senior standing.

INTL 102. Economics, Politics, and International Change (4)
 Examination of the domestic and international sources of economic and political change. Topics include the rise of the nation-state, comparative economic development, authoritarian and democratic regimes, international and civil conflict, globalization and its domestic and international implications. **Prerequisites:** International Studies major or minor with sophomore, junior, or senior standing.

INTL 190. Seminar in International Studies (4)
 Required seminar for International Studies seniors. Readings and discussion of topics in international and comparative studies from an interdisciplinary perspective. Emphasis on independent work and completion of a research paper. **Prerequisites:** International Studies major; successful completion of INTL 101 and 102; senior standing.

INTL 190H. Honors Seminar in International Studies (4)
 Required of all honors students in International Studies. Reading and discussion of international topics and cooperative studies from an interdisciplinary perspective. Emphasis on research design and completion of research paper in preparation for INTL 196H. **Prerequisites:** International Studies major with 3.5 major GPA; department stamp; senior standing; INTL 101; INTL 102; consent of instructor.

INTL 196H. International Studies Honors Program (4)

Open only to seniors who have completed INTL 190H. Completion of an honors thesis under the supervision of a member of the International Studies faculty. **Prerequisites:** International Studies major with 3.5 GPA; department stamp; senior standing; INTL 190H; consent of instructor.

Italian Studies

PROFESSORS

John Marino, Ph.D., *History*
Carol Plantamura, M.F.A., *Emerita, Music*
Janet Smarr, Ph.D., *Theatre and Dance*
Robert Westman, Ph.D., *History*

ASSOCIATE PROFESSORS

Nancy Caciola, Ph.D., *History*
Jack Greenstein, Ph.D., *Visual Arts*
Stephanie Jed, Ph.D., *Literature*
Pamela Radcliff, Ph.D., *History*
Pasquale Verdicchio, Ph.D., *History*

LECTURER

Adriana de Marchi Gherini, Ph.D., *Literature*

OFFICE:

History Undergraduate Advising
Humanities and Social Sciences Building, Fifth Floor
Muir College

<http://history.ucsd.edu/programs/caesar-programs/italian-stud/index.html>

Italian studies is an interdisciplinary program in the language, literature, history, theater, music, and art of Italy. Italian studies coordinates the resources of the Departments of History, Literature, Music, Theatre and Dance, and Visual Arts, and offers students the opportunity to design a major, leading to a B.A., around the course offerings of these five departments. Students in Italian studies are encouraged to participate in the University of California Education Abroad Program (EAP), which is affiliated with the Universities of Padua, Trento, and Bologna: this provides the possibility of a junior year abroad, including both language courses and courses dealing with various aspects of Italian studies. EAP credits may be transferred back to UC San Diego to coordinate with on-campus offerings.

THE MAJOR PROGRAM

A major in Italian studies consists of a choice of twelve upper-division courses in literature, history, music, theatre, and visual arts approved for the program and listed below. Courses in other areas of Italian studies taken abroad or on our campus may also apply. At least three areas must be represented in the student's program of study. The particular courses making up each student's major will be selected in consultation with the program advisor. The study of Dante (LTIT 115) is considered central for all Italian studies majors.

THE MINOR PROGRAM

A minor in Italian studies consists of seven upper-division courses from among those listed below (at least three areas must be represented). Credit from the EAP program may be applied toward the minor.

UPPER-DIVISION/ITALIAN STUDIES COURSES

For description of courses listed below, see appropriate departmental listing.

LITERATURE

LTIT 1A-B-C. The Language of Italian Culture
LTIT 100. Introduction to Literatures in Italian

LTIT 110. Selected Topics in Italian Literature
(may be repeated for credit as topics vary)

LTIT 115. Medieval Studies

LTIT 122. Studies in Modern Italian Culture

LTIT 137. Studies in Modern Italian Prose

LTIT 143. Major Italian Authors

LTIT 161. Advanced Stylistics and Conversation

LTIT 192. Senior Seminar in Literatures in Italian

LTIT 196. Honors Thesis

LTIT 198. Directed Group Study

LTIT 199. Special Studies

Note: Students must complete the following prerequisites for all upper-division work in Italian literature:

1. Linguistics/Italian 1A-B-C, or LTIT 1A-B-C
2. Literature/Italian 2A-B, 50

VISUAL ARTS

122CN. Defining High Renaissance Art

122D. Michelangelo

128B. Topics in Early Modern Art History (when on Italian topic)

129B. Seminar in Early Modern Art History (when on Italian topic)

HISTORY (HIEU)

113. Rule, Conflict, and Dissent in the Middle Ages

122. Politics, Italian Renaissance Style

199. Independent Study in European History

The following courses may be applied to the major or minor, when 50 percent or more of the course focus is on Italian topics:

Music 113

THHS 101

Additional courses counting toward a major in Italian studies are offered on a year-to-year basis. As these often cannot be listed in the catalog in advance, interested students should consult the program faculty for an up-to-date list.

Japanese Studies

Faculty

Yumiko Blanford, *Lecturer, History (Japanese Language)*

Takashi Fujitani, *Professor, History*

Hisae Fujiwara, *Lecturer, History (Japanese Language)*

Takeo Hoshi, *Professor, International Relations and Pacific Studies*

Joseph Hankins, *Assistant Professor, Anthropology*

Germaine A. Hoston, *Professor, Political Science*

Hifumi Ito, *Lecturer, History (Japanese Language)*

Noriko Kameda, *Lecturer, History (Japanese Language)*

Ellis Krauss, *Professor, International Relations and Pacific Studies*

Mayumi Mochizuki McKee, *Lecturer, History (Japanese Language)*

Megumi Naoi, *Assistant Professor, Political Science*

Masato Nishimura, *Lecturer, History (Japanese Language)*

Kyoko Sato, *Lecturer, History (Japanese Language)*

Ulrike Schaeede, *Professor, International Relations and Pacific Studies*

Stefan Tanaka, *Professor, History*

Yasu-Hiko Tohsaku, *Professor, International Relations and Pacific Studies*

Christena Turner, *Associate Professor, Sociology*

Lisa Yoneyama, *Associate Professor, Cultural Studies and U.S.–Japan Studies*

Joji Yuasa, *Professor Emeritus, Music*

OFFICE: 3024 Humanities and Social Sciences Building, Muir College
<http://japan.ucsd.edu>

The Program in Japanese Studies coordinates a variety of campus offerings dealing with the language, history, culture, and political economy of Japan. The program is especially strong in the area of modern and contemporary Japan. In addition to courses available in the Departments of Anthropology, Economics, History, Linguistics, Literature, Music, Political Science and Sociology, qualified undergraduates also may enroll in Japan-related courses in the Graduate School of International Relations and Pacific Studies with consent of instructors.

THE MAJOR

A. LOWER-DIVISION REQUIREMENT (9 COURSES)

1. Japanese language: two years lower-division or the transferred equivalent:
Japanese Studies 10A-B-C
Japanese Studies 20A-B-C
2. The remaining three courses must be chosen from among the following:
 - a. East Asian History: HILD 10-11-12
 - b. Eleanor Roosevelt College students may petition to use MMW Courses 2 and 5.

- c. Thurgood Marshall College students may petition to use DOC course 1.
3. The language requirement may be waived by demonstrating the equivalent proficiency through exam.

B. UPPER-DIVISION REQUIREMENT (12 COURSES)

1. Japanese language: six upper-division language courses or the transferred equivalent from Japanese Studies 100A-B-C
Japanese Studies 130A-B-C
Japanese Studies 140A-B-C
Japanese Studies 150A-B-C
Students may petition to include three upper-division language courses taken abroad under EAP or OAP.
2. Japanese Studies 190 (JAPN 190): Selected Topics in Contemporary Japanese Studies. This is a seminar-style course focusing on selected topics in contemporary interdisciplinary studies of Japan. **Prerequisite:** upper-division standing; student must complete a minimum of one upper-division Japanese studies approved course, or consent of instructor.
3. The remaining five courses must be taken from two or more different disciplines.
 - a. Students may petition to include two non-language upper-division courses taken abroad under EAP or OAP.
 - b. Students may include one 199.
4. All upper-division courses must be taken for a letter grade, with the exception of JAPN 199. Beginning in fall 2010, students who declare for the Japanese Studies major and minor will be allowed no more than one course with a D grade to count toward the program requirements. This new requirement will not apply to students who declared their major or minor prior to fall 2010.
5. The language requirement can be waived by demonstrating the equivalent proficiency through exam. The required number of courses must be fulfilled by taking other non-language upper-division courses.

C. HONORS PROGRAM

1. Junior standing or higher.
2. A GPA of 3.5 or better in the major.
3. Overall GPA of 3.2 or better.
4. Completion of at least four upper-division non-language courses approved by the Program in Japanese Studies.
5. Recommendation of a faculty sponsor familiar with the student's work.

Students who qualify for honors take a two-quarter sequence Japanese Studies 196A-B (fall and winter quarters preferred) of directed study during which they define a research project, carry out the research, and complete an honors thesis.

The completed honors thesis will be evaluated by a committee consisting of the student's thesis

advisor and one other faculty member appointed by the Program in Japanese Studies director.

THE MINOR

A minor in Japanese studies consists of at least fifteen units of Japanese language (lower- or upper-division) and at least sixteen units of upper-division non-language course work taken from two or more departments. Students may use one non-language course taken abroad. All courses to be used for the minor must be approved by the Program in Japanese Studies and must be taken for a letter grade. Beginning in fall 2010, students who declare for the Japanese studies major and minor will be allowed no more than one course with a D grade to count towards the program requirement. This new requirement will not apply to students who declared their major or minor prior to fall 2010. Students who are already beyond first- and second-year language levels will be placed in one of our upper-division Japanese language courses, Written Japanese (100A-B-C), Third-Year Japanese (130A-B-C), Fourth-Year Japanese (140A-B-C), or Advanced Japanese (150A-B-C), and will be required to take four upper-division language courses and three upper-division non-language courses. The language requirement can be waived by demonstrating the equivalent proficiency through exam. The required number of courses must be fulfilled by taking other non-language, upper-division courses.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

All graduate-level courses require permission of the instructor for undergraduate students. Course titles may vary from year to year.

Courses with asterisk can be approved as Japanese Studies courses when more than 33 percent of the course content concerns Japan.

HISTORY

HIEA 111. Japan: Twelfth through Mid-Nineteenth Century

HIEA 112. Japan: from Mid-Nineteenth Century through U.S. Occupation

HIEA 113. The Fifteen-Year War in Asia and the Pacific

HIEA 114. Postwar Japan

HIEA 115. Social and Cultural History of Twentieth-Century Japan

HIEA 116. Japan-U.S. Relations

HIEA 117. Ghosts in Japan

HIEA 119 Religion and Pop Culture in East Asia (Same as SOC/B 162R)

HIEA 160. Colloquium on Modern Japanese History

JAPANESE STUDIES

JAPN 190. Selected Topics in Contemporary Japanese Studies

LANGUAGE

(Students who have prior preparation of Japanese language are placed in language courses based on the results of a placement exam or an oral interview with an instructor. Students who have lived in Japan, or use Japanese at home are required to take a placement exam administered prior to the beginning of the fall quarter. Contact the Japanese Studies office for more information.)

10A-B-C. First-Year Japanese

(No prior study of Japanese language is required for 10A.)
Prerequisite for B and C: previous course or consent of instructor.

20A-B-C. Second-Year Japanese

Prerequisite: previous course or consent of instructor.

100A-B-C. Japanese for Bilingual Speakers I

(These courses are for those students who have a high level of speaking proficiency in Japanese but no or little reading and writing abilities.) **Prerequisite for A:** consent of instructor. **Prerequisite for B and C:** previous course or consent of instructor.

130A-B-C. Third-Year Japanese

Prerequisite: previous course or consent of instructor.

140A-B-C. Fourth-Year Japanese

Prerequisite: previous course or consent of instructor.

150A-B-C. Advanced Japanese

Prerequisite: previous course or consent of instructor.

ECONOMICS

ECON 163. Japanese Economy

LITERATURE

LTEA 130. Earlier Japanese Literature in Translation

(Quarter offerings will vary among A. General Literature; B. Poetry; C. Prose Fiction; D. Drama; and E. Essays, travelogues, diaries, etc.)

LTEA 132. Later Japanese Literature in Translation

(Quarter offerings will vary among A. General Literature; B. Poetry; C. Prose Fiction; D. Drama and Film; and E. Essays, criticism, etc.)

LTEA 134. A Single Japanese Author (in translation)

LTEA 136. Special Topics in Japanese Literature

***LTWL 155. Gender Studies**

***LTCS 110. Popular Culture**

***LTCS 115. Performance Culture**

***LTCS 118. Comedy**

***LTCS 120. Historical Perspectives on Culture**

***LTCS 125. Cultural Perspectives on Immigration and Citizenship**

***LTCS 130. Gender, Race, Ethnicity/Class, and Culture**

***LTCS 131. Topics in Queer Cultures/ Queer Subcultures**

***LTCS 132. Special Topics in Social Identities and the Media**

***LTCS 133. Globalization and Culture**

***LTCS 135. Interdisciplinary Approaches to Lesbian, Gay, Bisexual, and Transgender Studies**

***LTCS 141. Special Topics in Race and Empire**

***LTCS 145. National Cultures in Colonial and Postcolonial Contexts**

***LTCS 150. Topics in Cultural Studies**

***LTCS 160. Cultural Studies Approaches to Popular Music**

***LTCS 170. Visual Culture**

MUSIC

(Check with program office as to whether these courses may be used toward a Japanese studies minor.)

MUS 111. World Music

***MUS 116. Popular Music Studies Seminar**

MUS 211. Seminar in World Music

POLITICAL SCIENCE

POLI 113B. Chinese and Japanese Political Thought I

POLI 113C. Chinese and Japanese Political Thought II

POLI 132B. Modernity and Identity in East Asia

POLI 133A. Japanese Politics: A Developmental Perspective

POLI 133D. Japanese Foreign Policy

POLI 133G. Postwar U.S.-Japan Relations

SOCIOLOGY

SOC/D 158J. Religion and Ethics in China and Japan

SOC/B 162R. Religion and Popular Culture in East Asia (same as HIEA 119)

THEATRE AND DANCE

TDGE 126. Storytelling and Design in Animation

VISUAL ARTS

VIS 127N. Twentieth-Century Art in China and Japan

VIS 127P. Arts of Japan

VIS 128D. Topics/Non-Western Art History Japanese Painting and Prints

GRADUATE SCHOOL OF INTERNATIONAL RELATIONS AND PACIFIC STUDIES

IRGN 400. International Relations of Asia—Pacific

IRGN 411. Business and Management in Japan

IRGN 416. Postwar Politics in Japan

IRGN 471. Japanese Economy

Judaic Studies

FACULTY

David M. Goodblatt, Ph.D., *Professor, History; Endowed Chair in Judaic Studies*
Deborah Hertz, Ph.D., *Professor, History; Herman Wouk Chair in Modern Jewish Studies*
Thomas E. Levy, Ph.D., *Professor, Anthropology; Director, Judaic Studies*
William H.C. Propp, Ph.D., *Professor, History*

OTHER FACULTY OFFERING COURSES IN JUDAIC STUDIES

Robert McC. Adams, *Adjunct Professor, Anthropology*
Guillermo Algaze, *Professor, Anthropology*
Steven Cassedy, Ph.D., *Professor, Literature*
Adriana De Marchi Gherini, Ph.D., *Lecturer, Literature*
Tal Golan, Ph.D., *Associate Professor, History*
Sanford Lakoff, Ph.D., *Professor Emeritus, Political Science*
Lisa Lampert, Ph.D., *Associate Professor, Literature*
Jonathan Saville, Ph.D., *Associate Professor Emeritus, Theatre and Dance*
Gershon Shafir, Ph.D., *Professor, Sociology*
Melford E. Spiro, Ph.D., *Professor Emeritus, Anthropology*
Alana Shuster, *Lecturer, Hebrew*

OFFICE: 4008 Humanities and Social Sciences Building, Muir College
(858) 534-4551
Fax: (858) 534-7283

<http://history.ucsd.edu/programs/judaic-studies/index.html>

Judaic studies is an interdisciplinary program offering courses, majors, minors, concentrations, and masters degrees that draw upon a variety of perspectives. For doctoral programs see below—the Ph.D. in ancient history and the Ph.D. in anthropology. Courses are offered in the Departments of Anthropology, Communication, History, Literature, Music, Political Science, Philosophy, and Sociology. Students also have the option within the Literatures of the World major, in the Department of Literature, of concentrating on Judaic literature; or on a combined program of the Literatures of the World major (concentration in Judaic literature) and classical studies.

In addition, Revelle and Muir Colleges have noncontiguous minors in Judaic studies and in Hebrew language and literature; Warren College has Judaic studies and Hebrew literature concentrations; and various general requirements in all colleges can be met by courses in the Judaic area. For details students should inquire at their provost's office or at the Judaic Studies Program office.

The Judaic Studies Program offers scholarships and fellowships for study abroad.

Students are encouraged to participate in the UC Education Abroad Program (EAP) in Jerusalem or Beersheva, and to investigate other options through the Opportunities Abroad Program (OAP). By petition, credits earned through EAP/OAP can fulfill UC San Diego degree, major, and minor requirements.

Interested students should contact the Programs Abroad Office in the International Center for more information. Please visit the Web site at <http://orpheus.ucsd.edu/icenter/pao>.

In addition, the Judaic Studies Program and UC San Diego Department of Anthropology offer credit and hands-on experience in Near Eastern archaeology at their archaeological field school in Israel or Jordan. Up to twelve units of academic credit may be earned through the UCSD Summer Session Program. Some scholarships are available through the Judaic Studies Program. For more information call the UCSD Summer Session Office, or visit our Web site at <http://anthro.ucsd.edu/~tlevy> for our archaeological field schools in Israel and Jordan. For a general overview of the Judaic Studies Program see <http://history.ucsd.edu/programs/judaic-studies/index.html>.

MAJOR

Requirements for the major in Judaic studies are

1. Judaic Studies 100 or equivalent; HITO 104, HITO 105
2. Twelve upper-division courses in Judaic studies, to be selected in consultation with a faculty advisor
3. Upper-division competence in Hebrew, normally to be fulfilled by completion of first- and second-year Hebrew language courses, or the equivalent

MINORS

1. Requirements for the minor in Judaic studies:

- a. Judaic Studies 100, HITO 104, HITO 105
- b. Four upper-division courses in Judaic studies, to be selected in consultation with a faculty advisor

2. Requirements for the minor in Hebrew language and literature:

Seven quarter courses in Hebrew language and literature, ordinarily Judaic Studies 1, 2, 3, 101, 102, and 103 plus one elective course

Note: Other course combinations for the major and minor may be approved by the student's faculty advisor.

Note: A majority of the courses for the major or minor must be taken at UCSD.

THE PH.D. IN ANCIENT HISTORY

The Department of History offers a Ph.D. program in ancient history. Relevant major fields are the history of Israel in the biblical period and the history of the Jewish people in antiquity. One of the two minor fields may be outside the history department. Students must acquire competence in the relevant ancient and modern languages.

THE PH.D. IN ANTHROPOLOGY (ARCHAEOLOGY)

The Department of Anthropology offers graduate training in social, cultural, and psychological anthropology, as well as in anthropological archaeology and biological anthropology. In conjunction with the Judaic Studies Program, students may concentrate in Near Eastern archaeology with a focus on Israel and Jordan. Students pursuing anthropological

archaeology are expected to take required courses in anthropology and engage in field research.

Archaeology

Since 1993, the Judaic Studies Program has sponsored major archaeological excavations in Israel's northern Negev desert. Shortly after the peace treaty was formalized between Israel and Jordan, the program began a long-term archaeological field program in the Jabal Hamrat Fidan Region (JHF) of southern Jordan. The project aims at studying the influence of early ore procurement and metallurgy on social change from the Neolithic period through the Iron Age. UC San Diego graduate students play an active role in the fieldwork and laboratory studies of material from these excavations. Qualified students are encouraged to use these data as part of their doctoral studies. In 2006, the UCSD Judaic Studies Program will join in several excavations along the Wadi al-Guwayb and Wadi al-Jariyeh in southern Jordan. This is part of the UCSD Fall Session Middle East Field School.

The Judaic Studies Program supports a state-of-the-art archaeological laboratory in the Social Sciences Building. A wide range of digital-based technologies is used for archaeological data and image processing that are linked through the Internet. Labs for processing pottery, stone tools, and other materials are available for student use.

THE M.A. IN JUDAIC STUDIES

The M.A. in Judaic studies, offered under the auspices of the Department of History, is an interdisciplinary program permitting the student to select courses primarily in history and literature, but also in anthropology, political science, sociology, and philosophy.

FELLOWSHIPS

Four fellowships are available for Ph.D. students. These include

The Dita and Erwin Gumpel Judaic Studies Endowed Fellowship

The University Fellowship

The Wexler Family Judaic Studies Fellowship Fund in honor of David Noel Freedman Judaic Studies Fellowships

Teaching assistantships are available in the Revelle College Humanities/Writing Program and in other writing programs and departments. Dissertation fellowships may be awarded to doctoral students at the dissertation stage of their studies. Funds are also available for support of travel to archaeological excavations. Students are also eligible for research-travel funds to other campus libraries of the University of California, as well as for grants that permit research in archives and libraries elsewhere. Students who deliver papers at scholarly conferences may also receive financial support for their participation.

Publications

The program produces a series of volumes: *Biblical and Judaic Studies* from the University of California, San Diego (published by Eisenbrauns Winona Lake, USA). *The Anchor Bible* (Commentary, Reference Library, and Dictionary) is edited by David Noel Freedman at UCSD. The series *Approaches to*

Anthropological Archaeology is edited by Thomas E. Levy for Equinox Publishing Ltd. (London) at UCSD.

Lectures and Conferences

The program regularly hosts international conferences and an annual series of lectures and seminars by distinguished scholars in Hebrew Bible, Archaeology, and Judaica. "The Yigal Shiloh Memorial Lecture in Archaeology" is given by an archaeologist each year in memory of Professor Yigal Shiloh.

Application Procedures

The deadline for applications is January 9. For further information contact

University of California, San Diego
GRADUATE PROGRAM, JUDAIC STUDIES 0104
9500 Gilman Dr. # 0104
La Jolla, CA 92093-0104
E-mail: dwagoner@ucsd.edu

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Following are course offerings in this area.

For descriptions of the courses listed below, refer to the appropriate department's section of the catalog.

Judaic Studies 1. Beginning Hebrew (4)

Acquisition of basic vocabulary, fundamentals of Hebrew grammar, conversation, and reading.

Judaic Studies 2. Intermediate Hebrew (4)

Continued study of vocabulary and grammar, emphasis on fluency in conversation, and reading.

Judaic Studies 3. Intermediate Hebrew, Continued (4)

Vocabulary, grammar, conversation, introduction to literary and nonliterary texts.

Judaic Studies 100. Introduction to Hebrew Bible (4)
An introduction to the Hebrew Bible focusing on the first five books, the Torah.

Judaic Studies 101. Introduction to Hebrew Texts (4)
Reading and analysis of texts from Biblical through modern authors, study of advanced vocabulary and grammar. Course taught in Hebrew and in English.

Judaic Studies 102. Intermediate Hebrew Texts (4)
Further reading and analysis of Hebrew literature from a range of periods. Advanced grammar and vocabulary. Course taught in Hebrew and in English.

Judaic Studies 103. Advanced Hebrew Texts (4)
Synthesis of fluency, reading, and grammatical skills. Reading of texts from a range of periods.

Judaic Studies 110. Introduction to Judaism (4)
An introductory survey of Jewish history, literature, and culture from antiquity to contemporary times. Topics include sacred texts, the variety of groups and views of Judaism, the historical and geographical movements of the Jewish people, and the intersection of religion, ethnicity, and culture.

Judaic Studies 111. Topics in Judaic Studies (4)
Study of a particular period, theme, or literature in Jewish civilization.

Judaic Studies 120. Topics in Zionism: Israelis and Palestinians: Two Cultures in Conflict (4)
This course examines Israeli culture, Palestinian culture, and the conflict between them. We will discuss what is

distinct about each culture, how they are different, how they are similar, their histories, and what influences the relationship/conflict between them. **Prerequisite:** upper-division standing or consent of instructor.

Judaic Studies 196A. Judaic Studies Honors Course (4)

First quarter of honors thesis research for students accepted into honors program. Research is conducted under the supervision of a faculty member selected with the approval of the director of the Judaic Studies Program. **Prerequisites:** admission to Judaic Studies Honors Program; JUDA 100, JUDA 103, HITO 104, HITO 105; upper-division electives in Judaic Studies; at least junior standing; overall 3.3 GPA; 3.5 in Judaic Studies.

Judaic Studies 196B. Judaic Studies Honors Course (4)

Second quarter of honors thesis research for students accepted into honors program. Research is conducted under the supervision of a faculty member selected with the approval of the director of the Judaic Studies Program. **Prerequisites:** admission to Judaic Studies Honors Program; previous enrollment in JUDA 196A; JUDA 100, JUDA 103, HITO 104, HITO 105; upper-division electives in Judaic Studies; at least junior standing; overall 3.3 GPA; 3.5 in Judaic Studies.

Judaic Studies 198. Directed Group Study in Judaic Studies (1-4)

Directed group study on a topic not generally included in the regular curriculum. Student must make arrangements with individual faculty members. (P/NP only)

Judaic Studies 199. Independent Study in Judaic Studies (1-4)

Independent study on a topic not generally included in the regular curriculum. Student must make arrangements with individual faculty members. (P/NP only)

ANLD 3. World Prehistory (4)

ANGN 100. Special Topics in Socio-Cultural Anthropology: Law, Religion, and Politics in Israel (4)

ANGN 142. Pastoralism in Archaeological Ethnographic Perspective (4)

ANGN 181. Foundations of Archaeology (4)

ANGN 183. Chiefdoms, States, and the Emergence of Civilizations (4)

ANPR 194. Archaeological Field School (4)

ANRG 116. Archaeology of the Holy Land: Prehistory (4)

ANRG 150. The Rise and Fall of Ancient Israel (4)

ANRG 162. Peoples of the Middle East (4)

ANRG 286. Archaeology, Anthropology and the Bible—Foundations, Data, and Debate

HIGR 260A-B-C. Seminar in the Judaic Studies (4-4-4)

HIGR 264. Topics in Pre-Islamic Jewish History (4)

HIGR 295. Thesis Seminar (4)

HIGR 298. Directed Reading (1-12)

HIGR 299. Ph.D. Thesis Direction (1-12)

HIGR 500. Apprentice Teaching (1-40)

HINE 100. The Ancient Near East and Israel (4)

HINE 102. The Jews in Their Homeland in Antiquity (4)

HINE 103. The Jewish Diaspora in Antiquity (4)

HINE 104. The Bible and the Ancient Near East: The Primary History (4)

HINE 105. The Bible and the Near East: The Prophets (4)

HINE 106. The Bible and the Near East: The Writings (4)

HINE 108. The Middle East before Islam (4)

HINE 109. Learning to Read Biblical Hebrew (4)

HINE 114. History of the Islamic Middle East (4)

HINE 116. The Middle East in the Age of European Empires (1798 to 1914) (4)

HINE 118. The Middle East in the Twentieth Century (4)

HINE 151A/251A. Introduction to Aramaic Language (4)

HINE 151B/251B. Introduction to Aramaic Dialects (4)
Prerequisite: previous course.

HINE 151C/251C. Introduction to Aramaic Dialects (4)
Prerequisite: previous course.

HINE 152A/252A. The Evolution of the Northwest Semitic Dialects (4)

Prerequisite: knowledge of at least one Semitic language; a course in general linguistics also desirable.

HINE 152B/252B. Introduction to Ugaritic (4)
Prerequisite: previous course.

HINE 152C/252C. Advanced Ugaritic (4)
Prerequisite: previous course.

HINE 153A/253A. Introduction to Akkadian Language and Mesopotamian Culture (4)

HINE 153B/253B. Continued Akkadian Language (4)
Prerequisite: previous course.

HINE 153C/253C. Advanced Akkadian Language (4)
Prerequisite: previous course.

HINE 161/261. Seminar in the Hebrew Bible (4)

HINE 166/266. Nationalism in the Middle East (4)

HINE 170/270. Special Topics in Jewish History (4)

HINE 181/281. Problems in Hebrew Manuscripts (4)

HINE 186/286. Topics in Middle Eastern History (4)

HINE 199. Independent Study in Near Eastern History (4)

HITO 104. The Jews and Judaism in the Ancient and Medieval Worlds (4)

HITO 105. The Jews and Judaism in the Modern World (4)

HITO 106. How Jewish Women Lived in Modern Times (4)

Humanities 1. The Foundations of Western Civilization: Israel and Greece (6)

LTCO 212. Studies in the Hebrew Bible (4)

LTEU 105. Medieval Studies: Crusade, Conquest, Conversion in Medieval Literature (4)

LTNE 101. Bible: The Narrative Books (4)

LTNE 102. Bible: The Prophetic Books (4)

LTNE 103. Bible: The Poetic Books (4)

LTWL 115. Contemporary Literature/Italy and Holocaust: Jewish Experience in Literature (4)

LTWL 134. A Cultural History of American Jewry (4)

LTWL 138. Critical Religion Studies (4)

LTWL 148. Yiddish Literature in Translation (4)

LTWL 198. Directed Group Study (4)

LTWL 199. Special Studies (4)

Courses cross-listed as LTNE and LTWL may be taken as Hebrew literature by students proficient in the language or as general literature by students without knowledge of Hebrew.

Music II. Folk Music: Klezmer Music (4)

Philosophy 185. Philosophy of Religion (4-4)

**Political Science 121. Government
and Politics of the Middle East (4)**

Political Science 121B. Politics in Israel (4)

Political Science 138D. The Arab-Israeli Conflict (4)

Sociology/C 156. Sociology of Religion (4)

**Sociology/C 157. Religion in
Contemporary Society (4)**

Sociology/D 178. The Holocaust (4)

**Sociology/D 188F. Modern Jewish
Societies and Israeli Society (4)**

Language and Communicative Disorders

PROFESSORS

Farrell Ackerman, Ph.D., *Linguistics*
Ursula Bellugi, Ed.D., *Adjunct/Psychology*
Jeff Elman, Ph.D., *Cognitive Science*
Eric Halgren, Ph.D., *Radiology*
Mark Kritchevsky, M.D., *Clinical Neurosciences*
Marta Kutas, Ph.D., *Cognitive Science*
Rachel Mayberry, Ph.D., *Linguistics*
John Moore, Ph.D., *Linguistics*
Carol Padden, Ph.D., *Communication*
Keith Rayner, Ph.D., *Psychology*
Doris Trauner, M.D., *Neurosciences/Pediatrics*

ASSOCIATE PROFESSORS

Leslie Carver, Ph.D., *Psychology*
Seana Coulson, Ph.D., *Cognitive Science*
Gedeon Deak, Ph.D., *Cognitive Science*
Victor Ferreira, Ph.D., *Psychology*

ASSOCIATE RESEARCH SCIENTIST

Jeanne Townsend, Ph.D., *Neurosciences*

OFFICE: Cognitive Science Building, Room 266
Mail Code: 0526
(619) 594-6775
<http://crl.ucsd.edu>
<http://slhs.sdsu.edu/phdmain.php>

THE JOINT DOCTORAL PROGRAM

San Diego State University (SDSU) and the University of California, San Diego (UCSD), offer jointly a doctoral program in Language and Communicative Disorders. The program's focus is the interdisciplinary study of language and communicative disorders. A major emphasis of the program is to apply techniques developed in cognitive science and neuroscience to the study of language and language disorders. The program involves study and research in normal language (including sign languages of the deaf and language impairments), and in the neural bases of language use and language loss. Participating faculty have research interests in a wide range of issues in processes of language development, language and aging, multilingualism, language disorders, assessment, and intervention. Graduates of the program will be qualified to serve as faculty in university programs in a variety of disciplines, and to provide leadership in research and health services. The doctoral program faculty at UCSD are an interdisciplinary group from the Departments of Cognitive Science, Communication, Linguistics, Neurosciences, and Psychology. The doctoral program faculty at SDSU are members of the School of Speech, Language and Hearing Sciences and the Departments of Linguistics and Psychology. The program is coordinated by the doctoral program

coordinators at each campus, in conjunction with an Executive Committee comprising three faculty from each campus appointed by the Graduate Deans from each campus.

The program is innovative in that many of the requirements are designed to function as a model of professional preparation specifically incorporating activities in which a successful teacher and researcher must engage after obtaining the Ph.D: students will be required to participate in interdisciplinary research throughout the program, learn about the nature and ethics of research, prepare grant proposals, write manuscripts, and will gain experience in oral presentations and teaching. Graduates from the program will be well prepared for the rigors of an academic/research career. The doctoral program in Language and Communicative Disorders, being interdisciplinary, draws from a variety of undergraduate disciplines including communicative disorders, psychology, cognitive science, linguistics, engineering, and other related sciences. Students should have adequate preparation in mathematics, statistics, and biological sciences. Background in neurosciences and/or language sciences, or language disorders is helpful, but not required for admission.

By the end of the first year, all students will select a major field of emphasis by choosing one of three concentrations. The *Adult Language* concentration is intended to provide intensive education in communicative disorders in adults. Students in this concentration will also develop expertise in the study of language processing in normal adults. The *Child Language* concentration is intended to provide specialized education in childhood (birth to adolescence) communicative disorders. Students in this concentration will also achieve competence in developmental psycholinguistics emphasizing language acquisition in normally developing children. The *Multilingualism* concentration is intended to provide education in cross-linguistic, ethnographic, and other comparative studies of communicative disorders in children and/or adults, including those associated with bilingualism and second-language acquisition (including acquisition of sign language in deaf individuals). All students will be required to take some courses in each of the three concentrations. In addition, each student will elect a *methods minor*, applying one of the new technologies of cognitive neuroscience to research on language and communicative disorders. These may include computer-controlled studies of language processing in real-time functional brain imaging (including event-related brain potentials and/or functional magnetic resonance imaging), or neural-network simulations of communicative disorders.

The program is designed as a five-year curriculum, based on a twelve-month academic year. Students will be admitted to the doctoral program only in the fall semester/quarter. Information regarding admission is found in the current edition of the *Bulletin of the Graduate Division* of San Diego State University. To receive an application for admission, contact: SDSU/UCSD Joint Doctoral Program in Language and Communicative Disorders, San Diego State University, 5500 Campanile Drive, San Diego, CA 92182-1518, (619) 594-6775, or <http://slhs.sdsu.edu/phdmain.php>.

Required courses include the *Tools* requirement (two courses in statistics/research design, a course in neuroanatomy and physiology, a course in language structure and theory and a professional survival skills course), the *Foundations* requirement (three courses on normal language and three courses on disorders of language) and the *Electives* requirement (at least five courses, with a minimum of three courses related to the chosen concentration, chosen from a broad list of approved options from Cognitive Science, Communication, Computer Science, Linguistics, Neurosciences, and Psychology). Consult with advisor for approved list of elective courses. The five required electives must be approved by the student's advisor and the Doctoral Program Coordinators. In addition to their course requirements, students are required to complete three laboratory rotations in different research methodologies (each lasting a minimum of one quarter), two research projects (first year and second year), a qualifying examination for advancement to candidacy, and a dissertation proposal in the form of grant proposal to one of the public agencies that funds research in communicative disorders.

PH.D. TIME LIMIT POLICIES

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010-11, please contact the department for more information.

(See individual departments for details; for courses available at SDSU, see SDSU Graduate Catalogue.)

TOOLS REQUIREMENT

Quantitative Methods in Psychology 201A-B-C
Ethics and Survival Skills in Academia
Cognitive Science 241

Systems Neuroscience
Cognitive Science 201 or
Basic Neurology SOMC 205

Foundations: Theories and Methods in the Study of Cognitive Phenomena
Cognitive Science 203 or
Introduction to Grammatical Theory (Linguistics 221A) and
Introductory Phonology (Linguistics 211A)

FOUNDATIONS REQUIREMENT

Special Topics in Psycholinguistics
Psychology 244

ELECTIVES

COGNITIVE SCIENCE

200: Cognitive Science Seminar

202: Foundations: Computational Modeling of Cognition

211A-B-C: Research Methods in Cognitive Science
213: Issues in Cognitive Development

260: Seminar on Special Topics
272: Topics in Theoretical Neurobiology
273: Biological Basis of Attention

COMMUNICATION

200A: Communication as Social Force
200B: Communication and Culture
200C: Communication and the Individual
201B: Ethnographic Methods for Communication
Research
201C: Discourse Analysis

LINGUISTICS

211A: Introductory Phonology¹
221A: Introduction to Grammatical Theory¹
225: Topics in Syntax
270: Psycholinguistics
272: Topics in Neurolinguistics
278: Research in Second Language Acquisition

PSYCHOLOGY

218A-B: Cognitive Psychology
222: Biological Psychology
236: Substance Abuse
244: Special Topics in Psycholinguistics
252: Seminar on Cognitive Neuroscience

COMPUTER SCIENCE AND ENGINEERING

250A-B: Artificial Intelligence
253: Neural Networks
256: Statistical Natural Language Processing
258A: Cognitive Modeling

NEUROSCIENCES

243: Physiological Basis of Human Information
263: Developmental Neuroscience

PHILOSOPHY

234: Philosophy of Language

¹Students who use this course to fulfill the Tools requirement may not use this as an elective.

Languages

Students wishing to major or minor in a foreign language or enroll in language courses should go to the following sections of this catalog:

- Departments of History, Linguistics, and Literature
- Programs in Chinese Studies, Japanese Studies, Judaic Studies, and Latin American Studies
- School of International Relations and Pacific Studies (IR/PS)

For additional information and a chart listing languages offered at UC San Diego, go to the Language Web site at <http://www.ucsd.edu/current-students/academics/languages/index.html> on TritonLink.

Latin American Studies

PROFESSORS

Guillermo D. Algaze, Ph.D., *Professor, Anthropology*
Robert R. Alvarez, Ph.D., *Professor, Ethnic Studies*
Eric J. Bakovic, Ph.D., *Associate Professor, Linguistics*
John D. Blanco, Ph.D., *Associate Professor, Literature*
Geoffrey Braswell, Ph.D., *Associate Professor, Anthropology*
Kimberley C. Brouwer, Ph.D., *Assistant Adjunct Professor, Family and Preventative Medicine*
Robert Cancel, Ph.D., *Associate Professor, Literature*
Jaime Concha, Ph.D., *Professor, Literature*
Wayne A. Cornelius, Ph.D., *Professor, Political Science*
Peter Cowhey, Ph.D., *Professor, International Relations and Pacific Studies*
Ann Craig, Ph.D., *Associate Professor, Political Science*
Thomas Csordas, Ph.D., *Professor, Anthropology*
Teddy Cruz, Ph.D., *Associate Professor, Visual Arts*
Scott Desposato, Ph.D., *Assistant Professor, Political Science*
Ricardo Dominguez, M.F.A., *Assistant Professor, Visual Arts and Calit2*
Paul W. Drake, Ph.D., *Professor, Political Science*
Richard Feinberg, Ph.D., *Professor, International Relations and Pacific Studies*
David Fitzgerald, Ph.D., *Assistant Professor, Sociology*
Ross H. Frank, Ph.D., *Associate Professor, Ethnic Studies*
Richard Garfein, Ph.D., *Associate Adjunct Professor, Family and Preventive Medicine*
Rosemary George, Ph.D., *Associate Professor, Literature*
Brian Goldfarb, Ph.D., *Associate Professor, Communication*
Paul S. Goldstein, Ph.D., *Associate Professor, Anthropology*
Grant Goodall, Ph.D., *Professor, Linguistics*
David Gutierrez, Ph.D., *Professor, History*
Stephan Haggard, Ph.D., *Professor, International Relations and Pacific Studies*
Daniel Hallin, Ph.D., *Professor, Communication*
Gordon Hanson, Ph.D., *Professor, International Relations and Pacific Studies*
John Haviland, Ph.D., *Professor, Anthropology*
Ariana Hernandez-Reguant, Ph.D., *Assistant Professor, Communication*
Louis Hock, M.F.A., *Professor, Visual Arts*
Jorge Huerta, Ph.D., *Professor, Theatre and Dance*
Christine Hunefeldt, Ph.D., *Professor, History, Director*
Stephanie Jed, Ph.D., *Associate Professor, Literature*
Sara Johnson, Ph.D., *Assistant Professor, Literature*
Milos Kokotovic, Ph.D., *Associate Professor, Literature*
Andrew Lakoff, Ph.D., *Associate Professor, Sociology*
April Linton, Ph.D., *Assistant Professor, Sociology*
David Mares, Ph.D., *Professor, Political Science*
Jorge Mariscal, Ph.D., *Professor, Literature*
Luis Martin-Cabrera, Ph.D., *Assistant Professor, Literature*
Keith McNeal, Ph.D., *Assistant Professor, Anthropology*
Everard Meade, Ph.D., *Assistant Professor, History*
Hugh Mehan, Ph.D., *Professor, Sociology*

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John C. Moore, Ph.D., *Professor, Linguistics*
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Elizabeth Newsome, Ph.D., *Associate Professor, Visual Arts*
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Beatrice Pita, Ph.D., *Lecturer, Literature*
Nancy Grey Postero, Ph.D., *Associate Professor, Anthropology*
Mirle Bussel Rabinowitz, Ph.D., *Lecturer, Urban Studies Program*
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David Ringrose, Ph.D., *Professor Emeritus, History*
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Lisa Sánchez, Ph.D., *Assistant Professor, Ethnic Studies*
Marta Sánchez, Ph.D., *Professor Emeritus, Literature*
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AFFILIATED ACADEMIC STAFF

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OFFICE: Room 1, Gildred Latin American Studies Building,
Institute of the Americas Complex
<http://cilas.ucsd.edu>

THE LATIN AMERICAN STUDIES PROGRAM

UC San Diego's program in Latin American studies has attained national and international distinction for its excellence in teaching, research, and public service. Each year its faculty offers approximately 100 Latin America-related courses in fourteen academic departments, and the Latin American Studies Program offers three interdisciplinary degrees:

- Bachelor of arts in Latin American Studies
- Minor in Latin American Studies
- Master of arts in Latin American Studies
- Latin American studies at UCSD offers distinct advantages:
 - At the undergraduate level, students may take elective courses on Latin American topics or pursue a minor or a B.A. degree in Latin American Studies. At the graduate level, students can obtain a M.A. degree in Latin American studies. In addition, various doctoral programs in academic departments across the social sciences and humanities offer a regional focus on Latin America.
 - Latin American studies integrates teaching, research, and policy analysis, encouraging students to develop interdisciplinary perspectives and to work actively with faculty on research projects and conferences.
 - Students participate in the activities of an outstanding array of research and teaching organizations, including the Center for Iberian and Latin American Studies, the Center for U.S.-Mexican Studies, the Graduate School of International Relations and Pacific Studies, the Center for Comparative Immigration Studies, and the Institute of the Americas. The Center for Iberian and Latin American Studies (CILAS) sponsors multidisciplinary colloquia, conferences, projects, and publications. CILAS also awards fellowships and grants each year to promising graduate students.
 - Students are encouraged to interact with visiting Latin American scholars and to participate in Latin America-related internships, seminars, clubs, foreign exchange programs, and other extracurricular activities.
 - Students at UCSD have access to one of the largest and fastest-growing library collections on Latin America in the United States.

Degree programs in Latin American studies are supervised by an interdisciplinary faculty group under the direction of the director and program director of the Center for Iberian and Latin American Studies.

THE CURRICULAR PROGRAM

UNDERGRADUATE MAJOR IN LATIN AMERICAN STUDIES

The bachelor of arts in Latin American studies blends coverage of methodological and theoretical approaches to the study of Latin America with a broad foundation in the humanities and social sciences. Students receiving this degree will be prepared for private and government employment or for graduate training; the major also provides a valuable supplement for those who subsequently pursue professional degrees in business, law, engineering, medicine, or other fields.

To satisfactorily complete the B.A. degree, students must take a broad range of courses from at least three of UCSD's humanities and social science departments. The collection of courses should be structured so as to provide both depth in a special area of study and breadth across the broader field. Students must also demonstrate proficiency in Spanish.

All students entering the major must enroll in LATI 50 "Introduction to Latin America," an interdisciplinary course that prepares majors to build a coherent curriculum on Latin America. During the senior year, all B.A. candidates are required to successfully complete LATI 190, a writing seminar. This course will culminate in the preparation of an interpretive paper based on the secondary analysis of existing scholarly research (approximately twenty to forty pages in length). As part of the overall requirements, students are strongly encouraged to enroll in four credits of Individual Study (LATI 199) with a member of the Latin Americanist faculty, who will serve as the student's principal advisor.

All upper-division courses applied to the requirements of the major must be taken for a letter grade (with the sole exception of LATI 199). A 2.0 grade-point average is required in the major, and students must earn at least a C- in each course counted for the major.

Students majoring in Latin American studies are also urged to minor in a core discipline such as anthropology, economics, history, literature, political science, or sociology. In summary, the requirements for the bachelor of arts in Latin American studies are:

Lower-Division Requirements

1. The equivalent of at least two years of college-level language instruction in Spanish, comparable to satisfactory completion of Literature/Spanish 2C; students who satisfy this requirement are strongly encouraged to study Portuguese.
2. LATI 50: Introduction to Latin America

Upper-Division Requirements

1. Eleven upper-division courses selected from the approved interdisciplinary course list for Latin American studies as follows:
 - a. Course work must be in at least three departments.
 - b. At least three courses must be from one department.

- c. No more than five courses from one department will count for credit.
 - d. At least two courses must concentrate exclusively on periods earlier than the twentieth century.
2. Enrollment in the four-credit Senior Seminar (LATI 190), usually to be taken in the winter quarter of the senior year; satisfactory completion of a substantial paper is required of all graduating majors.
 3. Maintain a 2.0 grade-point average, earning at least a C- in each course counting for the major. With the sole exception of LATI 199, all courses must be taken for a letter grade.

HONORS IN LATIN AMERICAN STUDIES

The Latin American Studies Program offers an Honors Program for students who demonstrate excellence in the major. In order to receive Honors in Latin American Studies a student must

1. Satisfy all lower-division requirements of the major program;
2. Complete nine upper-division courses selected from the Approved Interdisciplinary Course List for Latin American Studies as follows:
 - a. Course work must be in at least three departments.
 - b. At least three courses must be from one department.
 - c. No more than five courses from one department will count for credit.
 - d. At least two courses must concentrate exclusively on periods earlier than the twentieth century.
3. Complete a three-course sequence in the senior year consisting of Individual Study, the Senior Seminar, and the Honors Seminar (LATI 199, 190, and 191, respectively);
4. Produce an original thesis based on primary research under the direction of a mentor selected from the Latin Americanist faculty, and defend this thesis during the spring quarter before an interdisciplinary faculty committee; and
5. Maintain a minimum GPA of 3.5 in the major.

UNDERGRADUATE MINOR IN LATIN AMERICAN STUDIES

The Latin American studies minor allows students to explore interdisciplinary approaches to a significant world region while pursuing a major in an academic discipline. To complete the program, students take at least seven classes (twenty-eight units) in Latin American studies, five (twenty units) of which must be upper-division. These courses need to be approved Latin American studies classes from the humanities and social sciences. All classes need to be taken for a letter grade and satisfactorily completed.

- Five courses (twenty units) need to be upper-division.
- One course needs to be LATI 50, which is offered once per year.
- One course needs to fulfill the language requirement, which should be the culmination of at least

two years of college-level language instruction in Spanish or Portuguese. This course can be fulfilled in the following ways:

- LTSP 2C for non-native speakers
- LTSP 2D for native speakers
- LTSP 50 or above
- A UCSD-approved Spanish/Portuguese education-abroad course

EDUCATION ABROAD

Students in Latin American studies are encouraged to participate in the Education Abroad Program (EAP) in Brazil, Chile, Costa Rica, or Mexico, or in other study abroad programs offered by the Opportunities Abroad Program (OAP). Subject to approval by petition after courses have been completed (based on syllabi and course work), courses taken through EAP/OAP will be accepted for credit toward the major or minor. The equivalent of six UCSD upper-division courses can be petitioned for credit toward the major, and a maximum of two UCSD upper-division courses can be petitioned for credit toward the minor.

Students interested in studying abroad should see the Latin American studies student affairs coordinator to discuss appropriate courses and programs for their plan of study before they leave. They should also visit the following Web site: <http://pao.ucsd.edu/acadint/CILASabroad.htm>. Information on EAP/OAP is given in the "Education Abroad Program" section of the *UC San Diego General Catalog*. Interested students should contact the Programs Abroad Office in the International Center and visit its Web site at <http://pao.ucsd.edu>. Financial aid can be used for EAP/OAP study, and special study-abroad scholarships are also available.

MASTER OF ARTS IN LATIN AMERICAN STUDIES

The master of arts in Latin American studies is designed for students who seek to integrate a broad range of disciplinary approaches to a world region of growing international significance. Upon graduation, most students pursue additional advanced degrees in academic or professional fields; others proceed to careers in the private sector, in international organizations, or in government.

To qualify for admission, students must have a B.A. with a grade-point average of at least 3.5 on a 4.0 scale for the final two years of undergraduate study plus satisfactory scores on the Graduate Record Examination.

To receive the master of arts in Latin American studies, a student must

1. Demonstrate foreign language competence in Spanish or Portuguese.
2. Maintain a 3.0 GPA in forty units of course work (about ten courses) to be completed as follows:
 - a. Complete the Latin American Studies Basic Seminar Sequence: twelve units must be taken in the required Core Seminar in Latin American Studies (LATI 200, four units), four units in approved theory seminar, and four units in approved methodology seminar.
 - b. Courses must be completed in at least three fields, with no more than sixteen units in any

one department. Students are encouraged to include four units of independent research (LATI 299) for work on the master's thesis.

- c. At least sixteen units must be taken in graduate-level courses, and up to sixteen units may be taken in upper-division, undergraduate-level courses.
3. Successfully complete either a comprehensive exam or master's thesis.

M.A. students have the option to upgrade upper-division, undergraduate-level courses to graduate-level courses (contact the Latin American studies student affairs coordinator for information on requirements and procedures). To convert an undergraduate-level course (100 level) into a 298 graduate-level course, a student must attend all of the course meetings and incorporate a component of additional, graduate-level research work, upon arrangement with the faculty member teaching the course (a special form describing the supplementary work must be filled by the student and approved by the instructor and CILAS' academic coordinator). In all such cases, the supplementary work should (a) increase the amount of reading to match the regular reading expectations of a graduate seminar, (b) include additional meeting time with the professor for a graduate-level discussion of the material, and (c) require the student to write a research paper (which would generally be on the order of fifteen to twenty pages).

DISCIPLINARY AND THEMATIC CONCENTRATIONS

M.A. students in Latin American studies who are interested in specific disciplines or research topics may apply for a disciplinary or thematic concentration. Currently students may choose from concentrations in cultural studies, gender studies, international migration, history, and sociology.

In addition to the general requirements for all candidates applying for admission to the Master of Arts in Latin American studies, applicants to a concentration must submit a statement explaining their intellectual and career interests in that specific area of study. Applications from new students will be considered for the fall quarter. Current students in the Latin American studies master's program may apply in the spring quarter of their first year.

M.A. students who were previously enrolled as undergraduates at UCSD will not be allowed to repeat courses for credit toward the concentration. In all cases there are alternatives, and those students will be expected to take other classes to fulfill the requirements.

GENERAL CONCENTRATION REQUIREMENTS

To receive the master of arts in Latin American studies with a concentration, a student must

1. Demonstrate foreign language competence in Spanish or Portuguese.
2. Maintain a 3.0 GPA in forty units of course work (about ten courses) to be completed as follows:
 - a. Complete the Latin American Studies Basic Seminar Sequence: twelve units must be taken in the required Core Seminar in Latin American Studies (LATI 200, four units), four

units in approved theory seminar, and four units in approved methodology seminar.

- b. Complete sixteen units within the specifications of the concentration (as specified below). All of the concentration units must be taken at the graduate level (200 level), and a maximum of two undergraduate-level courses (100 level) may be upgraded to graduate-level 298 courses.
 - c. Complete twelve units of general electives within the specification of the concentration (as specified below). At least 50 percent of the general elective units must be taken at the graduate level (200 level).
3. Successfully complete a master's thesis on a topic relevant to the area of concentration.

CONCENTRATION IN CULTURAL STUDIES

To receive the master of arts degree in Latin American studies (cultural studies), a student must complete the following units as concentration course work and general electives:

1. Two seminars (eight units) from the approved list of core seminars. These may be used to satisfy the theory and methodology requirements of the LAS M.A. program (ETHN 259, ETHN 260, HIGR 200, HIGR 205, HIGR 207, HIGR 247A-B, HIGR 248A-B, HIGR 252, LTCS 201, LTCS 210, LTCS 225, LTCS 250, LTCS 255, LTSP 272, LTSP 275, VIS 259).
2. Two courses (eight units) from the approved list of elective courses within the thematic specialization (ANAR 100, ANAR 153, ANSC 131, ANRG 131, ANAR 154, ANSC 132, ANSC 135, ANTH 269, COCU 110, COCU 130, COCU 131, COCU 165, COCU 168, COCU 179, COHI 114, COHI 115, COSF 140C, COSF/COCU/COHI 175, COSF 183, COSF 185, HIGR 245, LTAM 100, LTAM 101, LTAM 102, LTAM 105, LTAM 106, LTAM 107, LTAM 108, LTAM 109, LTAM 110, LTAM 111, LTAM 120, LTAM 130, LTAM 132, LTEN 180, LTEN 188, LTSP 130A/B, LTSP 133, LTSP 134, LTSP 135A, LTSP 135B, LTSP 136, LTSP 137, LTSP 138, LTSP 140, LTSP 141, LTSP 142, LTSP 150A, LTSP 150B, LTSP 151, LTSP 153, LTSP 154, LTSP 170, LTSP 172, LTSP 173, LTSP 174, LTSP 175, LTSP 176, LTSP 177, LTSP 190, LTSP 252, LTSP 258, MUS 107, MUS 111, MUS 126, MUS 150, MUS 151, TDHT 108, TDHT 110, TDHT 111, TDHT 112, VIS 126AN, VIS 126BN, VIS 126G, VIS 126H, VIS 128DN, VIS 152)
3. The selection of these seminars and courses must be formally approved by the student's personal advisor (by signing the student's graduate student general petition form). With approval from his/her advisor, however, students in the cultural studies concentration may take other seminars and courses that do not appear in the approved list, provided that the content of the work that they do is directly related to Latin American issues, topics, or themes.
4. General Electives: The remaining twelve units must be taken as follows: two courses from the Approved List of Courses on Latin America (eight units), and one course of Directed Reading or Independent Research (298 or 299, four units).

CONCENTRATION IN GENDER STUDIES

To receive the master of arts degree in Latin American studies (gender studies), a student must complete the following units as concentration course work and general electives:

1. One general theoretical course in gender studies (four units in any of the following: ANGR 244, CGS 100, CGS 101, CGS 104, CGS 112, COCU 132, COCU 139, ETNH 256, LTCS 250, SOCB 118, SOCC 132, SOCC 267).
2. One course in feminist theory (four units in any of the following: CGS 103, COCU 138, HIGR 205, POLI 116A, POLI 217).
3. One course focused on gender studies in Latin America (four units in any of the following: ETHN 129, ETHN 148, HILA 261, LTAM 105, LTAM 106, LTSP 175, POLI 134P, USP 135).
4. One course of directed reading (298, four units), taken with a faculty member affiliated with the CGS Program, focused on a topic relevant to Latin American gender studies.
5. General Electives: The remaining twelve units must be taken as follows: one course from the approved list of courses on Latin America (four units), four units of directed reading (298), and four units of independent research (299).

CONCENTRATION IN HISTORY

To receive the master of arts degree in Latin American studies (history), a student must complete the following units as concentration course work and general electives:

1. A required research seminar sequence in Latin American history (eight units in any of the following: HIGR 245A-B-C, HIGR 247A-B, or HIGR 248A-B).
2. Two elective courses or seminars in Latin American history (eight units in any two of the following: ETHN 130, ETHN 131, ETHN 180, ETHN 259, HILA 100, HILA 101, HILA 102, HILA 107, HILA 108, HILA 112, HILA 113, HILA 115, HILA 120, HILA 121, HILA 122, HILA 123, HILA 125, HILA 131, HILA 132, HILA 160/260, HILA 161/261, HILA 162/262, HILA 166/266, HILA 170/270, HILA 171/271, HIGR 245A-B-C, HIGR 247A-B, HIGR 248A-B, HIGR 249, HIGR 250, HIGR 251, HIGR 252, HIUS 158, HIUS 159, HIUS 167/267, LTSP 116, LTSP 135A).
3. General Electives: The remaining twelve units must be taken in departments other than the Department of History as follows: one course from the approved list of courses on Latin America (four units), four units of directed reading (298), and four units of independent research (299).

CONCENTRATION IN INTERNATIONAL MIGRATION

To receive the master of arts degree in Latin American studies (international migration), a student must complete the following units as concentration course work and general electives:

1. One course focused on economic and social factors in international migration (four units in any of the following: ECON 114, ETHN 118, ETHN 131,

ETHN 134, HIUS 159, IRGN 490, POLI 248, SOCG 282).

2. One course focused on Immigration Policy (4 units in any of the following: POLI 150, POLI 236, IRGN 490).
3. One course focused on Latin American international migration (four units in any of the following: COHI 175, ETHN 189, HIUS 180, HIUS 186, IRGN 490, LTAM 109, LTSP 177).
4. One course of directed reading (four units in a 298 course, focused on a topic relevant to Latin American migratory movements).
5. General Electives: The remaining twelve units must be taken as follows: one course from the approved list of courses on Latin America (four units), four units of directed reading (298), and four units of Independent Research (299).

CONCENTRATION IN SOCIOLOGY

To receive the master of arts degree in Latin American studies (sociology), a student must complete the following units as concentration course work and general electives:

1. One seminar in classical sociological theory (four units in SOC 201A or SOC 201B).
2. One seminar in sociological research methods (four units in any of the following: SOC 203, SOC 204, SOC 205, SOC 206, SOC 207, SOC 227).
3. One core sociological field seminar (four units in any of the following: SOC 212, SOC 216, SOC 222, SOC 226, SOC 234, SOC 244, SOC 264, SOC 267).
4. One sociology course or seminar focused on Latin America (four units in any of the following: SOCD 182, SOCD 188D, SOCG 258).
5. General Electives: The remaining twelve units must be taken in departments other than the Department of Sociology as follows: one course from the approved list of courses on Latin America (four units), four units of directed reading (298), and four units of independent research (299).

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LATI 1A. Zapotec Conversation and Analysis I (4)

Presentation and practice of the grammatical structures of Valley Zapotec, an indigenous language from Mexico. Course focus on listening, speaking, and writing. Students gain basic knowledge of grammatical principles in order to understand the structure and rules of the language.

LATI 1B. Zapotec Conversation and Analysis II (4)

Presentation and practice of the grammatical structures of Valley Zapotec, an indigenous language from Mexico. Course teaches comprehensive vocabulary through listening, speaking, reading, and writing activities. Course also focuses on oral proficiency/grammar, including verb conjugation and other grammatical structures. **Prerequisite:** LATI 1A.

LATI 1C. Zapotec Conversation and Analysis III (4)

Presentation and practice of the grammatical structures of Valley Zapotec, an indigenous language from Mexico. Course gives students an advanced understanding of

written and spoken Valley Zapotec through reading, conversation, group presentations, and composition. **Prerequisite:** LATI 1B.

LATI 50. Introduction to Latin America (4)

Interdisciplinary overview of society and culture in Latin America—including Mexico, the Caribbean, and South America: legacies of conquest, patterns of economic development, changing roles of women, expressions of popular culture, cycles of political change, and U.S.–Latin American relations.

LATI 50XL. Foreign Language Discussion—Introduction to Latin America (1)

Students will exercise advanced foreign language skills to discuss materials and the correspondingly numbered Latin American Studies foreign area course. This section is taught by the course instructor, has no final exam, and does not affect the grade in the core course, LATI 50.

LATI 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to 15 to 20 students, with preference given to entering freshmen.

LATI 120/220. Special Topics in Latin American Studies (1-4)

A course designed to cover various aspects and various disciplines of Latin American Studies.

LATI 190. Senior Seminar (4)

Research seminar on selected topics in the study of Latin America; all students will be required to prepare and present independent research papers. (Honors students will present drafts of senior research theses, of no less than fifty pages in length; non-honors students will present final versions of analytical papers of approximately twenty-five to forty pages in length.) **Prerequisites:** satisfactory completion of LATI 50 and a working knowledge of Spanish.

LATI 191. Honors Seminar (4)

Independent reading and research under direction of a member of the faculty group in Latin American Studies; goal is to provide honors students with an opportunity to complete senior research thesis (to be defended before three-person interdisciplinary faculty committee). **Prerequisites:** successful completion of LATI 50, working knowledge of Spanish; minimum GPA of 3.5 in the major.

LATI 199. Individual Study (4)

Guided and supervised reading of the literature on Latin America in the interdisciplinary areas of anthropology, communications, economics, history, literature, political science, and sociology. For students majoring in Latin American Studies, reading will focus around potential topics for senior papers; for honors students in Latin American Studies, reading will culminate in formulation of a prospectus for the research thesis. **Prerequisites:** LATI 50 and working knowledge of Spanish.

LATI 200. Core Seminar on Interdisciplinary Research and Methodology in Latin American Studies (4)

A team-taught course wherein members of the faculty group in Latin American Studies present diverse disciplinary and thematic approaches to the region. Topics vary from year to year. Grades are based on discussions and on a series of analytical papers. **Prerequisite:** enrollment in the master's degree program in Latin American Studies or permission of instructor.

LATI 210A-B. Latin American Library Resources and Research Methodology (2-2)

A detailed survey of major research methods and resources for the study of Latin America. Both conventional library materials and those available electronically will be explored. Skills will transfer to any major research library. Various methodologies will also be explored in relation to the students' individual projects. A critical review, annotated bibliography, and a statement of research methodology, related to their proposed topics, will be required. Not offered in 2009–10.

LATI 298. Directed Reading (1-12)

Guided and supervised reading of the literature of the several areas included in the interdisciplinary fields of anthropology, communications, economics, history, literature, political science, and sociology. **Prerequisite:** graduate standing in Latin American Studies.

LATI 299. Independent Research (1-12)

Independent work by graduate students engaged in thesis research and writing under the direct supervision of a faculty advisor.

LATI 500. Teaching Apprenticeship (1-4)

The course is designed for teaching assistants to learn effective teaching methods through supervision and mentorship by the faculty. Student will learn handling of discussions; preparation and grading of examinations and other written exercises; and student relations.

COURSES THAT SATISFY

UNDERGRADUATE/GRADUATE DEGREE REQUIREMENTS IN LATIN AMERICAN STUDIES

Approved Interdisciplinary Courses: The following is a list of courses available in UCSD departments that are approved to satisfy the requirements of the major, minor, and master's in Latin American studies. Please note that these courses may not be offered every quarter or year and new courses may be added. Check the current Schedule of Classes or the Latin American studies Web site (<http://orpheus.ucsd.edu/las>) for updated information.

The Departments of Linguistics and Literature and the Graduate School of International Relations and Pacific Studies offer language courses in Spanish and Portuguese. Language courses do not count toward the course requirements for Latin American studies degrees.

ANTHROPOLOGY

ANAR 100. Special Topics in Anthropological Archaeology (when Latin American content)

ANAR 153. The Mysterious Maya

ANAR 154. Aztecs and Their Ancestors

ANAR 155. Study Abroad: Ancient Mesoamerica

ANAR 156. The Archaeology of South America

ANAR 156-XL. The Archaeology of South America (FLD)

ANAR 157. Early Empires of the Andes: The Middle Horizon

ANAR 157-XL. The Andean Middle Horizon (FLD)

ANAR 158. The Inca: Empire of the Andes

ANSC 100. Special Topics in Socio-Cultural Anthropology

ANSC 125 . Gender, Sexuality, and Society

ANSC 131. Urban Cultures in Latin America

ANSC 131-XL . Foreign Language Discussion—Urban Cultures in Latin America

ANSC 132. Modernity in Brazil

ANSC 135. Indigenous Peoples of Latin America

ANTH 269. Current Readings in Latin America

COMMUNICATION

COCU 110. Cinema in Latin America: Visions of a Continent in Transition

COCU 131. Cinema of the Cuban Revolution

COHI 114. Bilingual Communication

COHI 114. Bilingual Communication

COSF 140C. Comparative Media Systems:
Latin America and the Caribbean

ECONOMICS

ECON 114. Economics of Immigration

ECON 161. Latin American Economic Development

ECON 162. Economics of Mexico

ETHNIC STUDIES

ETHN 116. The United States-Mexico
Border in Comparative Perspective

ETHN 117. Organic Social Movements

ETHN 118. Contemporary Immigration Issues

ETHN 119. Race in the Americas

ETHN 129. Asian and Latina Immigrant
Workers in the Global Economy

ETHN 130. Social and Economic
History of the Southwest I

ETHN 131. Social and Economic
History of the Southwest II

ETHN 132. Chicano Dramatic Literature

ETHN 133. Hispanic American Dramatic Literature

ETHN 135A. Early Latino/a-Chicano/a
Cultural Production, 1848–1960

ETHN 135B. Early Latino/a-Chicano/a
Cultural Production, 1960–Present

ETHN 136. Topics in Chicano/a-Latino/a Cultures

ETHN 138. Chicano/a and Latino/a Poetry

ETHN 139. Chicano Literature in English

ETHN 144. Bilingual Communities in the U.S.A.

ETHN 145. Spanish Language in the United States

ETHN 148. Latino/a and Chicano/a Literature

ETHN 180. Special Topics in
Mexican-American History

ETHN 189. Special Topics in Ethnic Studies

HISTORY.

HIEU 138. Imperial Spain, 1476–1808

HILA 100. Latin American Colonial Transformation

HILA 101. Latin American Independence 1810–1898

HILA 102. Latin America in the Twentieth Century

HILA 103. Revolution in Modern Latin America

HILA 104. Modern U.S.–Latin America Relations

HILA 112. Economic and Social
History of the Andean Region

HILA 113. Lord and Peasant in Latin America

HILA 114. Dictatorship in Latin America

HILA 115. Latin American City, A History

HILA 116. El Salvador and the U.S.:
Human Rights and Revolution

HILA 120. History of Argentina

HILA 121. History of Brazil

HILA 122. Cuba: From Colony to Socialist Republic

HILA 126. From Columbus to Castro:
Caribbean Culture and Society

HILA 127. History, Culture, and Power

HILA 131. History of Mexico

HILA 132. History of Contemporary Mexico

HILA 161/261. History of Women in Latin America

HILA 162/262. Special Topics in
Latin American History

HILA 163/263. History of Chile 1880–Present

HILA 164/264. Women's Work and
Family Life in Latin America

HILA 167/267. Historical Scholarship
on Latin American History

HILA 168/268. Historical Scholarship
on Latin American History

HILA 169/269. Historical Scholarship
on Latin American History

HILA 170/270. Topics in Latin
American History, 1820–1910

HILA 171/271. Special Topics in Latin
American History since 1910

HIUS 117. History of Los Angeles

HIUS 158. Social and Economic
History of the Southwest I

HIUS 159. Social and Economic
History of the Southwest II

HIGR 247AB. Readings and Seminar
on Colonial Latin America

HIGR 248AB. Readings and Seminar on
Latin America, National Period

HIGR 252. History, Social Evolution,
and Intellectuals in the Andes

INTERNATIONAL RELATIONS AND PACIFIC STUDIES

IRGN 409. Economic Policy in Latin America

IRGN 454. Current Issue/U.S.–Latin
American Relations

IRGN 476. Doing Business in Latin America

IRGN 477. Latin American Politics

IRGN 479. Politics and Institutions in Latin America

IRGN 490. Special Topics (with
Latin American content)

LATIN AMERICAN STUDIES

LATI 50. Introduction to Latin America

LATI 50XL. Foreign Language Discussion—
Introduction to Latin America

LATI 87. Freshman Seminar

LATI 120. Special Topics in Latin America

LATI 190. Senior Seminar

LATI 191. Honors Thesis Seminar

LATI 199. Independent Study

LATI 200. Core Seminar in Latin American Studies

LATI 220. Special Topics in Latin America

LATI 298. Directed Reading

LATI 299. Independent Research

LATI 500. Teaching Apprenticeship

LITERATURE

LTAM 100. Latino/a Cultures in the United States

LTAM 101. Early Latino/a-Chicano/a
Cultures: 1848–1960

LTAM 102. Contemporary Chicano/a-Latino/a
Cultural Production: 1960 to Present

LTAM 104. Cultures of the U.S./Mexico Border Region

LTAM 105. Gender and Sexuality in
Latino/a Cultural Production

LTAM 106. Modern Chicana and
Mexican Women Writings

LTAM 107. Comparative Latino/a
and U.S. Ethnic Cultures

LTAM 108. Chicano/a and Latino/a Cultures:
Intellectual and Political Traditions

LTAM 109. Cultural Production
of the Latino/a Diasporas

LTAM 110. Latin American Literature in Translation

LTAM 111. Contemporary Caribbean Discourse

LTAM 120. Mexican Literature in Translation

LTAM 130. Reading North by South

LTAM 132. The Dark Side of Enlightenment
in Spain, America, and the Philippines

LTEN 29. Introduction to Chicano Literature

LTEN 180. Chicano Literature in English

LTEN 188. Contemporary Caribbean Literature

LTSP 50BC. Readings in Latin American Topics

LTSP 107. Literature of the Fifteenth Century

LTSP 119ABC. Cervantes

LTSP 130B. Development of Latin
American Literature

LTSP 133. Contemporary Latin American Literature

LTSP 134. Literature of the Southern Cone

LTSP 135A. Mexican Literature Before 1910

LTSP 135B. Modern Mexican Literature

LTSP 136. Andean Literature

LTSP 137. Caribbean Literature

LTSP 140. Latin American Novel

LTSP 141. Latin American Poetry

LTSP 142. Latin American Short Story

LTSP 150B. Early Latino/a-Chicano/a
Cultural Production, 1960–Present

LTSP 151. Topics in Chicano/a-Latino/a Cultures

LTSP 153. Chicano/a and Latino/a Poetry

LTSP 154. Latino/a and Chicano/a Literature

LTSP 162. Spanish Language in the United States

LTSP 170. Contemporary Theories
of Cultural Production

LTSP 172. Indigenista Themes in
Spanish American Literature

LTSP 173. Problems in Spanish and
Spanish American Literary History

LTSP 175. Gender, Sexuality, and Culture

LTSP 176. Literature and Nation
(when Latin American content)

LTSP 177. Literary and Historical Migrations

LTSP 178. New Latin American Social Movements

LTSP 190. Seminar

LTSP 224. Golden Age Studies

LTSP 252. Studies in Modern Hispanic
Literature and Culture

LTSP 258. Spanish American Prose

LTSP 272. Literature and Society Studies

LTSP 275. Latin American Literature/Literary and Cultural Theory Since the 60s

MUSIC

MUS 111. Topics/World Music Traditions (when Latin American content)

POLITICAL SCIENCE

POLI 105A. Latino Politics in the U.S.

POLI 134AA. Comparative Politics of Latin America

POLI 134B. Politics in Mexico

POLI 134D. Selected Topics in Latin American Politics

POLI 134N. Politics in Central America

POLI 145A. International Politics and Drugs

POLI 146A. U.S. and Latin America: Political and Economic Relations

POLI 146E. U.S. and Latin American Relations: Security Issues

POLI 150A. Politics of Immigration

POLI 154. Special Topics in International Relations (when Latin American content)

POLI 181A. Field Research Methods for Migration Studies: Seminar

POLI 181B. Field Research Methods for Migration Studies: Practicum

POLI 181C. Field Research Methods for Migration Studies: Data Analysis

POLI 229. Special Topics: Comparative Politics (when Latin American content)

POLI 230A. The Mexican Political System

POLI 236. Immigration Policy and Politics

POLI 248. Special Topic/International Relations: Latin American Foreign Policy

SOCIOLOGY

SOCC 163. Migration and the Law (when Latin American content)

SOCD 182. Ethnicity and Indigenous Peoples in Latin America

SOCD 185. Globalization and Social Development

SOCD 188D. Latin America: Society and Politics

SOCD 189. Ethnicity in Latin America

SOCC 258. Institutional Change in the Contemporary World; Latin American Societies in a Comparative Perspective

THEATRE AND DANCE

TDMV 140. Beginning Dances of the World

TDMV 141. Advanced Dances of the World

TDMV 142. Latin Dance of the World

THHS 108. Luis Valdez

THHS 110. Chicano Dramatic Literature

THHS 111. Hispanic-American Dramatic Literature

THHS 112. Gay and Lesbian Themes in U.S. Latino Theatre

TDHT 108. Luis Valdez

TDHT 110. Chicano Dramatic Literature

TDHT 111. Hispanic-American Dramatic Literature

TDHT 112. Gay and Lesbian Themes in U.S. Latino Theatre

Urban Studies and Planning

USP 135. Asian and Latina Immigrant Workers in the Global Economy

VISUAL ARTS

VIS 126AN. Pre-Columbian Art of Ancient Mexico and Central America

VIS 126BN. Art and Civilization/Ancient Maya

VIS 126G. Problems in Mesoamerican Art History

VIS 126H. Problems in Ancient Maya Iconography and Inscriptions

VIS 126P. Latin American Art: Modern to Postmodern 1890–1950

VIS 126Q. Latin American Art: Modern to Postmodern 1950–Present

VIS 126R. Latin American Photography

VIS 128CN. Topics in Modern Art History (when Latin American content)

VIS 128DN. Topics in Non-Western Art History

VIS 129CN. Special Problems in Modern Art History (when Latin American content)

VIS 129DN. Special Problems in Non-Western Art History (when Latin American content)

VIS 152. Film in the Social Context (when Latin American content)

Law and Society

OFFICE: Interdisciplinary Programs, EBU 3B,
Computer Science and Engineering Building, Room
1114, Warren College

<http://provost.ucsd.edu/warren/law/>

Law and Society is an interdisciplinary minor that emphasizes the complexity and interrelationship of legal, social, and ethical issues in their historical context. Although it is administered by Warren College, it is available to all UC San Diego undergraduate students considering law-related careers or those with a general interest in law as a social institution. The purpose of the program is to enhance students' critical analysis of social and ethical issues related to law and of the legal implications and ramifications of policy and decision-making in their major fields of study. Students examine the role of the legal system and specific legal issues from the perspectives of the social sciences and humanities. Social forces, historical questions, and issues of values will be considered in the context of the legal system. The focus of the minor is on the process of law—how the law both reflects and defines basic social values—and its relation to the political, economic, and social conflicts within society.

The interdisciplinary content of the Law and Society minor offers students the opportunity to examine law-related issues from the perspectives of a broad range of disciplines, including anthropology, communication, critical gender studies, economics, environmental studies, ethnic studies, history, linguistics, philosophy, political science, psychology, sociology, and urban studies and planning.

Students should consult an academic advisor at their college to determine how the Law and Society minor can best meet their college graduation requirements. Minor declarations must be made online using the [TritonLink](#) major and minor application.

Students are urged to supplement the Law and Society minor with a law-related internship. The Academic Internship Program offers local placements with lawyers, judges, elected officials, government offices, and public interest groups. In addition, placements are available in Washington, D.C. with senators, representatives, legislative committees, and political action committees.

A number of extracurricular events and programs are also available to students interested in law.

Information on these programs and activities is available in the Warren College Interdisciplinary Programs Office, EBU 3B, Computer Science and Engineering Building, Room 1114, Warren College, or call (858) 534-3068. Web site: <http://provost.ucsd.edu/warren/law/>.

LAW AND SOCIETY MINOR REQUIREMENTS

The minor consists of four required courses and three elective courses. At least five courses must be taken at the upper-division level. To assure an interdisciplinary learning experience, students must include at least one course from each of the following academic departments: history, philosophy,

political science, and sociology. Law and Society 101, Contemporary Legal Issues, will count as a history, philosophy, political science, or sociology course according to the departmental affiliation of the instructor. Law and Society 101 may be repeated for credit once (separate topic required), for a maximum total of eight units.

REQUIRED COURSES

1. One of the following two courses:
Political Science 40. Introduction to Law and Society
Sociology 50. Introduction to Law and Society
2. Law and Society 101. Contemporary Legal Issues
3. One of the following four courses:
History US 150. American Legal History to 1865
History US 151. American Legal History since 1865
Political Science 104A. The Supreme Court and the Constitution
Political Science 104B. Civil Liberties—Fundamental Rights
4. One of the following two courses:
Philosophy 168. Philosophy of Law
Sociology 140. Sociology of Law

ELECTIVES CHOSEN FROM THE FOLLOWING

Anthropology

100. Topics in Socio-Cultural Anthropology (topic approval required)

Communication

- 139A–B. Law, Communication, and Freedom of Expression

Critical Gender Studies

106. Gender, Equality, and the Law
107. Gender and Reproductive Rights

Dimensions of Culture

2. Justice (open to Thurgood Marshall College students only)

Economics

118. Law and Economics: Torts, Property, Crime
119. Law and Economics: Contracts and Corporations

Environmental Studies

110. Environmental Law

Ethnic Studies

152. Law and Civil Rights

History of Science

131. Science, Technology, and Law

History Topics

134. International Law: War Crimes and Genocide
History of the United States

128. African-American Legal History

150. American Legal History to 1865

151. American Legal History since 1865

- 152A. A Constitutional History of the U.S. to 1865

- 152B. A Constitutional History of the U.S. since 1865

153. American Political Trials

- 155A. Religion and Law in American History: Foundations to the Civil War

- 155B. Religion and Law in American History: Civil War to the Present

169. Topics in American Legal and Constitutional History

Law and Society

101. Contemporary Legal Issues (may be repeated for credit once; separate topic required)

- 102S. Crimes, Civil Wrongs, and Constitution

Linguistics

105. Law and Language

176. Language of Politics and Advertising

Philosophy

10. Introduction to Logic

12. Logic and Decision Making

162. Contemporary Moral Issues

163. Biomedical Ethics

167. Contemporary Political Philosophy

168. Philosophy of Law

Political Science

13. Power and Justice

40. Introduction to Law and Society

- 104A. The Supreme Court and the Constitution

- 104B. Civil Liberties—Fundamental Rights

- 104C. Civil Liberties—The Rights of Criminals and Minorities

- 104D. Judicial Politics

- 104F. Seminar in Constitutional Law

- 104I. Law and Politics—Courts and Political Controversy

- 104L. Positive Political Theory of Law

- 104M. Law and Sex

- 140A. International Law and Organizations

- 145A. International Politics and Drugs

- 150A. Politics of Immigration

Psychology

162. Psychology and the Law

Sociology

50. Introduction to Law and Society

- 120T. Special Topics in Culture, Language, and Social Interaction (topic approval required)

140. Sociology of Law

- 140F. Law and the Workplace

141. Crime and Society

142. Social Deviance

144. Forms of Social Control

145. Violence and Society

146. Law Enforcement in America

152. Social Inequality and Public Policy

159. Special Topics in Social Organizations and Institutions (topic approval required)

- 160E. Law and Culture

163. Migration and the Law

173. Elite Crime

Urban Studies and Planning

124. Land Use Planning

Students may petition to substitute courses in the minor that have substantial legal content. Petitions should be submitted to the Warren College Interdisciplinary Programs Office.

RECOMMENDED INTERNSHIP EXPERIENCE

A law-related internship (AIP 197) is recommended and should be arranged at least one quarter in advance through the Academic Internship Program, Literature Building, Second Floor, <http://aip.ucsd.edu/>.

FACULTY ADVISORY COMMITTEE

Farrell Ackerman, *Professor, Linguistics*
Steven Adler, *Provost, Earl Warren College; Program Director*
Richard Arneson, *Professor, Philosophy*
Thomas Barton, *Professor, California Western School of Law*
Michal Belknap, *Professor, California Western School of Law; Adjunct Professor, History*
Laurence Benner, *Professor, California Western School of Law; Visiting Professor, Political Science*
Gerald Doppelt, *Professor, Philosophy*
Richard Finkmoore, *Professor, California Western School of Law; Visiting Professor, Environmental Studies*
Tal Golan, *Associate Professor, History*
Robert Horwitz, *Professor, Communication*
Alan Houston, *Professor, Political Science; Provost, Eleanor Roosevelt College*
Kwai Ng, *Assistant Professor, Sociology*
Michael Parrish, *Professor, History*
Patrick Patterson, *Assistant Professor, History*
Samuel Rickless, *Professor, Philosophy*
Sanford Schane, *Professor Emeritus, Linguistics*
John Skrentny, *Professor, Sociology*
Glenn Smith, *Professor, California Western School of Law; Visiting Professor, Political Science*

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Most course work for the Law and Society minor is listed under the academic department providing instruction. Law and Society 101, described below, is an interdisciplinary course. It may be counted toward minor requirements as either History, Philosophy, Political Science, or Sociology. Further information on Law and Society 101 is available in the Interdisciplinary Programs Office.

UPPER-DIVISION

101. Contemporary Legal Issues (4)

This course will deal in depth each year with a different legal issue of contemporary significance, viewed from the perspectives of political science, history, sociology, and philosophy. Required for students completing the Law and Society minor. May be repeated for credit once, for a maximum total of eight units. **Prerequisite:** upper-division standing or consent of instructor.

102S. Crimes, Civil Wrongs, and Constitution (4)

Through lectures and discussions on several controversial topics, students are introduced to the subjects taught in the first year of law school. They learn briefing, case analysis, and the Socratic method of instruction, engage in role-playing exercises, and take law-school examinations. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics

PROFESSORS

Farrell Ackerman, Ph.D.
Grant Goodall, Ph.D.
Andrew Kehler, Ph.D., Chair
Rachel Mayberry, Ph.D.
John C. Moore, Ph.D.

ASSOCIATE PROFESSORS

Amalia Arvanti, Ph.D.
Eric J. Bakovic, Ph.D.
Robert E. Kluender, Ph.D.
Sharon Rose, Ph.D.

ASSISTANT PROFESSORS

Gabriela Caballero, Ph.D.
Ivano Caponigro, Ph.D.
Roger Levy, Ph.D.

PROFESSORS EMERITUS

Matthew Y. C. Chen, Ph.D.
Ronald W. Langacker, Ph.D.
Leonard D. Newmark, Ph.D.
David M. Perlmutter, Ph.D.
Sanford A. Schane, Ph.D.

OFFICE:

3016 Applied Physics and Mathematics Building
Muir College
<http://ling.ucsd.edu>

In what ways do languages differ, and in what ways are all human languages alike? These are the basic questions that the science of linguistics seeks to answer.

In formulating hypotheses about language it has been found that languages have intricate structure at a number of different levels. Phonetics studies the sounds of speech and how they are produced and perceived. Phonology studies the principles by which the sounds of a language are organized into a system and combined into syllables and larger units. Morphology studies the principles by which smaller units of meaning are combined into words. Syntax is the study of the principles by which words are combined into larger units such as phrases and sentences. Semantics studies meaning—the meanings of words and the ways the meanings of words are related to the meanings of larger units such as the phrase, the sentence, and the discourse. Linguists attempt to discover to what extent the principles at each level vary across languages, and to what extent they are universal.

Because language provides a window into the human mind, linguistics plays a central role in the study of human cognition and figures prominently in the field of cognitive science. We know, for example, that all normal children succeed in learning language relatively quickly at a time when their other cognitive abilities are still developing. The universal properties of human language that linguists discover can be used to provide models of this process, to explain why it occurs so rapidly, and to

make specific predictions about the way it unfolds. The results of linguistic research can also be tested directly in experimental studies of how language is represented and processed in the mind (psycholinguistics) and brain (neurolinguistics). Language can also be studied in terms of its function as a cognitive system shared by an entire society; sociolinguistics investigate the ways in which the language we use is affected by our social environment.

The Department of Linguistics offers a series of lower-division courses designed to introduce non-majors to the scientific study of language in the broader perspective of a liberal arts education. These are LIGN 3 (Language as a Social and Cultural Phenomenon), LIGN 4 (Language as a Cognitive System), LIGN 7 (Sign Language and Its Culture), LIGN 8 (Languages and Cultures in America), and LIGN 17 (Making and Breaking Codes). These courses may be used to satisfy the Marshall College disciplinary breadth requirement. Lower-division linguistics courses may be used to satisfy the social sciences requirement at Muir College and Revelle College, and they partially fulfill the requirements for a program of concentration in Warren College. In addition, certain linguistics courses satisfy the American Cultures requirement in Revelle College and the cultural diversity requirement in Muir College and Warren College. LIGN 17 (Making and Breaking Codes) satisfies the Thurgood Marshall Computational Skills requirement in addition to the formal skills requirement in Warren College and in the Human Development Program. This course also satisfies the Structured Reasoning requirement in Sixth College. Students should consult their college advising offices to determine which linguistics courses satisfy these other requirements.

Linguistics courses are relevant to a wide range of fields of study at UC San Diego, including anthropology, cognitive science, communication, computer science, human development, law and society, psychology, and sociology, as well as areas such as African studies, Chinese studies, ethnic studies, Judaic studies, Latin American studies, and others. In some cases certain linguistics courses count toward a major or minor in one of these departments or programs. Students should consult with a faculty advisor in linguistics and the other department or program when deciding on their course of study.

Students are often able to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP) while still making progress toward the major. Students considering this option should discuss their plans with the department undergraduate advisor before going abroad. Detailed information on EAP/OAP is found in this catalog under the heading "[Education Abroad Program](#)."

The Department of Linguistics oversees the Linguistics Language Program, which offers basic language instruction in Arabic, ASL, French, German, Italian, Portuguese, and Spanish. Courses from the Language Program satisfy general-education requirements, as well as the Department of Linguistics language requirement. Graduate students who require a reading knowledge of French or German may enroll in LIFR 11 or LIGM 11, respectively.

The department also offers language instruction for individuals who grew up in an English-speaking

environment while speaking a different language at home (Arabic, Armenian, Cantonese, Hindi, Korean, Persian, Tagalog, and Vietnamese; other languages may be added to this list if student demand is sufficient). Instruction in these languages is designed to raise students' linguistic and cultural competence to professional levels. Finally, directed self-instruction is available for a wide variety of languages through LIDS 19.

Note: Please check with the department office for updates concerning programs and course offerings.

THE MAJOR PROGRAM

GENERAL REQUIREMENTS

Every linguistics major (except the language studies major) must satisfy the undergraduate language requirement and must successfully complete a minimum of twelve upper-division courses. In addition to the general major, the department offers a set of enriched major programs in various specializations.

Except for LIGN 199, no course taken on a Pass/Not Pass basis may be counted toward a linguistics major. No more than one quarter of LIGN 199 may be counted toward a linguistics major. For the general linguistics, language and society, and cognition and language majors, at least six out of the twelve upper-division linguistics courses counted toward the major must be linguistics courses taken in residence at UCSD. For the language studies major, at least six out of the twelve upper division courses counted toward the major must be taken at UCSD, and at least four of these must be linguistics courses that satisfy Part A of the language studies course requirements. A letter grade of C– or better is required for every course counted toward a linguistics major, including courses taken to satisfy the department's undergraduate language requirement.

REQUIRED LINGUISTICS COURSES

Linguistics 101 is required as an introduction to the field and serves as the prerequisite to certain other courses. Students who choose a linguistics major should enroll in it as early as possible.

Every major program in linguistics (except the language studies major) must include the following required courses covering basic areas of the field:

LIGN 101. Introduction to the Study of Language
LIGN 110. Phonetics
LIGN 111. Phonology I
LIGN 120. Morphology
LIGN 121. Syntax I
LIGN 130. Semantics

Students are advised to take these required courses as early as possible, since the background they provide may be needed for other upper-division linguistics courses. Check individual course listings for prerequisite information.

LINGUISTICS ELECTIVES

LIGN 105. Law and Language
LIGN 108. Languages of Africa
LIGN 119. First and Second Language Learning: From Childhood Through Adolescence

LIGN 140. The Structure of American Sign Language
 LIGN 141. Language Structures
 LIGN 142. Language Typology
 LIGN 143. The Structure of Spanish
 LIGN 144. Discourse Analysis: American Sign Language and Performing Arts
 LIGN 145. Pidgins and Creoles
 LIGN 146. Sociolinguistics in Deaf Communities
 LIGN 150. Historical Linguistics
 LIGN 160. Pragmatics
 LIGN 165. Computational Linguistics
 LIGN 170. Psycholinguistics
 LIGN 171. Child Language Acquisition
 LIGN 172. Language and the Brain
 LIGN 173. Heritage Languages
 LIGN 174. Gender and Language in Society
 LIGN 175. Sociolinguistics
 LIGN 176. Language of Politics and Advertising
 LIGN 177. Multilingualism
 LIGN 179. Second Language Acquisition Research

Restricted Courses

LIGN 87. Freshman Seminar (does not count as a linguistics elective)
 LIGN 192. Senior Seminar in Linguistics (does not count as a linguistics elective)
 LIGN 195. Apprentice Teaching (does not count as a linguistics elective)
 LIGN 197. Linguistics Internship
 LIGN 199. Independent Study in Linguistics
 LIGN 199H. Honors Independent Study in Linguistics

Note to Revelle and Warren students

Revelle: For Revelle College only, the classification of the linguistics major as humanities, natural science, or social science must be determined on the basis of each student's specific program. The classification of the major program will in turn determine what areas will be acceptable for the noncontiguous minor.

Warren: For Warren College only, any courses taken in departments other than linguistics may not overlap with the student's outside area(s) of concentration.

UNDERGRADUATE LANGUAGE REQUIREMENT

Linguistics majors must demonstrate proficiency in one foreign language.

Proficiency in a foreign language may be demonstrated in three ways:

1. By passing the reading proficiency examination and the oral interview administered by the Department of Linguistics in French, German, Italian, or Spanish; or
2. By successfully completing a course given at UCSD representing the fourth quarter (or beyond) of instruction in any single foreign language with a grade of C- or better; or
3. By scoring four or greater on the Advanced Placement (AP) exam.

Students are encouraged to satisfy this requirement as early as possible in order to be able to use the language for reference in linguistics courses.

Students with native language competence in a language other than English may petition to have English count as satisfying the proficiency requirement.

GENERAL MAJOR (12 COURSES)

The general major in linguistics requires satisfaction of the undergraduate language requirement and successful completion of twelve upper-division courses:

6 required linguistics courses

LIGN 101
 LIGN 110
 LIGN 111
 LIGN 120
 LIGN 121
 LIGN 130

5 linguistics electives

1 additional linguistics elective or upper-division course in another department pertaining to the study of language. Courses currently approved to satisfy this requirement include the electives for the cognition and language major (except PSYC 105) and the electives for the language and society major (Note: some of these courses may have prerequisites) or a Heritage Language course offered in the Linguistics Language Program (for example, LIHL 112/LIHL 112X).

SPECIALIZED MAJORS

Every student with a specialized major must consult the faculty advisor in the Department of Linguistics to have approved an individual curricular plan to satisfy the major requirements for the option chosen. Each specialized major requires satisfaction of the undergraduate language requirement and successful completion of upper-division requirements as specified below. The specialization will be reflected in the wording of a degree, e.g., "B.A. in Linguistics (with Specialization in Language and Society)."

Cognition and Language (12 courses)

6 required linguistics courses

LIGN 101
 LIGN 110
 LIGN 111
 LIGN 120
 LIGN 121
 LIGN 130

4 linguistics electives chosen from

LIGN 145
 LIGN 165
 LIGN 170
 LIGN 171
 LIGN 172
 LIGN 176
 LIGN 179

2 additional courses from linguistics or other departments subject to advisor approval.

Courses currently approved to satisfy this requirement include the following. **Note:** Some of these courses may have prerequisites.

Linguistics

Any upper-division courses (except those used to fulfill requirements A and B).

Anthropology

ANBI 140. The Evolution of the Human Brain
 ANBI 159. Biological and Cultural Perspectives on Intelligence
 ANBI 173. Cognition in Animals and Humans

Cognitive Science

COGS 101C. Language
 COGS 102A. Distributed Cognition
 COGS 102B. Cognitive Ethnography
 COGS 107C. Cognitive Neuroscience
 COGS 108D. Programming Methods for Cognitive Science
 COGS 108E. Neural Network Models of Cognition I
 COGS 108F. Advanced Programming Methods for Cognitive Science
 COGS 151. Analogy and Conceptual Systems
 COGS 154. Communication Disorders in Children and Adults
 COGS 156. Language Development
 COGS 170. Natural and Artificial Symbolic Representational Systems
 COGS 184. Modeling the Evolution of Cognition
 COGS 191. Laboratory Research

Computer Science and Engineering

CSE 133. Information Retrieval

Philosophy

PHIL 120. Symbolic Logic I
 PHIL 134. Philosophy of Language
 PHIL 136. Philosophy of Mind
 PHIL 150. Philosophy of the Cognitive Sciences

Psychology

PSYC 105. Introduction to Cognitive Psychology
 PSYC 118A. Real-Time Examination of Language Processing
 PSYC 118B. Real-time Examination of Language Processing
 PSYC 119. Psycholinguistics/Cognition Laboratory
 PSYC 145. Psychology of Language

Language and Society (12 courses)

6 required linguistics courses

2 appropriate upper-division courses in other departments (especially the Departments of Anthropology, Communication, Cognitive Science, or Sociology), selected in consultation with the faculty advisor for language and society. Courses currently approved to satisfy this requirement include the following. **Note:** Some of these courses may have prerequisites.
 ANSC 162 [formerly known as ANGN 112]. Language, Identity, and Community
 ANSC 122 [formerly known as ANGN 149]. Language in Society
 COCU 100. Introduction to Communication and Culture
 COHI 114. Bilingual Communication

COHI 117. Language, Thought, and the Media
 COHI 124. Voice. Deaf People in America
 COHI 134. Language and Human Communication
 COHI 13. Language and Globalization
 ETHN 140. Language and American Ethnicity
 ETHN 141. Language, Culture, and Inequality
 ETHN 144. Bilingual Communities in the USA
 SOCI 117/EDS 117. Language, Culture, and Education
 SOCI 118E. Sociology of Language
 SOCI 120T. Special Topics in Culture, Language, and Social Interaction
 EDS 125. History, Politics, and Theory of Bilingual Education

1 course in sociolinguistics (by approval of the faculty advisor, may be taken in another department). Courses currently approved to satisfy this requirement include the following. **Note:** some of these courses may have prerequisites:

LIGN 174. Gender and Language in Society
 LIGN 175. Sociolinguistics
 LIGN 177. Multilingualism

3 linguistics electives. Courses particularly relevant to this specialization are

LIGN 105. Law and Language
 LIGN 174. Gender and Language in Society
 LIGN 175. Sociolinguistics
 LIGN 176. Language of Politics and Advertising
 LIGN 177. Multilingualism

LANGUAGE STUDIES MAJOR

Students majoring in language studies must consult with the language studies faculty advisor to approve an individual curricular plan.

The language studies major is designed for students who wish to pursue the study of a particular language from a variety of perspectives. To this end, students will take courses in linguistics and literature, as well as electives in linguistics, literature, culture, and area studies. This major provides preparation for a variety of careers that make use of second language skills. Depending on the elective emphasis, these include international business/law, teaching, translation, interpreting, linguistics, and foreign service. Each language studies major will specialize in one **language of concentration**. In principle, this could be any language other than English. However, some languages may require that some course work be completed outside UCSD. **Hence, it is recommended that language studies majors consider a year abroad.** Students whose language of concentration is **American Sign Language** will need to consult the faculty advisor for individualized requirements; these students may also consider an exchange year at Gallaudet University.

REQUIREMENTS

Lower-division preparation:

- Two years of language instruction in the language of concentration, or equivalent proficiency
- Lower-division prerequisites for upper-division courses in the literature of the language of concentration

Upper-division requirements:

Note: At least two of the upper-division courses must be conducted in the language of concentration. Students are encouraged to increase their academic exposure to their language of concentration by taking one-unit seminars in the language and by participating in the EAP program.

1. 6 upper-division linguistics courses, as follows:

LIGN 101. Introduction to Linguistics

3 courses chosen from

LIGN 110. Phonetics
 LIGN 111. Phonology I
 LIGN 120. Morphology
 LIGN 121. Syntax I
 LIGN 130. Semantics
 LIGN 145. Pidgins and Creoles
 LIGN 150. Historical Linguistics

“Structure of” language of concentration course (e.g., LIGN 143 Structure of Spanish). If no such course is available, the student must consult with the undergraduate advisor regarding a possible substitution.

One additional upper-division LIGN course.

2. 2 upper-division courses in the literature of the language of concentration
3. 4 additional upper-division courses that deal with general linguistics, the language of concentration (e.g., literature), or the corresponding culture/area studies (e.g., anthropology, economics, history, political science, sociology), subject to approval of the faculty advisor.

Approved courses for this requirement include the following. **Note:** Some of these courses may have prerequisites.

Linguistics: Any upper-division courses (except those used to fulfill requirement A).

Literature: Any upper-division courses related to the language of concentration (except those used to fulfill requirement B).

Area Studies: Approved courses are listed by language of concentration; other languages of concentration are possible in principle, but probably require course work outside of UCSD.

Arabic

ANSC 133. Peoples and Cultures of the Middle East
 ECON 165. Middle East Economics
 HINE 114. History of the Islamic Middle East
 HINE 115. Islamic Civilization
 HINE 118. The Middle East in the Twentieth Century
 HINE 119. Contemporary Middle East Conflicts
 HINE 122. Politicization of Religion in the Middle East
 POLI 121B. Politics in Israel
 RELI 112. Texts and Contexts: The Holy Book in Islam

ASL

COHI 124. Voice. Deaf People in America

Chinese

ANRG 170/ ANSC 136. Traditional Chinese Society
 ANRG 173/ ANSC 137. Chinese Popular Religion
 ANSC 136. Traditional Chinese Society

ANSC 137. Chinese Popular Religion
 HIEA 120. Classical Chinese Philosophy and Culture
 HIEA 121. Medieval Chinese Culture and Society
 HIEA 122. Late Imperial Chinese Culture and Society
 HIEA 119/SOCB 162R. Religion and Popular Culture in East Asia
 HIEA 125. Women and Gender in East Asia
 HIEA 126. The Silk Road in Chinese and Japanese History
 HIEA 128. History of Material Culture in China
 HIEA 129. Faces of the Chinese Past
 HIEA 130. End of the Chinese Empire, 1800–1911
 HIEA 131. History of the Modern Chinese Revolution: 1911–1949
 HIEA 132. History of the People’s Republic of China
 HIEA 133. Twentieth Century China: Cultural History
 HIEA 134. History of Thought and Religion in China: Confucianism
 HIEA 135. History of Thought and Religion in China: Buddhism
 HIEA 136. History of Thought and Religion in China: Daoism
 HIEA 137. Women and Family in Chinese History
 HIEA 138. Women and the Chinese Revolution
 HIEA 162/262. History of Women in China
 HIEA 163/263. Cinema and Society in Twentieth-Century China
 HIEA 164/264. Seminar in Late Imperial Chinese History
 HIEA 165/265. Topics in Medieval Chinese History
 HIEA 166/266. Creating Ming Histories
 HIEA 167. Special Topics in Modern Chinese History
 HIEA 168/268. Topics in Classical and Medieval Chinese History
 HIEA 171/271. Society and Culture in Premodern China
 POLI 113A. East Asian Thought in Comparative Perspective
 POLI 113B. Chinese and Japanese Political Thought I
 POLI 130B. Politics in the People’s Republic of China
 POLI 131C. The Chinese Revolution
 POLI 132B. Politics and Revolution in China and Japan
 POLI 132C. Political Development and Modern China
 POLI 133D. Political Institutions of East Asian Countries
 SOCD 188B Chinese Society
 SOCB 162R/HIEA 119. Religion and Popular Culture in East Asia
 VIS 127B. Arts of China
 VIS 127C. Arts of Modern China
 VIS 127D. Early Chinese Painting
 VIS 127E. Later Chinese Painting
 VIS 127G. Twentieth-Century Chinese Art
 VIS 127N. Twentieth-Century Art in China and Japan

French

HIEU 129. Paris, Past and Present
 HIEU 130. Europe in the Eighteenth Century
 HIEU 131. The French Revolution: 1789–1814
 HIEU 142. European Intellectual History, 1780–1870
 POLI 120C. Politics in France
 TDHT 105. French Comedy

German

HIEU 130. Europe in the Eighteenth Century

HIEU 132. German Politics and Culture: 1648–1848
 HIEU 142. European Intellectual History, 1780–1870
 HIEU 143. European Intellectual History, 1870–1945
 HIEU 145. The Holocaust as Public History
 HIEU 154. Modern German History
 HIEU 155. Modern Austria
 HIEU 158. Why Hitler? How Auschwitz?
 HIEU 172/272. Comparative European Fascism
 HIEU 174/274. The Holocaust: A Psychological Approach
 HIEU 177. Special Topics in Modern German Thought
 PHIL 106. Kant
 PHIL 107. Hegel
 POLI 120B. The German Political System
 POLI 120D. Germany: Before, During, and After Division
 SOCI 178. The Holocaust
 TDHT 106. Brecht and Beyond

Hebrew

ANRG 150/ANAR 142. The Rise and Fall of Ancient Israel
 HIEU 159. Three Centuries of Zionism, 1648–1948
 HIEU 176/276. Politics in the Jewish Past
 HINE 102. The Jews in Their Homeland in Antiquity
 HINE 103. The Jewish Diaspora in Antiquity
 HINE 111. Anthropology and the Hebrew Bible
 HINE 112A. Great Stories from the Hebrew Bible
 HINE 112B. Great Poems from the Hebrew Bible
 HINE 161/HINE 261. Seminar in the Hebrew Bible
 HINE 162/262. Anthropology and the Hebrew Bible
 HINE 170. Special Topics in Jewish History
 HINE 181/281. Problems in the Study of Hebrew Manuscripts
 HINE 186. Special Topics in Middle Eastern History
 POLI 121. Government and Politics of the Middle East
 POLI 121B. Politics in Israel
 RELI 111. Texts and Contexts: The Holy Book in Christianity and Judaism
 SOCI 188F. Modern Jewish Societies and Israeli Society

Italian

HIEU 119. Modern Italy: From Unification to the Present
 HIEU 120. The Renaissance in Italy
 HIEU 121. Early Modern Italy
 HIEU 122. Politics Italian Renaissance Style
 HIEU 172/272. Comparative European Fascism
 POLI 120I. Politics in Italy
 TDHT 104. Italian Comedy
 VIS 122AN. Renaissance Art
 VIS 122CN. Defining High Renaissance Art
 VIS 122D. Michelangelo
 VIS 122D. Michelangelo
 VIS 122F. Leonardo's La Gioconda

Japanese

ECON 163. Japanese Economy
 HIEA 110. Japan Through the Twelfth Century
 HIEA 111. Japan: Twelfth to Mid-Nineteenth Centuries
 HIEA 112. Japan: From the Mid-Nineteenth Century through the U.S. Occupation

HIEA 113. The Fifteen-Year War in Asia and the Pacific
 HIEA 114. Postwar Japan
 HIEA 115. Social and Cultural History of Twentieth-Century Japan
 HIEA 116. Japan-U.S. Relations
 HEA 117. Ghosts in Japan
 HIEA 125. Women and Gender in East Asia
 HIEA 126. The Silk Road in Chinese and Japanese History
 HIEA 160. Colloquium on Modern Japanese History
 POLI 113A. East Asian Thought in Comparative Perspective
 POLI 113B. Chinese and Japanese Political Thought I
 POLI 132B. Politics and Revolution in China and Japan
 POLI 133A. Japanese Politics: A Developmental Perspective
 POLI 133D. Political Institutions of East Asian Countries
 POLI 133E. Public Policy in Japan
 VIS 127F. Japanese Buddhist Art
 VIS 127N. Twentieth-Century Art in China and Japan
 VIS 127P. Arts of Japan
 VIS 127Q. Japanese Painting and Prints

Russian

HIEU 134. The Formation of the Russian Empire, 800–1855
 HIEU 156. History of the Soviet Union, 1905–1991
 HIEU 178. Soviet History
 POLI 126AB. Politics and Economics in Eastern Europe
 POLI 130AA. The Soviet Successor States
 POLI 130AC. Seminar: Post-Soviet Politics
 POLI 130AD. The Politics of the Russian Revolution

Spanish

ANAR 156. The Archaeology of South America
 ANSC 131. Urban Cultures in Latin America
 ANSC 142. Anthropology of Latin America
 COCU 131. Cinema of the Cuban Revolution
 COCU 168. Latino Space, Place, and Culture
 COSF 140C. Comparative Media Systems: Latin America and the Caribbean
 COCU 110. Cinema in Latin America
 ECON 161. Global Integration of Latin America
 ECON 162. Economics of Mexico
 ETHN 116. The United States–Mexico Border in Comparative Perspective
 ETHN 129/USP 135. Asian and Latina Immigrant Workers in the Global Economy
 ETHN 132. Chicano Dramatic Literature
 ETHN 133. Hispanic-American Dramatic Literature
 ETHN 135A. Early Latino/a–Chicano/a Cultural Production: 1848–1960
 ETHN 135B. Contemporary Latino/a–Chicano/a Cultural Production: 1960 to Present
 ETHN 136. Topics in Chicano/a–Latino/a Cultures
 ETHN 138. Chicano/a and Latino/a Poetry
 ETHN 145. Spanish Language in the United States
 ETHN 148. Latino/a and Chicano/a Literature
 ETHN 180. Topics in Mexican American History
 HIEU 138. Imperial Spain, 1476–1808
 HIEU 151. Spain since 1808
 HILA 100. Latin America-Colonial Transformations

HILA 101. Latin America: The Construction of Independence 1810–1898
 HILA 102. Latin America in the Twentieth Century
 HILA 103. Revolution in Modern Latin America
 HILA 104. Modern U.S.–Latin American Relations
 HILA 108. Economic History: Continuity and Change in Latin America
 HILA 112. Economic and Social History of the Andean Region
 HILA 113. Lord and Peasant in Latin America
 HILA 114. Dictatorship in Latin America
 HILA 115. The Latin American City, A History
 HILA 116. El Salvador and the United States: Human Rights and Revolution
 HILA 120. History of Argentina
 HILA 121. History of Brazil
 HILA 122. Cuba: From Colony to Socialist Republic
 HILA 124A. History of Women and Gender in Latin America
 HILA 126. From Columbus to Castro: Caribbean Culture and Society
 HILA 127. History, Culture, and Power
 HILA 131. A History of Mexico
 HILA 132. A History of Contemporary Mexico
 HILA 161. History of Women in Latin America
 HILA 162. Special Topics in Latin American History
 HILA 163/263. The History of Chile, 1880–Present
 HILA 164/264. Women's Work and Family Life in Latin America
 HILA 167/267. Scholarship on Latin American History in the Colonial Period
 HILA 168/268. Scholarship on Latin American History in the Nineteenth Century
 HILA 169/269. Scholarship on Latin American History in the Twentieth Century
 LATI 120. Special Topics in Latin American Studies
 THHS 109. African Heritage in Contemporary Drama: African, Caribbean, and African-American
 TDHT 110. Chicano Dramatic Literature
 TDHT 111. Hispanic-American Dramatic Literature
 POLI 134AA. Comparative Politics of Latin America
 POLI 134B. Politics in Mexico
 POLI 134D. Selected Topics in Latin American Politics
 POLI 134I. Politics in the Southern Cone of Latin America
 POLI 134N. Politics in Central America
 POLI 146A. The U.S. and Latin America: Political and Economic Relations
 SOCI 151M. Chicanos in American Society
 SOCI 182. Ethnicity and Indigenous Peoples in Latin America
 SOCI 188D. Latin America: Society and Politics
 VIS 125F. Latin American Film
 VIS 126P. Latin American Art: Modern to Postmodern, 1890–1950
 VIS 126Q. Latin American Art: Modern to Postmodern, 1950–Present
 VIS 126R. Latin American Photography

HONORS PROGRAM

The department offers an honors program for outstanding students. Those students who have a 3.75 GPA in linguistics (3.25 overall) at the end of their junior year are eligible to participate. Students interested in participating in the honors program should consult with their department advisor:

admission to the program requires nomination by the advisor and approval of the department faculty.

The honors program requires that two graduate linguistics courses be taken as part of the twelve required courses for the major, and further requires one quarter of LIGN 199H. During one of the two graduate courses, the student, in consultation with the instructor and a faculty advisor, will begin a substantial research project which will be continued during the quarter of 199H and will culminate in an honors paper. Responsibility for proposing possible projects and completing necessary paperwork rests with the student. Upon successful completion of the requirements the designation "with distinction," "with high distinction," or "with highest distinction" will appear on the student's diploma.

INDEPENDENT STUDY AND DIRECTED GROUP STUDY IN LINGUISTICS FOR MAJORS

Upon presentation of a written study proposal or project, and with the consent of the instructor and the advisor, linguistics majors with at least a 3.5 GPA in the major courses may request permission to undertake independent study in linguistics (LIGN 199). No more than one such course (to be taken Pass/Not Pass) may count toward the major.

THE MINOR PROGRAM

The *Linguistics* minor consists of LIGN 101, plus six additional courses in linguistics, at least four of which must be upper-division.

For all courses counted toward the linguistics minor, the student must receive letter grades of C– or better. Courses counted toward the minor may not be taken on a Pass/Not Pass basis, except LIGN 199. Only one quarter of LIGN 199 may be counted toward the minor.

The *Language Studies* minor consists of seven courses, at least five of which must be upper-division:

Literature: One upper-division literature course is required in the language of concentration. This will require proficiency as well as lower-division prerequisites. Therefore, the lower-division courses of the minor may consist of prerequisites for the upper-division literature requirement. American Sign Language students may substitute a non-literature upper-division elective with approval of the faculty advisor.

Linguistics: LIGN 101 is required. In addition students must take a "Structure of" language of concentration course (e.g., LIGN 143 Structure of Spanish). If no such course is available, the student must consult with the undergraduate advisor regarding a possible substitution.

Other: Two additional courses that deal with general linguistics, the language of concentration (e.g., literature), or the corresponding culture, subject to approval of the faculty advisor are required.

THE PH.D. PROGRAM

The UC San Diego Ph.D. program in linguistics offers rigorous training in multiple areas of theoretical

linguistics, including syntax, semantics, phonetics, phonology, and morphology. The department is particularly strong in the study of interface areas, including syntax/semantics, phonetics/phonology, and phonology/syntax. Research conducted in a variety of theoretical frameworks is integrated into the graduate curriculum. Students receive a firm foundation in both formal and cognitive/functionalist approaches to syntax and semantics. In phonology, basic training includes segmental and autosegmental phonology, constraint-based phonology, syllable theory, metrical theory, and theories of the phonology-morphology interface. The first two years of graduate study are devoted primarily to gaining a strong background in these core theoretical areas.

This theoretical strength of the department is matched by strength in both language study and experimental science. The range of languages represented in faculty research encompasses American Sign Language (ASL), Caucasian, Chinese, Finno-Ugric, Germanic, Greek, Persian, Romance, Semitic, Slavic, and Uto-Aztecan. The departmental concern with the empirical facts of language is reflected in a field methods requirement for graduate students as well as in the graduate student language requirement (conversational ability in one language other than English and reading ability in one language other than English). The department has a tradition of working with native speakers of a wide variety of languages. The department's language laboratory maintains a library of written and recorded materials permitting independent study of dozens of languages; it also includes computers for self-instruction in French, German, Italian, and Spanish. The Linguistics Language Program (LLP) provides basic foreign language instruction for the entire campus, and many linguistics graduate students are employed as TAs in the program. Aside from providing a source of funding, the LLP provides graduate students with valuable teaching experience.

The department houses laboratories devoted to experimental studies of language with emphasis on phonetics, event related brain potentials (ERPs) computational linguistics, and signed languages. The focus of experimental research in the department is the mutual dependence between mechanisms of language processing and theories of phonology, and syntax. Linguistics graduate students may supplement their theoretical studies with experimental research; in addition to departmental laboratories, graduate students have access to experimental laboratories concerned with language issues in other departments.

The department has a strong commitment to, and is an active and integral part of, the cognitive science and neuroscience communities at UCSD. Most linguistics faculty have joint appointments in the Department of Linguistics and the Cognitive Science Interdisciplinary Ph.D. Program, and participate in the Department of Cognitive Science graduate core course in language (Cognitive Science 201D) as well as in the all-campus Interdisciplinary Program seminar (Cognitive Science 200) on a regular basis. Graduate students in the Cognitive Science Department frequently participate in Linguistics graduate courses, and Linguistics graduate students regularly attend courses in the Cognitive Science

Department on neuroscience, child language acquisition, aphasia, neural networks, and semantics and cognition. Linguistics graduate students are eligible to pursue a joint degree in Cognitive Science and Linguistics within the Interdisciplinary Program. Areas of secondary specialization that are especially well represented in the cognitive science community at UCSD and related institutes include child development, connectionist modeling, distributed cognition, language disorders, neuroscience, philosophy, and psycholinguistics.

The department has access to rich informational resources; in addition to the extensive linguistics holdings in the main library, the department maintains a collection of research reports, dissertations, and unpublished papers. Access to the libraries of other universities exists through interlibrary loan.

PREPARATION

Since linguistics is a highly technical and analytic field, linguistics students will find their undergraduate training in mathematics and the natural sciences especially valuable. Undergraduate work in certain of the social sciences and humanities, particularly psychology, anthropology, philosophy and literature, is also good preparation for linguistics. The ideal candidate for admission will have both experience with foreign languages and some knowledge of the fundamentals of contemporary linguistic theory. Students who, upon admission, are deficient either in their formal linguistics preparation or languages will be advised by the department on how to make up the deficiency. New graduate students will be admitted only in the fall of any academic year.

LANGUAGE REQUIREMENTS

A candidate for the Ph.D. degree must demonstrate: (1) Conversational ability in one language other than English. (2) A reading knowledge of any one language other than his or her native language, subject to faculty approval.

REQUIRED COURSES

Candidates for the Ph.D. must pass certain linguistics graduate courses prior to taking the qualifying examination. All graduate students must take a common core of ten courses. These are

- Three courses in Syntax and Semantics: 221A, 221B, 230
- Three courses in Phonology and Phonetics: 210, 211A, 211B
- One course in Field Methods: 240
- Two courses in Research Methods, selected from 241, 245, and 251 (Note: Although 241 is repeatable, only one instance may count toward this requirement.)
- One course in Research Paper Writing: 293

All required courses (except 293) must be taken for a letter grade.

EVALUATIONS

A graduate student is formally evaluated by the entire faculty at particular stages during the first three years of graduate study. The first evaluation

(at the end of the third quarter of graduate study) pertains chiefly to performance in courses. The second (or comprehensive) evaluation (at the end of the sixth quarter) determines the student's fitness to continue in the Ph.D. Program. It takes into account performance in course work and ability to engage in original research in one area of linguistics as demonstrated in a research paper. The third evaluation (at the end of the ninth quarter) focuses primarily on a second research paper (which must be in a different area of linguistics from the first).

QUALIFYING EXAMINATION

Candidates for the Ph.D. degree must pass an oral qualifying examination which tests the student's knowledge in the area of specialization. Prior to taking this examination, the student must pass the comprehensive evaluation, satisfy all language requirements, successfully complete all required courses, and demonstrate—through research papers—the ability to carry out independent, dissertation-level research. Students must take the qualifying examination by the end of the fourth year of graduate work.

COLLOQUIUM PRESENTATION

Sometime prior to the thesis defense, a student must present a paper orally at a professional gathering. The colloquium requirement is intended to enable a student to develop the skills necessary for organizing research results for oral presentation. The requirement is generally met by presenting a department colloquium or by presenting a paper at a professional meeting. In either case, a faculty member must certify the acceptability of the presentation.

DISSERTATION

The candidate for the Ph.D. will write a substantial dissertation incorporating the results of original and independent research carried out under the supervision of the doctoral committee. The candidate will be recommended for the doctor of philosophy degree after having made a successful oral defense of the dissertation before the doctoral committee in a public meeting and after having the final version of the dissertation accepted by Geisel Library.

APPRENTICE TEACHING

As part of their preparation for a future academic career, graduate students in linguistics at UCSD are given special opportunities to participate in teaching programs under the supervision of a professor. Depending on qualifications, students may conduct conversation or analysis classes in lower-division language courses (LLP and HLP), or may assist a professor in the teaching of an undergraduate linguistics course.

OTHER DEGREES

Candidates for the Ph.D. who have not previously earned a master's degree may be granted the M.A. in linguistics after: 1) satisfactorily completing twelve required courses (all but LIGN 293 must be taken for a letter grade); 2) passing the comprehensive evaluation at the end of the sixth quarter; and

3) demonstrating a reading knowledge of any language except English, subject to faculty approval.

Candidates for the Ph.D. may also be granted the C.Phil. upon completion of all degree requirements other than the dissertation.

DEPARTMENTAL PH.D. TIME LIMIT POLICIES

The time a student takes to complete the Ph.D. depends on a number of factors, including previous preparation and the amount of time spent in teaching or other job commitments. Several policies set an upper limit to the length of the program. All degree requirements other than the dissertation must be completed by the end of the fourth year of graduate work. Total instructional support (TAs, ships, etc.) cannot exceed six years; total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

SPECIALIZATION IN ANTHROPOGENY

This is a transdisciplinary graduate specialization in anthropogeny with the aim of providing graduate students the opportunity to specialize in research and education on explaining the origins of the human phenomenon. The aim is to rectify the absence of existing training programs that provide such a broad and explicitly transdisciplinary approach—spanning the social and natural sciences—and focusing on one of the oldest questions known to humankind, namely, the origins of humans and humanity. This specialization is not a stand-alone program, but aims at providing graduate students who have just embarked on their graduate careers with the opportunity to interact and communicate with peers in radically different disciplines throughout the duration of their Ph.D. projects. Such communication across disciplines from the outset is key to fostering a capacity for interdisciplinary “language” skills and conceptual flexibility.

ADMISSION TO THE SPECIALIZATION

The Linguistics Graduate Program will advertise the specialization to those students in our programs who have an interest in human origins. Qualifying applicants will have the opportunity to enroll for the specialization.

SPECIALIZATION REQUIREMENTS

Students pursuing this specialization will be required to take a series of courses in addition to research rounds over four years of study. It is advised that students begin their course work in their second year.

1. Course work: Introduction to Anthropogeny (BIOM 225) and Advanced Anthropogeny (BIOM 229) are each taken once, in the winter and spring of the student's second year. Current Topics in Anthropogeny (BIOM 218) is to be taken every quarter for four years.
2. Research Rounds: Monthly seminars during which all participating students talk about their respective research.

QUALIFYING EXAMINATION

Linguistics students in the anthropogeny specialization must meet the departmental requirement for advancement to candidacy. In addition, students must meet internal deadlines, mentoring provisions, and proposal standards of the anthropogeny specialization track.

DISSERTATION

Ph.D. students must complete a dissertation, which meets all requirements of the home program. In addition, it is expected that the Ph.D. dissertation is broadly related to human origins and will be interdisciplinary in nature.

TIME LIMITS

It is expected that students will retain the same time to degree as students not pursuing this specialization. Additional course load consists only of two regular courses (two quarters twenty lectures each). The third proposed course takes place only three times a year from Friday noon to Saturday evening.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Note: Not all courses are offered every year. It is essential that students consult the linguistics advisor when planning their degree programs.

LINGUISTICS

LOWER DIVISION

3. Language as a Social and Cultural Phenomenon (4)
The role of language in thought, myth, ritual, advertising, politics, and the law. Language variation, change, and loss; multilingualism, pidginization and creolization; language planning, standardization, and prescriptivism; writing systems. **Prerequisite:** none.

4. Language as a Cognitive System (4)
Fundamental issues in language and cognition. Differences between animal communication, sign systems, and human language; origins and evolution of language; neural basis of language; language acquisition in children and adults. **Prerequisite:** none.

5. The Linguistics of Invented Languages (4)
Introduction to the study of language through the investigation of invented languages, whether conscious (Elvish, Klingon, Esperanto) or unconscious (creoles, twin/sibling languages). Students will participate in the invention of a language fragment. Topics discussed include language structure, history, culture, and writing systems. **Prerequisite:** none.

7. Sign Language and Its Culture (4)
Deaf history since the eighteenth century. The structure of American Sign Language and comparison with oral languages. ASL poetry and narrative and Deaf people's system of cultural knowledge. Basic questions concerning the nature of language and its relation to culture. **Prerequisite:** none.

8. Languages and Cultures in America (4)
Language in American culture and society. Standard and non-standard English in school, media, pop-culture, politics; bilingualism and education; cultural perception of language issues over time; languages and cultures in the “melting pot,” including Native American, Hispanic, African-American, Deaf. **Prerequisite:** none.

17. Making and Breaking Codes (4)

A rigorous analysis of symbolic systems and their interpretations. Students will learn to encode and decode information using progressively more sophisticated methods; topics covered include ancient and modern phonetic writing systems, hieroglyphics, computer languages, and ciphers (secret codes). **Prerequisite:** none.

87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

90. Undergraduate Seminar (1)

A seminar intended for exposing undergraduate students, especially freshman and sophomores, to exciting research programs and conducted by the faculty.

UPPER DIVISION

101. Introduction to the Study of Language (4)

Language is what makes us human, but how does it work? This course focuses on speech sounds and sound patterns, how words are formed, organized into sentences, and understood, how language changes, and how it is learned. **Prerequisite:** none.

105. Law and Language (4)

The interpretation of language in understanding the law: 1) the language of courtroom interaction (hearsay, jury instructions); 2) written legal language (contracts, ambiguity, legal fictions); 3) language-based issues in the law (First Amendment, libel and slander). **Prerequisite:** none.

108. Languages of Africa (4)

Africa is home to an astonishing variety of languages. This course investigates the characteristics of the major language families as well as population movements and language contact, and how governments attempt to regulate language use. **Prerequisite:** none.

110. Phonetics (4)

The study of the sounds which make up human language. How sounds are physically produced; acoustics of speech perception; practical training in translating speech signals into written form and in interpreting computerized speech signals. **Prerequisite:** LIGN 101, concurrent enrollment in LIGN 101, or consent of instructor.

111. Phonology I (4)

Why does one language sound different from another? This course analyzes how languages organize sounds into different patterns, how those sounds interact, and how they fit into larger units, such as syllables. Focus on a wide variety of languages and problem-solving. **Prerequisite:** LIGN 110.

119. First and Second Language Learning: From Childhood through Adolescence (4)

(Same as EDS 119) An examination of how human language learning ability develops and changes over the first two decades of life, including discussion of factors that may affect this ability. **Prerequisite:** upper-division standing or consent of instructor.

120. Morphology (4)

How do some languages express with one word complex meanings that English needs several words to express? Discovery of underlying principles of word formation through problem-solving and analysis of data from a wide variety of languages. **Prerequisite:** LIGN 101 or consent of instructor.

121. Syntax I (4)

What universal principles determine how words combine into phrases and sentences? Introduction to research methods and results. Emphasis on how argumentation in problem-solving can be used in the development of theories of language. **Prerequisite:** LIGN 101 or consent of instructor.

130. Semantics (4)

Introduction to the formal study of meaning. What is the meaning of a word? What is the meaning of a sentence?

Which role does the context play in determining linguistic meaning? **Prerequisite:** LIGN 101 or consent of instructor.

140. The Structure of American Sign Language (4)

Examination of ASL phonetics, phonology, morphology, syntax, semantics. Including linguistic facial expressions and uses of physical space in verb agreement, aspectual morphology, and classifier constructions. Discussion of discourse, acquisition, psycholinguistics, and historical change. **Prerequisite:** LIGN 101; in its absence LISL 1CX or consent of instructor.

141. Language Structures (4)

Detailed investigation of the structure of one or more languages. May be repeated for credit as topics vary. **Prerequisite:** LIGN 101 or consent of instructor.

142. Language Typology (4)

The systematic ways languages differ. Cross-linguistics studies of specified topics (e.g., word order, agreement, case, switch reference, phonological systems, and rule types, etc.) in an effort to develop models of language variation. **Prerequisite:** LIGN 101 or consent of instructor.

143. The Structure of Spanish (4)

Surveys aspects of Spanish phonetics, phonology, morphology, and syntax. Topics include dialect differences between Latin American and Peninsular Spanish (both from a historical and contemporary viewpoint), gender classes, verbal morphology, and clause structure. **Prerequisite:** LIGN 101 or consent of instructor.

144. Discourse Analysis: American Sign Language and Performing Arts (4)

A discourse-centered examination of ASL verbal arts: rhyme, meter, rhythm, handedness, non-manual signals, and spatial mapping; creation of scene and mood; properties of character, dialogue, narration, and voice; cultural tropes; poetic constructions in everyday genres; transcription, body memory and performance. **Prerequisites:** LISL 1C/1CX or consent of instructor.

146. Sociolinguistics in Deaf Communities (4)

An examination of sociolinguistic research on Deaf communities throughout the world, including: sociohistorical contexts for phonological, lexical and syntactic variation, contact between languages, multilingualism, language policies and planning, second language learning, language attitudes, and discourse analysis of specific social contexts. Course will be conducted in ASL. **Prerequisite:** LISL 1C/1CX or consent of instructor.

150. Historical Linguistics (4)

Language is constantly changing. This course investigates the nature of language change, how to determine a language's history, its relationship to other languages, and the search for common ancestors or "proto-language." **Prerequisite:** LIGN 101 or consent of instructor.

155. Evolution of Language (4)

History of thought on language origins, genetic, neural, anatomical, and gestural theories of language evolution in relation to prior hominid and other species, the role of generational differences in language acquisition, and computational models. **Prerequisite:** upper-division standing or consent of instructor.

160. Pragmatics (4)

An introduction to the context-dependent aspects of language meaning. Topics include given versus new information, Gricean maxims and rules of conversation, presupposition, implicature, reference and cognitive status, discourse coherence and structure, and speech acts. **Prerequisite:** LIGN 101 or consent of instructor.

165. Computational Linguistics (4)

An introduction to the fundamental concepts of computational linguistics, in which we study natural language syntax and semantics from an interpretation perspective, describe methods for programming computer systems to perform such interpretation, and survey applications of computational linguistics technology. **Prerequisite:** none.

170. Psycholinguistics (4)

The study of how humans learn, represent, comprehend, and produce language. Topics include visual and auditory recognition of words, sentence comprehension, reading,

sentence production, language acquisition, neural representation of language, bilingualism, and language disorders. **Prerequisite:** LIGN 101, or upper-division standing, or consent of instructor.

171. Child Language Acquisition (4)

A central cognitive, developmental mystery is how children learn their first language. Overview of research in the learning of sound systems, word forms and word meanings, and word combinations. Exploration of the relation between cognitive and language development. **Prerequisite:** LIGN 101, or upper-division standing, or consent of instructor.

172. Language and the Brain (4)

The mind/body problem, basic neuroanatomy and neurophysiology, cerebral lateralization, origins and evolution of language, aphasia, magnetic resonance imaging (MRI), and event-related potentials (ERPs). **Prerequisite:** LIGN 101, or upper-division standing, or consent of instructor.

173. Heritage Languages (4)

A heritage language (HL) is a language that an individual has some knowledge of due to childhood exposure. Topics: HL imperfect language competence, bilinguals vs. HL speakers, language loss, re-learning of HLs, parallels across HLs, teaching of HLs, language planning. **Prerequisite:** upper-division standing or consent of instructor.

174. Gender and Language in Society (4)

(Same as SOCI 116.) This course examines how language contributes to the social construction of gender identities, and how gender impacts language use and ideologies. Topics include the ways language and gender interact across the life span (especially childhood and adolescence); within ethnolinguistic minority communities; and across cultures. **Prerequisite:** LIGN 101, or upper-division standing, or consent of instructor.

175. Sociolinguistics (4)

The study of language in its social context, with emphasis on the different types of linguistic variation and the principles underlying them. Dialects; registers; sex-based linguistic differences; factors influencing linguistic choice; formal models of variation; variation and change. **Prerequisite:** LIGN 101, or upper-division standing, or consent of instructor.

176. Language of Politics and Advertising (4)

How can we explain the difference between what is literally said versus what is actually conveyed in the language of law, politics, and advertising? How people's ordinary command of language and their reasoning skills are used to manipulate them. **Prerequisite:** none.

177. Multilingualism (4)

Official and minority languages, pidgins and Creoles, language planning, bilingual education and literacy, code switching, and language attrition. **Prerequisite:** LIGN 101, or upper-division standing, or consent of instructor.

179. Second Language Acquisition Research (4)

This course will investigate topics in second language acquisition including the critical period, the processing and neural representation of language in bilinguals, theories of second language acquisition and creolization, exceptional language learners, and parallels with first language acquisition. **Prerequisite:** LIGN 101, or upper-division standing, or consent of instructor.

180. Language Representation in the Brain (4)

The mind/body problem, modularity, basic neuroanatomy, cerebral lateralization, re-evaluation of classical language areas, aphasia, dyslexia, the KE family and FOXP2 gene, mirror neurons, sign language, brain development, cortical plasticity, and localization studies of language processing (electrical stimulation, MEG, fMRI, and PET). Students may not receive credit for both LIGN 172 and LIGN 180. **Prerequisite:** LIGN 101, or upper-division standing, or consent of instructor.

181. Language Processing in the Brain (4)

Modularity and models of language processing, basic neurophysiology, EEG/MEG, linguistic event-related brain potentials (ERPs), cross-linguistic functional significance of ERP components and their MEG correlates: N400, N400-700, lexical processing negativity, slow anterior negative potentials, (early) left anterior negativity, and late positive

Prerequisite: LIGN 101, or upper-division standing, or consent of instructor.

192. Senior Seminar in Linguistics (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in linguistics (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

195. Apprentice Teaching (0-4)

Students lead a class section of a lower-division linguistics course. They also attend a weekly meeting on teaching methods. (This course does not count toward minor or major.) May be repeated for credit, up to a maximum of four units. (P/NP grades only.) **Prerequisites:** consent of instructor, advanced standing.

197. Linguistics Internship (2 or 4)

The student will undertake a program of practical research in a supervised work environment. Topics to be researched may vary, but in each case the course will provide skills for carrying out these studies. **Prerequisite:** consent of instructor.

199. Independent Study in Linguistics (2 or 4)

The student undertakes a program of research or advanced reading in linguistics under the supervision of a faculty member of the Department of Linguistics. (P/NP grades only.) **Prerequisite:** consent of instructor. May be repeated for credit.

199H. Honors Independent Study in Linguistics (4)

The student undertakes a program of research and advanced reading in linguistics under the supervision of a faculty member in the Department of Linguistics. (P/NP grades only.) **Prerequisite:** admission to Honors Program.

GRADUATE

200. Research Forum (2)

A forum for discussion of current issues. (S/U grades only.) May be repeated for credit.

210. Phonetics (4)

This is an introduction to articulatory, acoustic, and auditory phonetics. Major phonetic theories in these areas, and the relationship between phonetics and phonology are discussed. The course also covers experimental design and methodology and provides hands-on experience with laboratory equipment. **Prerequisite:** none

211A. Introductory Phonology (4)

Introduction to the study of the sound patterns of language. Rules and representations, lexical phonology, segmental processes, autosegmental phonology. **Prerequisite:** LIGN 110 or consent of instructor.

211B. Nonlinear Phonology (4)

This course will introduce topics in prosodic phonology and morphology, (including syllable structure, stress, and reduplication). These topics will be investigated within constraint-based phonology. **Prerequisite:** LIGN 211A or equivalent.

214. Topics in Phonetics (4)

This course examines recent developments in controversial areas of phonetics. Topics will vary, and will address issues in speech production (articulation; acoustics), speech perception, phonetic theory, and the relationship between phonetics and phonology. **Prerequisite:** LIGN 210, 211A, 211B, or consent of instructor.

215. Topics in Phonology (4)

Descriptive and theoretical problems in phonology. Discussion of work in progress and/or theoretical consequences of alternative analyses. May be repeated for credit when topics vary.

221A. Introduction to Grammatical Theory (4)

This course introduces basic syntactic phenomena and argumentation via the Government and Binding Theory

of the 1980s. The phenomena, including NP-Movement, Binding, and Wh-Movement, have been important in the development of Generative Grammar and remain central to current generative frameworks.

221B. Introduction to Grammatical Theory (4)

This course continues to develop Principles and Parameters Theory, as introduced in 221A. It concentrates on A-bar dependencies and the Binding Theory. Focus will be on testing theoretical proposals and understanding the role of theoretical alternatives, underlying assumptions, and the empirical results upon which these theoretical proposals are based.

223. Current Issues in Principles and Parameters Theory (4)

This course examines recent developments in Principles and Parameters Theory. Topics include fundamental work that led to the Minimalist Program and more recent developments in this tradition. May be repeated for credit when topics vary.

224. Lexicalist Theories of Grammar (4)

Introduction to conceptual issues and representational apparatus of lexicalist theories of grammar. Focus on empirical argumentation from numerous languages for lexicalist assumptions. Particular attention to lexical semantics, morphology, and syntax.

225. Topics in Syntax (4)

Descriptive and theoretical problems in syntactic analysis. Theoretical consequences of alternative analyses. May be repeated for credit when topics vary.

230. Semantics (4)

Theories of semantic structure. The relation of meaning to grammar, and how it is to be accommodated in an overall model of linguistic organization. The application of formal semantics to the description of natural language.

235. Topics in Semantics (4)

Advanced material in special areas of the study of meaning and its relation to formal aspects of human language. As subject matter varies, the course may be repeated for credit.

236. Language Universals and Linguistic Typology (4)

Introduction to the typological study of language, contrasting alternative approaches to research in language universals. Main topics covered: cross-linguistic approach to language study (sampling: universal generalizations, hierarchies); explanations for language universals; the role of cross-linguistic analyses in linguistic theory.

238. Topics in Cognitive Linguistics (0-4)

(Same as Cognitive Science 238) Basic concepts, empirical findings, and recent developments in cognitive and functional linguistics. Language viewed dynamically in relation to conceptualization, discourse, meaning construction, and cognitive processing. As topics vary, may be repeated for credit.

240. Field Methods (4)

Techniques of discovering the structure of a language through elicitation of data from native speaker consultants. Phonemic, morphemic, and syntactic analysis. **Prerequisite:** LIGN 110 or equivalent.

241. Fieldwork (4)

Fieldwork continuing the research of the previous quarter; student-directed elicitations on topics of interest. **Prerequisite:** LIGN 240.

242. Discourse Interpretation (4)

A graduate course examining discourse interpretation from a computational perspective. Theoretically principled algorithms for resolving pronominal and other types of reference. The interpretation of ellipsis. Methods for recovering the structure of a discourse and determining its coherence.

245. Computational Corpus Linguistics (4)

Introduction to computational corpus tools for performing empirically-grounded linguistic investigations. Annotated and unannotated corpora; annotation schemes. Searching using regular expressions. UNIX tools. The PERL programming language. Publicly-available language processing systems.

247. Topics in Pragmatics (4)

Advance material covering particular topics relating to the theoretical analysis of the pragmatics of natural languages. May be repeated for credit when topics vary. **Prerequisite:** consent of instructor.

248. Morphology (4)

Theories of word structure are examined and confronted with data from a variety of languages. Topics may include: the distinction between derivational and inflectional morphology, the morphology/phonology interface, and the morphology/syntax interface. May be repeated for credit as topics vary.

251. Probabilistic Methods in Linguistics (4)

Probabilistic approaches to language knowledge, acquisition, and use. Quantitative analysis of linguistic data. Quantitative models in linguistic theory. Covers basic probability theory and tools of statistical analysis for language, including linear regression, ANOVA, generalized linear models (e.g., logistic regression), data visualization. Familiarity with probability theory highly encouraged.

256. Statistical Natural Language Processing (4)

(Same as CSE 256) Introduction to modern statistical approaches to natural language processing: part-of-speech tagging, word-sense disambiguation and parsing, using Markov models, hidden Markov models, and probabilistic context-free grammars. Recommended **Prerequisite:** one of LIGN 165, LIGN 245, CSE 151, CSE 250A, CSE 254. **Prerequisite:** graduate standing or consent of instructor.

265. Topics in Computational Linguistics (4)

Advanced topics in computational linguistics of current interest. Subjects will vary, and may include computational morphology, syntax, semantics, discourse, psycholinguistics, or language change. May be repeated for credit. **Prerequisites:** none.

270. Psycholinguistics (4)

Issues of natural language processing in relation to one or more of the following levels of linguistic analysis: phonetics, phonology, the lexicon, morphology, syntax, semantics, information structure, or discourse. May be repeated for credit when topics vary.

272. Topics in Neurolinguistics (4)

Issues of language representation and neural instantiation that arise in studies of neural imaging, language disorders, multilingualism and second language acquisition, animal communication, and the origins and evolution of language. May be repeated for credit when topics vary.

274. Computational Psycholinguistics (4)

Investigation of problems in psycholinguistics—the study of how humans learn, represent, comprehend, and produce language—from a computational perspective. Research article readings covering word-level, sentence-level, and discourse-level processing. Prior background in psycholinguistics and/or computational linguistics highly recommended.

278. Research in Second Language Acquisition (4)

This course will investigate topics in second language acquisition including the critical period, the processing and neural representation of language in bilinguals, theories of second language acquisition and creolization, exceptional language learners, and parallels with first language acquisition.

279. Topics in Language Acquisition (4)

Language acquisition is central to theories about human development, cognition, brain organization, and language origins and change. Topics include the role of input and critical periods on language outcome and processing, neural organization, and sign language creation. **Prerequisite:** none.

280. Sign Language Research (4)

An overview of sign language research in terms of how it informs language theory. Topics include the structure of ASL, acquisition, psycholinguistic and neurolinguistic processing of sign language in comparison to spoken language, critical period effects, and language evolution. **Prerequisite:** Graduate standing or consent of instructor.

293. Research Practicum (0–4)

Gathering and interpreting data, formulating research questions and hypotheses, making the predictions of hypotheses explicit, finding relevant evidence, and organizing research results into suitable form for presentation in abstracts, talks, and research papers. (S/U grades only.) May be repeated for credit.

296. Directed Research (1–8)

Individual research. May be repeated for credit.

299. Doctoral Research (1–12)

Directed research on dissertation topic for students who have been admitted to candidacy for the Ph.D. degree. May be repeated for credit. **Prerequisite:** advancement to candidacy.

502. Apprentice Teaching of Linguistics (1–4)

The course, designed for graduate students serving as teaching assistants in the department's linguistics courses, includes discussion of teaching theories, techniques, and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. The student must be serving as a teaching assistant in a LIGN course to receive credit.

503. Apprentice Teaching of American Sign Language (1–4)

The course, designed for graduate students serving as teaching assistants in American Sign Language, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

504. Apprentice Teaching of French (1–4)

The course, designed for graduate students serving as teaching assistants in French, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

505. Apprentice Teaching of German (1–4)

The course, designed for graduate students serving as teaching assistants in German, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

506. Apprentice Teaching of Italian (1–4)

The course, designed for graduate students serving as teaching assistants in Italian, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

507. Apprentice Teaching of Spanish (1–4)

The course, designed for graduate students serving as teaching assistants in Spanish, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

508. Apprentice Teaching of Language/ Directed Study (1–4)

The course, designed for graduate students serving as teaching assistants in language directed study, includes discussion of teaching theories, techniques and materials, directing study of various uncommonly taught languages, sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

509. Apprentice Teaching, Head Teaching Assistant (1–4)

This course, designed for a graduate student serving as Head Teaching Assistant in the Linguistics Language Program, includes discussion of teaching methods and materials, and classroom observation, directing study of various uncommonly taught languages, sessions, and participation in examinations, under the supervision of the instructor in charge of the course.

510. Apprentice Teaching of Arabic (1–4)

The course, designed for graduate students serving as teaching assistants in Arabic, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

511. Apprentice Teaching of Portuguese (1–4)

The course, designed for graduate students serving as teaching assistants in Portuguese, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

512. Apprentice Teaching of Heritage Korean (1–4)

The course, designed for graduate students serving as teaching assistants in Heritage Korean, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U only.) May be repeated for credit.

513. Apprentice Teaching of Heritage Vietnamese (1–4)

The course, designed for graduate students serving as teaching assistants in Heritage Vietnamese, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U only.) May be repeated for credit.

514. Apprentice Teaching of Heritage Persian (1–4)

The course, designed for graduate students serving as teaching assistants in Heritage Persian, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

515. Apprentice Teaching of Heritage Filipino (1–4)

The course, designed for graduate students serving as teaching assistants in Heritage Filipino, includes discussion of teaching theories, techniques and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. (S/U grades only.) May be repeated for credit.

COURSES

LANGUAGE

OFFICE: Linguistics Language Program Office, 3016 Applied Physics and Mathematics Building, Muir College

Students are placed in foreign language courses based on prior preparation and, for French, German, Italian, and Spanish, on the results of a placement test. Information on taking the placement exam is available at <http://ling.ucsd.edu/language/placement-test.html> or at the Linguistics Language Program Office (3016 Applied Physics and Mathematics Building). For placement in Arabic, American Sign Language, or Portuguese contact the Linguistics Language Program Office (3016 Applied Physics and Mathematics Building).

Conversation sections (Linguistics 1A-1B-1C-1D) consist of small tutorial meetings, plus reading and assigned laboratory work. Analysis sections (Linguistics 1AX-1BX-1CX-1DX) consist of presentation and practice of grammatical structures, discussion sections, assigned laboratory work, and outside reading. Each course in the 1A-1B-1C-1D series must be taken concurrently with the corresponding course in the 1AX-1BX-1CX-1DX series.

Heritage Language courses are offered in Arabic, Armenian, Cantonese, Filipino, Hindi, Korean, Persian, and Vietnamese. These courses are designed for students with a background in the language who want to improve their oral and written expression.

Linguistics 11 courses are self-instructional: intended for reading the language for scholarly purposes. They are particularly aimed at graduate students preparing to fulfill French or German reading requirements.

Linguistics 19 courses, offered in more than sixty languages, are designed for self-instructional study at an introductory level. Students may enroll for two or four units of credit. For some languages, depending on the availability of suitable materials, the course may be repeated for credit.

AMERICAN SIGN LANGUAGE**Linguistics/American Sign Language (LISL)****1A. American Sign Language Conversation (2.5)**

Small tutorial meetings with a signer of American Sign Language (ASL). Conversational practice organized around common everyday communicative situations. Must be taken with LISL 1AX. **Prerequisite:** no prior study of ASL.

Linguistics/American Sign Language (LISL)**1AX. Analysis of American Sign Language (2.5)**

Study of American Sign Language (ASL) and analysis of its syntactic, morphological, and phonological features. Readings and discussions of cultural information. The course is taught entirely in ASL. Must be taken with LISL 1A. **Prerequisite:** no prior study of ASL.

Linguistics/American Sign Language (LISL)**1B. American Sign Language Conversation (2.5)**

Small tutorial meetings with a signer of American Sign Language (ASL). Conversational practice organized around common everyday communicative situations. Must be taken with LISL 1BX. **Prerequisites:** LISL 1A with a grade of C– or better, or equivalent and LISL 1AX with a grade of D or better, or equivalent.

Linguistics/American Sign Language (LISL)**1BX. Analysis of American Sign Language (2.5)**

Study of American Sign Language (ASL) and analysis of its syntactic, morphological, and phonological features. Readings and discussions of cultural information. The course is taught entirely in ASL. Must be taken with LISL 1B. **Prerequisites:** LISL 1A with a grade of C– or better, or equivalent and LISL 1AX with a grade of D or better, or equivalent.

Linguistics/American Sign Language (LISL)**1C. American Sign Language Conversation (2.5)**

Small tutorial meetings with a signer of American Sign Language (ASL). Conversational practice organized around common everyday communicative situations. Must be taken with LISL 1CX. **Prerequisites:** LISL 1B with a grade of C– or better, or equivalent and LISL 1BX with a grade of D or better, or equivalent.

Linguistics/American Sign Language (LISL)**1CX. Analysis of American Sign Language (2.5)**

Study of American Sign Language (ASL) and analysis of its syntactic, morphological, and phonological features. Readings and discussions of cultural information. The course is taught entirely in ASL. Must be taken with LISL 1C. **Prerequisites:** LISL 1B with a grade of C– or better, or equivalent and LISL 1BX with a grade of D or better, or equivalent.

Linguistics/American Sign Language (LISL)**1D. American Sign Language Conversation (2.5)**

Small conversation sections taught entirely in American Sign Language. Emphasis on developing signing fluency and greater cultural awareness. Practice of the principal language functions needed for successful communication. Must be taken in conjunction with LISL 1DX. Successful completion of LISL 1D and LISL 1DX satisfies the requirement for language proficiency in Eleanor Roosevelt and Revelle Colleges. **Prerequisites:** LISL 1C with a grade of

C– or better, or equivalent and LISL 1CX with a grade of D or better, or equivalent.

Linguistics/American Sign Language (LISL)

1DX. Analysis of American Sign Language (2.5)
Practice of the grammatical functions indispensable for comprehensible communication in the language. The course is taught entirely in American Sign Language. Must be taken in conjunction with LISL 1D. Successful completion of LISL 1D and LISL 1DX satisfies the requirement for language proficiency in Eleanor Roosevelt and Revelle Colleges. **Prerequisites:** LISL 1C with a grade of C– or better, or equivalent and LISL 1CX with a grade of D or better, or equivalent.

Linguistics/American Sign Language (LISL) 1E. Intermediate American Sign Language Conversation (4)

Course aims to improve language skills through discussion of topics relevant to the Deaf community. Central topics will include education and American Sign Language (ASL) literature. Conducted entirely in American Sign Language. **Prerequisites:** LISL 1D and LISL 1DX with a grade of C– or better, or equivalent.

Linguistics/American Sign Language (LISL)

10. French Sign Language for ASL Signers (4)
Small tutorial meetings with a signer of French Sign Language (Langue des signes française), the historical antecedent and a close relative of American Sign Language. **Prerequisites:** LISL 1C/1CX. (Not offered in 2010–11.)

Linguistics/American Sign Language (LISL) 5A, 5B, 5C. Fundamentals of American Sign Language (5)

This course concentrates on those language skills essential for communication: signing, comprehension, grammar analysis, and deaf culture. UCSD students: LISL 5A is equivalent to LISL 1A/1AX, LISL 5B to LISL 1B/BX, and LISL 5C to LISL 1C/1CX. Enrollment is limited. **Prerequisites:** none for 5A; for 5B two or more years of ASL in high school or the first semester of college-level ASL. (Offered in Summer Session only. Not offered summer 2011.)

ARABIC

See also Linguistics/“[Heritage Language Program](#).”

Linguistics/Arabic (LIAB) 1A. Arabic Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIAB 1AX. **Prerequisite:** no prior study of Arabic.

Linguistics/Arabic (LIAB) 1AX. Analysis of Arabic (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. This course is taught entirely in Arabic. Must be taken in conjunction with LIAB 1A. **Prerequisite:** no prior study of Arabic.

Linguistics/Arabic (LIAB) 1B. Arabic Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIAB 1BX. **Prerequisite:** LIAB 1A with a grade of C– or better, or equivalent and LIAB 1AX with a grade of D or better, or equivalent.

Linguistics/Arabic (LIAB) 1BX. Analysis of Arabic (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. This course is taught entirely in Arabic. Must be taken in conjunction with LIAB 1B. **Prerequisite:** LIAB 1A with a grade of C– or better, or equivalent and LIAB 1AX with a grade of D or better, or equivalent.

Linguistics/Arabic (LIAB) 1C. Arabic Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken

in conjunction with LIAB 1CX. **Prerequisite:** LIAB 1B with a grade of C– or better, or equivalent and LIAB 1BX with a grade of D or better, or equivalent.

Linguistics/Arabic (LIAB) 1CX. Analysis of Arabic (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. This course is taught entirely in Arabic. Must be taken in conjunction with LIAB 1C. **Prerequisites:** LIAB 1B with a grade of C– or better, or equivalent and LIAB 1BX with a grade of D or better, or equivalent.

Linguistics/Arabic (LIAB) 1D. Arabic Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIAB 1DX. Successful completion of LIAB 1D and 1DX satisfies the requirement for language proficiency in Revelle and Eleanor Roosevelt Colleges. **Prerequisites:** LIAB 1C with a grade of C– or better, or equivalent and LIAB 1CX with a grade of D or better, or equivalent.

Linguistics/Arabic (LIAB) 1DX. Analysis of Arabic (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. This course is taught entirely in Arabic. Must be taken in conjunction with LIAB 1D. Successful completion of LIAB 1D and 1DX satisfies the requirement for language proficiency in Revelle and Eleanor Roosevelt Colleges. **Prerequisites:** LIAB 1C with a grade of C– or better, or equivalent and LIAB 1CX with a grade of D or better, or equivalent.

Linguistics/Arabic (LIAB) 1E. Arabic Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIAB 1EX. **Prerequisites:** LIAB 1D with a grade of C– or better, or equivalent, and LIAB 1DX with a grade of D or better, or equivalent.

Linguistics/Arabic (LIAB) 1EX. Arabic Conversation (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Arabic. Must be taken in conjunction with LIAB 1E. **Prerequisites:** LIAB 1D with a grade of C– or better, or equivalent, and LIAB 1DX with a grade of D or better, or equivalent.

CHINESE

See “[Chinese Studies](#).”

See also Linguistics “[Directed Study](#).”

See also “[Linguistics/Cantonese](#).”

ESPERANTO

See also Linguistics “[Directed Study](#).”

Linguistics/Esperanto (LIEO) 5AS. Fundamentals of Esperanto I (5)

A communicative introduction to Esperanto for students with no prior exposure, with attention to listening comprehension, conversation, reading, writing, and grammar analysis. (Offered in Summer Session only.)

Linguistics/Esperanto (LIEO) 5BS. Fundamentals of Esperanto II (5)

A course to increase the proficiency level of students who have completed LIEO 5AS or who are at an equivalent level. Attention to listening comprehension, conversation, reading, writing, and grammar analysis. **Prerequisite:** LIEO 5AS or consent of instructor. (Offered in Summer Session only.)

Linguistics/Esperanto (LIEO) 5CS. Fundamentals of Esperanto III (5)

A course to increase the proficiency level of students who have completed LIEO 5BS or who are at an equivalent level.

Attention to listening comprehension, conversation, reading, writing, and grammar analysis. **Prerequisite:** LIEO 5BS or consent of instructor. (Offered in Summer Session only.)

Linguistics/Esperanto (LIEO) 5DS. Fundamentals of Esperanto IV (5)

A course to increase the proficiency level of students who have completed LIEO 5CS or who are at an equivalent level. Attention to listening comprehension, conversation, reading, writing, and grammar analysis. **Prerequisite:** LIEO 5CS or consent of instructor. (Offered in Summer Session only.)

Linguistics/Esperanto (LIEO) 12S. Esperanto for the Humanities and Social Sciences (5)

Readings and discussion on topics in humanities and social sciences. Conducted entirely in Esperanto. **Prerequisite:** consent of instructor. (Offered in Summer Session only.)

FRENCH

Linguistics/French (LIFR) 1A. French Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIFR 1AX. **Prerequisite:** no prior study of French.

Linguistics/French (LIFR) 1AX. Analysis of French (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in French. Must be taken in conjunction with LIFR 1A. **Prerequisite:** no prior study of French.

Linguistics/French (LIFR) 1B. French Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIFR 1BX. **Prerequisites:** LIFR 1A with a grade of C– or better, or equivalent and LIFR 1AX with a grade of D or better, or equivalent.

Linguistics/French (LIFR) 1BX. Analysis of French (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in French. Must be taken in conjunction with LIFR 1B. **Prerequisite:** LIFR 1A with a grade of C– or better, or equivalent and LIFR 1AX with a grade of D or better, or equivalent.

Linguistics/French (LIFR) 1C. French Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIFR 1CX. **Prerequisite:** LIFR 1B with a grade of C– or better, or equivalent and LIFR 1BX with a grade of D or better, or equivalent.

Linguistics/French (LIFR) 1CX. Analysis of French (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in French. Must be taken in conjunction with LIFR 1C. **Prerequisite:** LIFR 1B with a grade of C– or better, or equivalent and LIFR 1BX with a grade of D or better, or equivalent.

Linguistics/French (LIFR) 1D. French Conversation (2.5)

Small conversation sections taught entirely in French. Emphasis on speaking, reading, writing, and culture. Practice of the language functions needed for successful communication. Must be taken in conjunction with LIFR 1DX. Successful completion of LIFR 1D and LIFR 1DX satisfies the requirement for language proficiency in Eleanor Roosevelt and Revelle Colleges. **Prerequisite:** LIFR 1C with a grade of C– or better, or equivalent and LIFR 1CX with a grade of D or better, or equivalent.

Linguistics/French (LIFR) 1DX.

Analysis of French (2.5)

Practice of the grammatical functions indispensable for comprehensible communication in the language. The course is taught entirely in French. Must be taken in conjunction with LIFR 1D. Successful completion of LIFR 1D and LIFR 1DX satisfies the requirement for language proficiency in Eleanor Roosevelt and Revelle Colleges. **Prerequisite:** LIFR 1C with a grade of C– or better, or equivalent and LIFR 1CX with a grade of D or better, or equivalent.

Linguistics/French (LIFR) 11.

Elementary French Reading (2–4)

A self-instructional program designed to prepare graduate students to meet reading requirements in French. After a one-week introduction to French orthography/ sound correspondence, students work with a self-instructional textbook. Mid-term and final examinations. (F,W,S)

Linguistics/French (LIFR) 5A, 5B, 5C,

5D. Fundamentals of French (5)

This course concentrates on those language skills essential for communication: listening comprehension, conversation, reading, writing, and grammar analysis. UCSD students: LIFR 5A is equivalent to LIFR 1A/1AX, LIFR 5B to LIFR 1B/1BX, LIFR 5C to LIFR 1C/1CX, and LIFR 5D to LIFR 1D/1DX. Enrollment is limited. **Prerequisite:** None for 5A; for 5B, two or more years of French in high school or the first semester of college-level French. (Offered in Summer Session only.)

See also "[Department of Literature.](#)"

GERMAN

Linguistics/German (LIGM) 1A.

German Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIGM 1AX. **Prerequisite:** no prior study of German.

Linguistics/German (LIGM) 1AX.

Analysis of German (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in German. Must be taken with LIGM 1A. **Prerequisite:** no prior study of German.

Linguistics/German (LIGM) 1B.

German Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIGM 1BX. **Prerequisites:** LIGM 1A with a grade of C– or better, or equivalent and LIGM 1AX with a grade of D or better, or equivalent.

Linguistics/German (LIGM) 1BX.

Analysis of German (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in German. Must be taken with LIGM 1B. **Prerequisites:** LIGM 1A with a grade of C– or better, or equivalent and LIGM 1AX with a grade of D or better, or equivalent.

Linguistics/German (LIGM) 1C.

German Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIGM 1CX. **Prerequisites:** LIGM 1B with a grade of C– or better, or equivalent and LIGM 1BX with a grade of D or better, or equivalent.

Linguistics/German (LIGM) 1CX.

Analysis of German (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in German. Must be taken with LIGM 1C. **Prerequisites:** LIGM 1B with a grade of C– or better, or equivalent and LIGM 1BX with a grade of D or better, or equivalent.

Linguistics/German (LIGM) 1D.

German Conversation (2.5)

Small conversation sections taught entirely in German. Emphasis on speaking, reading, writing, and culture. Practice of the language functions needed for successful communication. Must be taken in conjunction with LIGM 1DX. Successful completion of LIGM 1D and LIGM 1DX satisfies the requirement for language proficiency in Eleanor Roosevelt and Revelle Colleges. **Prerequisites:** LIGM 1C with a grade of C– or better, or equivalent and LIGM 1CX with a grade of D or better, or equivalent.

Linguistics/German (LIGM) 1DX.

Analysis of German (2.5)

Practice of the grammatical functions indispensable for comprehensible communication in the language. The course is taught entirely in German. Must be taken in conjunction with LIGM 1D. Successful completion of LIGM 1D and LIGM 1DX satisfies the requirement for language proficiency in Eleanor Roosevelt and Revelle Colleges. **Prerequisites:** LIGM 1C with a grade of C– or better, or equivalent and LIGM 1CX with a grade of D or better, or equivalent.

Linguistics/German (LIGM) 11.

Elementary German Reading (2–4)

A self-instructional program designed to prepare graduate students to meet reading requirements in German. After a one-week introduction to German orthography/sound correspondences, students work with a self-instructional textbook. Mid-term and final examinations. (F,W,S)

Linguistics/German (LIGM) 5A, 5B, 5C,

5D. Fundamentals of German (5)

This course concentrates on those language skills essential for communication: listening comprehension, reading, writing, and grammar analysis. UCSD students: LIGM 5A is equivalent to LIGM 1A/1AX, LIGM 5B to LIGM 1B/1BX, and LIGM 5C to LIGM 1C/1CX. Enrollment is limited. **Prerequisites:** none for 5A; for 5B, two or more years of German in high school or the first semester of college-level German. (Offered in Summer Session only.)

See also "[Department of Literature.](#)"

GREEK

See "[Department of Literature.](#)"

See also Linguistics "[Directed Study.](#)"

HEBREW

See "[Judaic Studies.](#)"

See also Linguistics "[Directed Study.](#)"

HERITAGE LANGUAGE PROGRAM

"Heritage" or "incomplete" language acquisition refers to the situation of individuals who are exposed to a language used in their environment during childhood that they may learn to understand or even speak to some degree, but never fully acquire. The idea behind the department's innovative Heritage Language Program is that such individuals have a set of skills, competencies, and needs that are distinct from those of both native speakers learning to read and write the language for the first time, and also non-native learners who may study it as a foreign language during adulthood. These individuals therefore require a different type of language instruction, one that builds on and enhances the linguistic skills they already possess, and amplifies their cultural competence and literacy. The Heritage Language Program allows students to work towards developing higher levels of proficiency in order to pursue personal and professional goals.

Linguistics/Filipino for Filipino

Speakers (LIHL) 112 (4)

For students who already comprehend informal spoken Filipino but wish to improve their communicative and sociocultural competence and their analytic understanding. Language functions for oral communication, reading, writing, and culture; dialect and language style differences; structure and history of Filipino. Some speaking ability in Filipino recommended. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics/Advanced Filipino for

Filipino Speakers (LIHL) 132 (4)

Instruction stresses language functions required for advanced oral communication, reading, writing, and cultural understanding in professional contexts. High-level vocabulary and texts; dialect differences and formal language styles (registers). Advanced structural analysis and history of Filipino. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics/Armenian for Armenian

Speakers (LIHL) 113 (4)

For students who already comprehend informal spoken Armenian but wish to improve their communicative and sociocultural competence and their analytic understanding. Language functions for oral communication, reading, writing, and culture; dialect and language style differences; structure and history of Armenian. Some speaking ability in Armenian recommended. **Prerequisite:** upper-division standing or consent of instructor. (Not offered in 2010–11.)

Linguistics/Advanced Armenian for

Armenian Speakers (LIHL) 133 (4)

Instruction stresses language functions required for advanced oral communication, reading, writing, and cultural understanding in professional contexts. High-level vocabulary and texts; dialect differences and formal language styles (registers). Advanced structural analysis and history of Armenian. **Prerequisite:** upper-division standing or consent of instructor. (Not offered in 2010–11.)

Linguistics/Vietnamese for Vietnamese

Speakers (LIHL) 114 (4)

For students who already comprehend informal spoken Vietnamese but wish to improve their communicative and sociocultural competence and their analytic understanding. Language functions for oral communication, reading, writing, and culture; dialect and language style differences; structure and history of Vietnamese. Some speaking ability in Vietnamese recommended. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics/Advanced Vietnamese for

Vietnamese Speakers (LIHL) 134 (4)

Instruction stresses language functions required for advanced oral communication, reading, writing, and cultural understanding in professional contexts. High-level vocabulary and texts; dialect differences and formal language styles (registers). Advanced structural analysis and history of Vietnamese. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics/Korean for Korean

Speakers (LIHL) 115 (4)

For students who already comprehend informal spoken Korean but wish to improve their communicative and sociocultural competence and their analytic understanding. Language functions for oral communication, reading, writing, and culture; dialect and language style differences; structure and history of Korean. Some speaking ability in Korean recommended. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics/Advanced Korean for

Korean Speakers (LIHL) 135 (4)

Instruction stresses language functions required for advanced oral communication, reading, writing, and cultural understanding in professional contexts. High-level vocabulary and texts; dialect differences and formal language styles (registers). Advanced structural analysis and history of Korean. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics/Arabic for Arabic Speakers (LIHL) 116 (4)

For students who already comprehend informal spoken Arabic but wish to improve their communicative and sociocultural competence and their analytic understanding. Language functions for oral communication, reading, writing, and culture; dialect and language style differences; structure and history of Arabic. Some speaking ability in Arabic recommended. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics/Advanced Arabic for Arabic Speakers (LIHL) 136 (4)

Instruction stresses language functions required for advanced oral communication, reading, writing, and cultural understanding in professional contexts. High-level vocabulary and texts; dialect differences and formal language styles (registers). Advanced structural analysis and history of Arabic. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics/Persian for Persian Speakers (LIHL) 117 (4)

For students who already comprehend informal spoken Persian but wish to improve their communicative and sociocultural competence and their analytic understanding. Language functions for oral communication, reading, writing, and culture; dialect and language style differences; structure and history of Persian. Some speaking ability in Persian recommended. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics/Advanced Persian for Persian Speakers (LIHL) 137 (4)

Instruction stresses language functions required for advanced oral communication, reading, writing, and cultural understanding in professional contexts. High-level vocabulary and texts; dialect differences and formal language styles (registers). Advanced structural analysis and history of Persian. **Prerequisite:** upper-division standing or consent of instructor.

Linguistics/Cantonese for Cantonese Speakers (LIHL) 118 (4)

For students who already comprehend informal spoken Cantonese but wish to improve their communicative and sociocultural competence and their analytic understanding. Language functions for oral communication, reading, writing, and culture; dialect and language style differences; structure and history of Cantonese. Some speaking ability in Cantonese recommended. **Prerequisite:** upper-division standing or consent of instructor. (Not offered in 2010–11.)

Linguistics/Advanced Cantonese for Cantonese Speakers (LIHL) 138 (4)

Instruction stresses language functions required for advanced oral communication, reading, writing, and cultural understanding in professional contexts. High-level vocabulary and texts; dialect differences and formal language styles (registers). Advanced structural analysis and history of Cantonese. **Prerequisite:** upper-division standing or consent of instructor. (Not offered in 2010–11.)

Linguistics/Hindi for Hindi Speakers (LIHL) 119 (4)

For students who already comprehend informal spoken Hindi but wish to improve their communicative and sociocultural competence and their analytic understanding. Language functions for oral communication, reading, writing, and culture; dialect and language style differences; structure and history of Hindi. Some speaking ability in Hindi recommended. **Prerequisite:** upper-division standing or consent of instructor. (Not offered in 2010–11.)

Linguistics/Advanced Hindi for Hindi Speakers (LIHL) 139 (4)

Instruction stresses language functions required for advanced oral communication, reading, writing, and cultural understanding in professional contexts. High-level vocabulary and texts; dialect differences and formal language styles (registers). Advanced structural analysis and history of Hindi. **Prerequisite:** upper-division standing or consent of instructor. (Not offered in 2010–11.)

HINDI

See also Linguistics/"[Heritage Language Program](#)."

Linguistics/Hindi (LIHI) 1A. Hindi Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIHI 1AX. **Prerequisite:** no prior study of Hindi. (Not offered in 2010–11.)

Linguistics/Hindi (LIHI) 1AX. Analysis of Hindi (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. This course is taught entirely in Hindi. Must be taken in conjunction with LIHI 1A. **Prerequisite:** no prior study of Hindi. (Not offered in 2010–11.)

Linguistics/Hindi (LIHI) 1B. Hindi Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIHI 1BX. **Prerequisites:** LIHI 1A with a grade of C– or better, or equivalent and LIHI 1AX with a grade of D or better, or equivalent. (Not offered in 2010–11.)

Linguistics/Hindi (LIHI) 1BX. Analysis of Hindi (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. This course is taught entirely in Hindi. Must be taken in conjunction with LIHI 1B. **Prerequisites:** LIHI 1A with a grade of C– or better, or equivalent and LIHI 1AX with a grade of D or better, or equivalent. (Not offered in 2010–11.)

Linguistics/Hindi (LIHI) 1C. Hindi Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIHI 1CX. **Prerequisites:** LIHI 1B with a grade of C– or better, or equivalent and LIHI 1BX with a grade of D or better, or equivalent. (Not offered in 2010–11.)

Linguistics/Hindi (LIHI) 1CX. Analysis of Hindi (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. This course is taught entirely in Hindi. Must be taken in conjunction with LIHI 1C. **Prerequisites:** LIHI 1B with a grade of C– or better, or equivalent and LIHI 1BX with a grade of D or better, or equivalent. (Not offered in 2010–11.)

Linguistics/Hindi (LIHI) 1D. Hindi Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIHI 1DX. **Prerequisites:** LIHI 1C with a grade of C– or better, or equivalent and LIHI 1CX with a grade of D or better, or equivalent. (Not offered in 2010–11.)

Linguistics/Hindi (LIHI) 1DX. Analysis of Hindi (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. This course is taught entirely in Hindi. Must be taken in conjunction with LIHI 1D. **Prerequisites:** LIHI 1C with a grade of C– or better, or equivalent and LIHI 1CX with a grade of D or better, or equivalent. (Not offered in 2010–11.)

ITALIAN

Linguistics/Italian (LIIT) 1A. Italian Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIIT 1AX. **Prerequisite:** no prior study of Italian.

Linguistics/Italian (LIIT) 1AX. Analysis of Italian (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Italian. Must be taken with LIIT 1A. **Prerequisite:** no prior study of Italian.

Linguistics/Italian (LIIT) 1B. Italian Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken

in conjunction with LIIT 1BX. **Prerequisites:** LIIT 1A with a grade of C– or better, or equivalent and LIIT 1AX with a grade of D or better, or equivalent.

Linguistics/Italian (LIIT) 1BX. Analysis of Italian (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Italian. Must be taken with LIIT 1B. **Prerequisites:** LIIT 1A with a grade of C– or better, or equivalent and LIIT 1AX with a grade of D or better, or equivalent.

Linguistics/Italian (LIIT) 1C. Italian Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIIT 1CX. **Prerequisites:** LIIT 1B with a grade of C– or better, or equivalent and LIIT 1BX with a grade of D or better, or equivalent.

Linguistics/Italian (LIIT) 1CX. Analysis of Italian (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Italian. Must be taken with LIIT 1C. **Prerequisites:** LIIT 1B with a grade of C– or better, or equivalent and LIIT 1BX with a grade of D or better, or equivalent.

Linguistics/Italian (LIIT) 1D. Italian Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIIT 1DX. *Successful completion of LIIT 1D and LIIT 1DX satisfies the requirement for language proficiency in Revelle and Eleanor Roosevelt Colleges.* **Prerequisites:** LIIT 1C and LIIT 1CX, or equivalent.

Linguistics/Italian (LIIT) 1DX. Analysis of Italian (2.5)

Practice of the grammatical functions indispensable for comprehensible communication in the language. The course is taught entirely in Italian. Must be taken in conjunction with LIIT 1D. *Successful completion of LIIT 1D and LIIT 1DX satisfies the requirement for language proficiency in Revelle and Eleanor Roosevelt Colleges.* **Prerequisites:** LIIT 1C and LIIT 1CX, or equivalent.

See also "[Department of Literature](#)."

JAPANESE

See "[Japanese Studies](#)."

See also Linguistics "[Directed Study](#)."

LATIN

See "[Department of Literature](#)."

PORTUGUESE

Linguistics/Portuguese (LIPO) 1A. Portuguese Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary-building, reading, and culture. Emphasis on the language and culture of Brazil. Must be taken in conjunction with LIPO 1AX. **Prerequisite:** no prior study of Portuguese.

Linguistics/Portuguese (LIPO) 1AX. Analysis of Portuguese (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Portuguese. Must be taken in conjunction with LIPO 1A. **Prerequisite:** no prior study of Portuguese.

Linguistics/Portuguese (LIPO) 1B. Portuguese Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking,

vocabulary-building, reading, and culture. Emphasis on the language and culture of Brazil. Must be taken in conjunction with LIPO 1BX. **Prerequisites:** LIPO 1A with a grade of C– or better or equivalent and LIPO 1AX with a grade of D or better, or equivalent.

Linguistics/Portuguese (LIPO) 1BX.
Analysis of Portuguese (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and reading. The course is taught entirely in Portuguese. Must be taken in conjunction with LIPO 1B. **Prerequisites:** LIPO 1A with a grade of C– or better or equivalent and LIPO 1AX with a grade of D or better, or equivalent.

Linguistics/Portuguese (LIPO) 1C.
Portuguese Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary-building, reading, and culture. Emphasis on the language and culture of Brazil. Must be taken in conjunction with LIPO 1CX. **Prerequisites:** LIPO 1B with a grade of C– or better or equivalent and LIPO 1BX with a grade of D or better, or equivalent.

Linguistics/Portuguese (LIPO) 1CX.
Analysis of Portuguese (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and reading. The course is taught entirely in Portuguese. Must be taken in conjunction with LIPO 1C. **Prerequisites:** LIPO 1B with a grade of C– or better or equivalent and LIPO 1BX with a grade of D or better, or equivalent.

Linguistics/Portuguese (LIPO) 1D.
Portuguese Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LIPO 1DX. Successful completion of LIPO 1D and LIPO 1DX satisfies the requirement for language proficiency in Revelle and Eleanor Roosevelt Colleges. **Prerequisites:** LIPO 1C with a grade of C– or better, or equivalent and LIPO 1CX with a grade of D or better, or equivalent.

Linguistics/Portuguese (LIPO) 1DX.
Analysis of Portuguese (2.5)

Practice of the grammatical functions indispensable for comprehensible communication in the language. The course is taught entirely in Portuguese. Must be taken in conjunction with LIPO 1D. Successful completion of LIPO 1D and LIPO 1DX satisfies the requirement for language proficiency in Revelle and Eleanor Roosevelt Colleges. **Prerequisites:** LIPO 1C with a grade of C– or better or equivalent and LIPO 1CX with a grade of D or better, or equivalent.

Linguistics/Portuguese (LIPO) 15.
Intermediate Brazilian Portuguese for the Social Sciences: Social Movements (2.0)

Conducted entirely in Portuguese. Course aims to improve oral language skills through discussions of social science topics, with emphasis on social and political movements in contemporary Brazil. Course materials may encompass televised news broadcasts, newspapers, and periodicals. **Prerequisites:** LIPO 1D and 1DX or equivalent or by consent of the instructor.

Linguistics/Portuguese (LIPO) 16.
Intermediate Brazilian Portuguese for the Social Sciences: Cultural Movements (2.0)

Conducted entirely in Portuguese. Course aims to improve oral language skills through discussions of social science topics, with emphasis on culture and the arts in contemporary Brazil. Course materials may encompass televised news broadcasts, newspapers, and periodicals. **Prerequisites:** LIPO 1D and 1DX or equivalent or by consent of instructor.

Linguistics/Portuguese (LIPO) 17.
Intermediate Brazilian Portuguese for the Social Sciences: Ethnicity (2.0)

Conducted entirely in Portuguese. Course aims to improve oral language skills through discussions of social science topics, with emphasis on the role of ethnicity in contemporary Brazil. Course materials may encompass televised news

broadcasts, newspapers and periodicals. **Prerequisites:** LIPO 1D and 1DX or equivalent or by consent of instructor.

RUSSIAN

See “[Department of Literature](http://publications.ucsd.edu/clientsites/catalog1011/courses/LIT.html)”
<http://publications.ucsd.edu/clientsites/catalog1011/courses/LIT.html>.”

See also Linguistics “[Directed Study](#).”

SPANISH

Linguistics/Spanish (LISP) 1A.
Spanish Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LISP 1AX. **Prerequisite:** no prior study of Spanish.

Linguistics/Spanish (LISP) 1AX.
Analysis of Spanish (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Spanish. Must be taken with LISP 1A. **Prerequisite:** no prior study of Spanish.

Linguistics/Spanish (LISP) 1B.
Spanish Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LISP 1BX. **Prerequisites:** LISP 1A with a grade of C– or better, or equivalent and LISP 1AX with a grade of D or better, or equivalent.

Linguistics/Spanish (LISP) 1BX.
Analysis of Spanish (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Spanish. Must be taken with LISP 1B. **Prerequisites:** LISP 1A with a grade of C– or better, or equivalent and LISP 1AX with a grade of D or better, or equivalent.

Linguistics/Spanish (LISP) 1C.
Spanish Conversation (2.5)

Small conversation sections taught entirely in the target language. Emphasis on listening comprehension, speaking, vocabulary building, reading, and culture. Must be taken in conjunction with LISP 1CX. **Prerequisites:** LISP 1B with a grade of C– or better, or equivalent and LISP 1BX with a grade of D or better, or equivalent.

Linguistics/Spanish (LISP) 1CX.
Analysis of Spanish (2.5)

Presentation and practice of the basic grammatical structures needed for oral and written communication and for reading. The course is taught entirely in Spanish. Must be taken with LISP 1C. **Prerequisites:** LISP 1B with a grade of C– or better, or equivalent and LISP 1BX with a grade of D or better, or equivalent.

Linguistics/Spanish (LISP) 1D.
Spanish Conversation (2.5)

Small conversation sections taught entirely in Spanish. Emphasis on speaking, reading, writing, and culture. Practice of the language functions needed for successful communication. Must be taken in conjunction with LISP 1DX. Successful completion of LISP 1D and LISP 1DX satisfies the requirement for language proficiency in Eleanor Roosevelt and Revelle Colleges. **Prerequisites:** LISP 1C with a grade of C– or better, or equivalent and LISP 1CX with a grade of D or better, or equivalent.

Linguistics/Spanish (LISP) 1DX.
Analysis of Spanish (2.5)

Practice of the grammatical functions indispensable for comprehensible communication in the language. The course is taught entirely in Spanish. Must be taken in conjunction with LISP 1D. Successful completion of LISP 1D and LISP 1DX satisfies the requirement for language proficiency in Eleanor Roosevelt and Revelle Colleges. **Prerequisites:** LISP 1C with a grade of C– or better, or equivalent and LISP 1CX with a grade of D or better, or equivalent.

Linguistics/Spanish (LISP) 5A, 5B, 5C, 5D. Fundamentals of Spanish (5)

This course concentrates on those language skills essential for communication: listening comprehension, conversation, reading, writing, and grammar analysis. UCSD students: LISP 5A is equivalent to LISP 1A/1AX, LISP 5B to LISP 5B/5BX, LISP 5C to LISP 1C/1CX and LISP 5D to LISP 1D/1DX. Enrollment is limited. **Prerequisites:** none for 5A; for 5B, two or more years of Spanish in high school or the first semester or the first quarter of college-level Spanish. (Offered in Summer Session only.)

Linguistics/Spanish (LISP) 15, 16, 17.
Intermediate Spanish for the Social Sciences (2)

Conducted entirely in Spanish. Course aims to improve oral language skills through discussions of social science topics, with emphasis on political events and current affairs. Course materials encompass televised news broadcasts, newspapers and periodicals. LISP 15 is offered fall quarter only, LISP 16 is offered winter quarter only, and LISP 17 is offered spring quarter only. Each course may be taken one time and need not be taken in sequence. **Prerequisites:** LISP 1D/DX or at least three semesters/four quarters of college Spanish or by permission of the instructor.

See also “[Department of Literature](#).”

DIRECTED STUDY

Linguistics (LIDS) 19. Directed Study—Language (2–4)

Introductory-level study of a language in the language laboratory on a self-instructional basis. Depending on the availability of appropriate study materials, the course may be taken in blocks of two or four units of credit and may be repeated up to the total number of units available for that language.

Albanian	Hungarian
American Sign Language	Indonesian
Amharic	Irish
Arabic, Eastern	Italian
Arabic, Egyptian	Japanese
Arabic, Iraqi	Kannada
Arabic, Moroccan	Kituba
Arabic, Saudi	Korean
Armenian, Eastern	Latvian
Bengali	Lithuanian
Bulgarian	Malay
Burmese	Navajo
Cambodian	New Guinea Pidgin
Catalan	Norwegian
Chinese, Cantonese	Persian
Chinese, Mandarin	Polish
Chinyanja	Portuguese
Cree	Romanian
Czech	Russian
Danish	Serbo-Croatian
Dutch	Slovenian
Esperanto	Spanish
Finnish	Swahili
French	Swedish
Fula	Tagalog
German	Taiwanese
Greek, Modern	Telugu
Haitian Creole	Thai
Hausa	Tibetan
Hawaiian	Turkish
Hebrew, Modern	Twí
Hindi-Urdu	Vietnamese
	Yoruba

Literature

PROFESSORS

Rae Armantrout, M.A., *Poetry and Contemporary Poetics*
Linda Brodkey, Ph.D., *Writing*
Sarah Shun-lien Bynum, M.F.A., *Fiction Writing and Literature*
Steven Cassedy, Ph.D., *Slavic and Comparative Literature*
Alain J.-J. Cohen, Ph.D., *Comparative Literature and Film Studies*
Jaime Concha, Ph.D., *Spanish and Latin American Literature*
Stephen D. Cox, Ph.D., *English Literature; Director, Revelle Humanities Writing Program; Academic Senate Distinguished Teaching Award*
R. Michael Davidson, Ph.D., *American Literature, Writing*
Page duBois, Ph.D., *Classics and Comparative Literature*
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Richard S. Cohen, Ph.D., *South Asian Literature*
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Max Parra, Ph.D., *Mexican and Latin American Literature*

Shelley Streeby, Ph.D., *American Literature*
Nicole Tonkovich, Ph.D., *American Literature*
Pasquale Verdicchio, Ph.D., *Italian and Comparative Literature*
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Leslie Collins Edwards, Ph.D., *Classical Languages and Literature*
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John Granger, Ph.D., *Writing*
Jeyseon Lee, Ph.D., *Korean Language*
Beatrice Pita, Ph.D., *Spanish Language and Latin American Literature*

Catherine Ploye, Ph.D., *French Language and Literature*
Stephen Potts, Ph.D., *American and Popular Literature*
Rebecca Wells, C.Phil., *Russian Language and Literature*
Eliot Wirshbo, Ph.D., *Classical Languages and Literature*

ADMINISTRATIVE OFFICE:

130 Literature Building, (858) 534-4618

GRADUATE OFFICE:

139/140 Literature Building, (858) 534-3217

UNDERGRADUATE OFFICE:

110 Literature Building, (858) 534-3210

The Department of Literature at UC San Diego is unique both conceptually and structurally in that it combines all literary study in a single department, enabling students to concentrate on single-language or national literatures, while at the same time facilitating student engagement in dialogue across literatures and languages. The department also houses undergraduate and graduate study in the craft and theory of creative writing. The department brings together writers, teachers, scholars, and students of several different languages and literatures, uniting them by the nature of the studies they pursue. This lends a comparative aspect to both undergraduate and graduate programs, which lead to the bachelor of arts, master of fine arts, the candidate in philosophy, and doctor of philosophy degrees. All students must show knowledge of a foreign literature by doing upper-division or graduate work in that literature in the original language. Courses are offered not only in the literatures themselves but in the theoretical aspects of literature and—often in cooperation with other departments—in the relationship of literary study to other disciplines such as philosophy, visual arts, music, sociology, history, psychology, linguistics, and communication. With special permission, undergraduates may take graduate courses for credit, and graduate students may also take undergraduate courses for credit.

The UCSD Library's Mandeville Department of Special Collections offers the undergraduate and graduate literature student an excellent range of resources, including single-author collections, rare and out-of-print books, tapes, maps, and historical archives. Of special interest are the Southworth Collection of Spanish Civil War materials, the Hill Collection of South Pacific Voyages, the Don Cameron Allen Renaissance collection, and the Archive for New Poetry. Within the latter collection are an extensive series of single-author archives, including the papers of Paul Blackburn, Donald Allen, Lew Welch, Charles Reznikoff, Joanne Kyger, Jerome Rothenberg, and others. The Archive for New Poetry is one of the largest collections of contemporary poetry in the United States. Graduate students also have access, facilitated by travel grants, to all other University of California research collections.

Literature majors in languages are trained

- To write effectively, marshalling textual evidence in their engagement with complex and diverse

ideas.

- To read texts and other cultural productions in a nuanced manner, sensitive to factors of historical context and aesthetic form.
- To develop a critical vocabulary and framework that will promote and facilitate their engagement with texts.
- To work at an advanced level in a second language/literature.
- To lead, evaluate, and apply secondary sources to their analyses of primary texts.
- To develop a lifelong appreciation of the subtleties of cultural texts and the ongoing need to engage with and evaluate their meanings.

Literature majors in writing are trained

- To write clear expository prose.
- To work at an advanced level in a second language/literature, including the ability to complete at least one upper division course in literature, film, etc. taught exclusively in that language.
- To produce original works of fiction, poetry, or nonfiction.
- To demonstrate in-depth familiarity with the literary history of their chosen genre, including canonical and alternative texts across some breadth of time.
- To develop a critical vocabulary for understanding, discussing, and evaluating literary techniques and aesthetic arguments while honing editorial skills.
- To become active, sophisticated, articulate consumers and producers of a variety of texts.

CAREERS FOR LITERATURE MAJORS

Literature majors develop skills and perspectives that prepare them for careers in education and numerous other professions. The writing, analytical, and cultural breadth of majors makes them attractive as preparation for professional schools as well as advanced graduate studies. A degree in literature provides a strong background for the LSAT and law school. Medical schools seek out students who are prepared not only in the sciences, but also in the humanities and writing. The business world seeks college-trained English majors, and international corporations actively recruit students with a specialty in French, German, Italian, Russian, or Spanish. Literature majors' skills also prepare them for work in advertising, editing, publishing, journalism, communications, mass media, and other professions where writers and editors are in demand. The knowledge of a second language and culture provides literature majors with a decided career advantage.

SECONDARY SCHOOL ENGLISH TEACHING

The literature department offers an excellent preparation for teaching English/ESL in secondary schools. Suggested majors include Literatures of the

World, Literatures in English, and Literature/Writing. If you are interested in receiving a California teaching credential from UC San Diego, contact [Education Studies](#) (EDS) for information about prerequisites and professional preparation requirements. Please consult EDS and the literature department early in your academic career to plan an appropriate literature curriculum.

THE UNDERGRADUATE PROGRAM

THE MAJOR IN LITERATURE

There are ten majors available to students within the Department of Literature: Literatures in Cultural Studies, English, French, German, Italian, Russian, Spanish, Literatures of the World, Writing, and the composite major in two literatures. Requirements vary from major to major as described below. Once a student has decided upon a major in literature, he or she is required to meet regularly with an advisor in the Department of Literature. Worksheets defining major requirements are available in the literature undergraduate office to help students organize their course work.

All departmental courses taken to satisfy the requirements of the literature major, including courses in the secondary literature, must be taken for a letter grade. No grade below C– is acceptable for a course taken in the major.

At least six of the upper-division courses for the major, including a minimum of four in the primary literature, must be taken at UCSD.

Lower-Division Preparation

Lower-division requirements vary, depending on the literature major in which the student elects to concentrate. However, the department strongly recommends that, as part of the freshman/sophomore course work, students who have chosen or are considering a major in literature begin an appropriate lower-division language sequence in the Departments of Linguistics or Literature as preparation for upper-division course work in a foreign language and literature. All literature majors require knowledge of a second language.

Secondary Literature

All students majoring in literature must study a secondary literature, that is, a literature in a language different from that of their primary literature. The range of secondary literatures includes ASL, Classical Greek, Hebrew, and Latin, as well as the previously mentioned French, German, Italian, Russian, Spanish, and for those concentrating in a foreign literature, English is also an option. Students will satisfy this requirement by taking three courses in the secondary literature, given substantially in the native language. At least one of these courses must be upper-division. Students should see an advisor to confirm the selection of the specific courses that will be taken to satisfy both the lower-division and the upper-division components of the secondary literature requirement.

The lower-division component within the secondary literatures may be satisfied by: American Sign Language 1D/1DX and 1E; French (LTFR) 2B and either 2C or 50; German (LTGM) 2B and 2C; Hebrew (JUDA) 2 and 3 (see "[Judaic Studies](#)"); Italian (LTIT) 2B and 50; Greek (LTGK) 2 and 3; Latin (LTLA) 2 and 3; Russian (LTRU) 2B and 2C; two courses from Spanish (LTSP) 50A-50B-50C. For majors other than literatures in English, two courses from English (LTEN) 21-22-23-25-26-27-28-29-60 are applicable. Literatures of the World and writing courses may not be applied toward the English secondary literature requirement.

Note: World Literature (LTWL) courses taught in English do not apply unless there is a foreign-language discussion section and materials are available in the foreign language. World Literature courses whose primary focus is U.S. Literature may apply toward requirements in literatures in English. Alternative secondary literatures are subject to approval and petition.

Upper-division courses in the secondary literature are counted as part of the total number of upper-division courses required for the major when possible. Students are free to choose from any of the upper-division offerings in their secondary foreign literature. Special studies courses (198s and 199s) cannot be used to satisfy upper-division secondary literature requirements.

All departmental courses taken to satisfy the requirements of the literature major, including courses in the secondary literature, must be taken for a letter grade. No grade below C– is acceptable for a course taken in the major.

At least six of the upper-division courses for the major, including a minimum of four in the primary literature, must be taken at UCSD.

Writing Component in Literature Courses

It is the departmental expectation that students in lower-division courses will write a minimum of 2,500 words per course. In upper-division courses the minimum requirement is 4,000 words per course.

Honors Program

The department offers a special program of advanced study for outstanding undergraduates majoring in literature. Admission to this program requires an overall GPA of 3.5 and a literature major GPA of 3.7 at the beginning of the senior year. Students meeting these requirements will be sent, during the middle of fall quarter, an invitation to participate in the program. Interested students who anticipate that they will not meet the established criteria may petition to participate in the program by submitting a personal statement and a five-page example of their writing by the end of the third week of fall quarter. During the winter quarter of their senior year, all honors students enroll in the honors seminar (LTWL 191), which aims to deepen their understanding of the issues of theory and method implied in the study of literature. This seminar lays the groundwork for an honors thesis, written in spring quarter (LT__ 196), each under the supervision of a faculty member who specializes in the literature of the student's primary concentration. The Honors Program concludes with an oral examination of each honors candidate by a faculty committee,

which is charged with recommending whether departmental honors are warranted and, if so, which degree of honors will appear on the student's transcript and diploma. Students from this program will also be recommended for the Burckhardt and Williams Prizes, which are awarded at graduation for outstanding achievement in the literature major. The honors seminar and thesis course may be applied toward the primary concentration in the literature major, if applicable. For Literature/Writing majors, the honors seminar is considered to be equivalent to a writing workshop.

Special Studies

These upper-division independent study opportunities are intended for advanced students, able to work on their own, and interested in a topic not normally covered by departmental offerings.

Students with upper-division standing, a departmental GPA of at least 3.0, an overall GPA of at least 2.5, and completion of lower-division prerequisites in the subject, are eligible to take special studies courses (198s and 199s). Those not satisfying these criteria may, with justification supported by the proposed special studies instructor, petition for an exception to the regulation. 198s and 199s require at least 4,000 words of writing or an equivalent project as determined by the instructor. Information and Special Studies Enrollment forms are available in the literature undergraduate office. Enrollment requires departmental approval. Special studies courses may not be taken for a grade. These courses may not be used to satisfy upper-division requirements for majors or minors.

Study Abroad

Study abroad can significantly enhance a student's major, particularly in ways in which it relates to international issues. Literature students are encouraged to study abroad before their senior year. Students who take Education Abroad Program or Opportunities Abroad Program (EAP/OAP) courses in a country appropriate to their major may use up to five upper-division courses to satisfy major requirements and up to three toward a minor. For composite majors in literature, six courses from abroad may apply, with no more than four toward either one of the two concentrations. These must be approved by the department after they have been entered on the student's official record at UCSD. The approval process is described in a handout on receiving transfer credit, available in the Literature Undergraduate Office. Before leaving to study abroad, students should meet with an advisor to identify which EAP courses are appropriate to fulfill the major or minor requirements.

Information on EAP/OAP is given in the "Education Abroad Program" section of the UC San Diego General Catalog. Interested students should contact the Programs Abroad Office in the International Center and visit its Web site at <http://programsabroad.ucsd.edu/>. Financial aid can be used for EAP/OAP study, and special study-abroad scholarships are also available.

INDIVIDUAL PROGRAMS

Literature/Cultural Studies

Literatures in English
 Literatures in French
 Literatures in German
 Literatures in Italian
 Literatures in Russian
 Literatures in Spanish
 Literatures of the World
 Literature/Writing
 Composite Major

INDIVIDUAL PROGRAM REQUIREMENTS

Primary Concentration in Cultural Studies

The Literature/Cultural Studies major aims to provide students with broad cultural literacy and critical thinking skills—in language, visual media, social practices, and theories of interpretation—which are basic, necessary cornerstones of a humanities education. With four focus areas—visual culture, popular cultures, culture and globalization, and social identities—the undergraduate major in Literature/Cultural Studies, on the one hand, offers literacy in a range of traditional and modern cultural forms (from literature and texts, to film, art, and visual culture) and methods for interpreting these cultural forms, and on the other hand, prepares students to engage with a society whose "culture" is, and will become increasingly, diverse, international, and multilingual.

- Three lower-division courses:
 - LTCS 50 and 52
 - Third course may be selected from: LTEN 25, 26, 27, 28, 29, 60; LTWL 4A-B-C-D-F-M; TWS 21-22-23-24-25-26; or LTWL 19A-B-C.
- Six upper-division LTCS courses (one of each from the four a–d focus areas):
 - Reading Visual Culture: LTCS 170, 171, 172, 173
 - Popular Cultures: LTCS 110, 111, 114, 118
 - Culture and Globalization: LTCS 125, 133, 140, 141, 145
 - Social Identities: LTCS 130, 131, 132, 135

Note: At least one upper-division LTCS methods course is recommended and will fulfill the upper-division requirement: LTCS 100, 102, 120, 155.
- Three courses in a secondary literature, that is, a literature taught in a language other than English. At least one of these courses must be upper-division. Upper-division courses taken to satisfy the secondary literature requirement may be counted as part of the twelve upper-division courses. Special studies courses (198s and 199s) and courses in foreign literatures taught in translation do not apply to the secondary literature requirement. See "Secondary Literature," above.
- The remaining upper-division electives, to total twelve upper-division courses, can be drawn from these existing Department of Literature courses:
 - Literatures in English: LTEN 150, 160, 178, 180, 181, 183, 184, 185, 186, 187, 188, 189
 - Literatures in French: LTFR 145, 164, 170
 - Literatures in Italian: LTIT 122, 140, 150
 - Literatures in Korean: LTKO 100
 - Literatures in Spanish: LTSP 123, 137, 150A, 150B, 154, 170, 174, 175, 176, 177

- Literature/Theory: LTTH 110, 115, 150
- Literatures of the World: LTAF 110, 120, LTAM 100, 101, 102, 108, 109, 111, 130, 132, LTEA 120A, 120B, 120C, 120D, 138, 142, 143, 144, 145, LTWL 110B, 114, 116, 120, 124, 141, 155, 160, 180, 181, 183, 184, 185
- Literature/Writing: LTWR 110, 113, 115, 119, 121

Primary Concentration in Literatures in English

- Six lower-division courses:
 - LTEN 21, 22, 23, 25, and 26
 - One of the following: LTEN 27, 28, or 29
- Nine upper-division courses from literatures in English offerings, including a course from each of the following four a–d categories:
 - British Literature before 1660
 - British Literature after 1660
 - U.S. Literature before 1860
 - U.S. Literature after 1860
- One course in world Anglophone literature(s) with focus other than British or U.S. literatures.
- One upper-division course in the history of criticism or in literary/cultural theory and methods from among the following: LTTH 110; LTTH 115; or LTCS 100.
- Three courses in a secondary literature, that is, a literature taught in a language other than English. At least one of these courses must be upper-division. Upper-division courses taken to satisfy the secondary literature requirement may be counted as part of the twelve upper-division courses. Special studies courses (198s and 199s) do not apply to the secondary literature requirement. See "Secondary Literature," above.
- Upper-division elective chosen from Department of Literature offerings to make a total of twelve upper-division courses.

Primary Concentration in a Foreign Literature

Literatures in French

- Nine upper-division courses as follows:
 - LTFR 115-116, Themes in French Intellectual and Literary History.
 - Seven additional upper-division courses in French literature, including at least one course in each of the following periods: seventeenth or eighteenth century; nineteenth century; and twentieth century.
- Three courses in a secondary literature, that is, a literature taught in a language other than French. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures which are taught in French do not apply to the secondary literature requirement. See "Secondary Literature," above.
- Upper-division electives chosen from Department of Literature offerings to make a total of twelve upper-division courses.

Literatures in German

1. Nine upper-division courses in German literature. Two of these should be in literature written before the year 1850.
 2. Three courses in a secondary literature, that is, a literature taught in a language other than German. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures taught in German do not apply to the secondary literature requirement. See "[Secondary Literature](#)," above.
- Upper-division electives chosen from Department of Literature offerings to make a total of twelve upper-division courses.

Literatures in Italian

1. Nine upper-division courses in Italian literature as follows:
 - a. LTIT 100, Introduction to Italian Literature
 - b. LTIT 115, Medieval Studies
 - c. LTIT 161, Advanced Stylistics and Conversation
 - d. One course in Italian North American Culture
 - e. Five additional upper-division courses in Italian literature taught in Italian
2. Three courses in a secondary literature, that is, a literature taught in a language other than Italian. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures taught in Italian do not apply to the secondary literature requirement. See "[Secondary Literature](#)," above.
3. Upper-division electives chosen from Department of Literature offerings to make a total of twelve upper-division courses.

Literatures in Russian

1. LTRU 1A-B-C and 2A-B-C or their equivalent.
2. Twelve upper-division courses in Russian:
 - a. LTRU 104A-B-C
 - b. LTRU 110A-B-C
 - c. Six additional upper-division courses in Russian literature
3. Three courses in a secondary literature, that is, a literature taught in a language other than Russian. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures taught in Russian do not apply to the secondary literature requirement. See "[Secondary Literature](#)," above.

Students in the Russian literature major are encouraged to participate in the Education Abroad Program (EAP) in Moscow and to investigate other options for foreign study through the Opportunities Abroad Program (OAP). By petition, credits earned through EAP/OAP can fulfill UCSD degree and major requirements.

Literatures in Spanish

1. Two lower-division Spanish literature courses, as indicated:
 - a. LTSP 50A, Peninsular Literature

- b. Either LTSP 50B or LTSP 50C, Latin American Literature
2. Nine upper-division courses as follows:
 - a. One course in Spanish Peninsular literature before 1900: LTSP 100, 107, 115, 119AB, 119C, 122, or the following topics course when the topic is pre-twentieth-century literature: LTSP 123
 - b. One course in Latin American literature before 1900: LTSP 116, 135A, or any of the following regional, genre, or topics courses when the topic is pre-twentieth-century literature: LTSP 134, 136, 137, 138, 140, 141, 142, 171, 173, 174, 175, 176, 177, 178
 - c. Seven additional upper-division courses in Spanish, Latin American, and/or Chicano literature (taught in Spanish)
 3. Three courses in a secondary literature, that is, a literature taught in a language other than Spanish. At least one of these courses must be upper-division. Special studies courses (198s and 199s) and courses in foreign literatures taught in Spanish do not apply to the secondary literature requirement. See "[Secondary Literature](#)," above, for applicable lower-division courses.
 4. Upper-division electives from Department of Literature offerings, whether in Spanish or in another literature, to make a total of twelve upper-division courses.

Students majoring in Spanish can choose to concentrate on either Spanish or Latin American literature. All students, however, are encouraged to take courses in the various national literatures as well as in Chicano literature for a broad background in Spanish language literatures.

Students not having a solid linguistic base in Spanish are advised to take intermediate language courses from the LTSP 2 and 50 sequences for additional review of Spanish grammar, development of writing skills, and introduction to literary analysis. Only LTSP 50A and either 50B or 50C, however, can count towards the major.

Primary Concentration in Literatures of the World

The major in Literatures of the World allows students to expand the focus of their work beyond a single-language literature. They plan an individual program with options in regional studies (for example, Europe, the Americas, East Asia, Africa, Near East) and topical studies (for example, genre, period, gender, ethnic literature, literature and the visual arts, cultural studies, writing, Third World studies) as well as the single-language literatures.

1. Lower-division (three courses):

A three-course sequence in literature chosen from any section in literature.

Students can combine courses in an original national language/literature with courses in translation to satisfy this requirement, such as LTRF 2A and 2B plus LTWL 4A (Film and Fiction in Twentieth-Century Societies: French). Students may use either the Revelle College Humanities sequence (HUM 1–5) or Eleanor Roosevelt College's Making of the Modern World (MMW 1–6) to satisfy the lower-division sequence for the LTWL major.

2. Upper-division (twelve courses):
 - a. Six courses in a regional or single-language literature, to be taken in the original language(s) or in translation
 - b. Four courses focused on a topic or another regional or single-language literature
 - c. Two courses in non-European and non-U.S. Literature; if satisfied under group (a) or group (b), any other two literature courses may be substituted.
3. Three courses in a secondary literature, that is, a literature taught in a language different from that of the primary literature. At least one of these courses must be upper-division. Upper-division courses taken to satisfy the secondary literature requirement may be counted as part of the twelve upper-division courses for the major and may, where appropriate, be applied to requirements in Group B or C. Students should see an advisor when selecting specific courses that will be taken to satisfy this requirement. Special studies courses (198s and 199s) and courses in foreign literatures taught in translation do not apply to the secondary literature requirement. See "[Secondary Literature](#)," above, for applicable lower-division courses.

At least two of the required twelve upper-division courses must be in literature written before 1850. No more than four courses in literature/writing (LTWR) may be taken as part of the world literatures major, and these will generally apply to Group 2.b.

Primary Concentration in Writing

The writing major is designed to provide direct experience in writing fiction, nonfiction, and poetry as well as engage the student writer in both the world of "writing culture"—public readings, publication, and the media—and literary theory and practical critique. An indispensable feature of this program is that it engages students with one another's work, both critically and communally. Writing majors will move through a sequence of courses within (and between) genres in order to develop their own style and confidence in the work of writing and critique. Students who are interested in teaching writing will find this major an opportunity both for writing extensively and dealing critically with the act of written composition. The major requirements are as follows:

1. LTWR 8A, 8B, and 8C.
2. Three lower-division courses:
 - a. LTEN 26
 - b. Any two of the following: LTEN 21, 22, 23, 25, 27, 28, 29; TWS 21, 22, 23, 25, 26
 - c. Twelve upper-division courses:
3. Six upper-division courses in Literature/Writing from the writing workshop sequence (LTWR 100–129). These workshops may be repeated for credit (see course listing for number of times workshops may be repeated), but the requirement should show a range of writing experience in at least two major writing types. No other courses may be substituted for this basic requirement of six upper-division workshops.

- a. One course from the group numbered LTWR 140–148.
 - b. Five upper-division electives chosen from Department of Literature offerings, excluding LTWR 100–148 courses.
4. Three courses in a secondary literature, that is, a literature taught in a language other than English. At least one of these courses must be upper-division. Students should see an advisor when selecting specific courses that will be taken to satisfy this requirement. Special studies courses (198s and 199s) and courses in foreign literatures which are taught in English translation do not apply to the secondary literature requirement. See “[Secondary Literature](#),” above.

Composite Major in Literature

The composite major in literature permits a student to develop a solid foundation in two literatures while remaining within one department. Because the UCSD Department of Literature houses literatures that are divided among different departments at most universities, our composite major allows students to coordinate their studies with a single, closely-knit group of faculty, and to arrange their program without repeating two different sets of major requirements. (For example, since a composite major necessarily combines literatures written in two different languages, it automatically fulfills the secondary language requirement for the literature major.)

Students pursuing a composite major work closely with an advisor to plan a program of study that meets the following requirements:

1. Students will select two literatures of concentration (Literature 1 and Literature 2).
 - a. One of the literatures must be in a language other than English.
 - b. Both concentrations, however, can be in non-English literatures; thus a student can choose English and French, for example, or Russian and Spanish, French and Italian, German and Latin, Spanish and English, etc., but not Literatures of the World or Literature/Writing.
2. Students will meet all lower-division major requirements for each of the two literatures of concentration. See specific “Primary Concentration” listings above; [English](#), [Spanish](#), and [Russian](#), for example, all have lower-division requirements for the major.
3. Students will take eight upper-division courses in each of the two selected literatures of concentration for a total of sixteen upper-division courses.
 - a. These must satisfy the upper-division course requirements for each of the two majors. Thus, for example, if one of the concentrations is English, the student must include courses from each of the four stipulated categories; if one of the concentrations is Spanish, upper-division courses must include LTSP 130A and 130B.
 - b. Beyond the upper-division requirements for each literature of concentration (Literature 1 and Literature 2), students will take a sufficient number of elective courses in each of the two literatures of concentration to make a total of

eight upper-division courses in each chosen concentration.

Double Major within the Department of Literature in Literature/Writing and Another Literature

Students who wish to major both in Literature/Writing and in literature (any section) should see the department for information regarding appropriate double major requirements. Generally, all requirements for each major must be completed, though the secondary literature and two upper-division courses, where appropriate, may overlap from one major to the other.

Students must submit a double major petition for approval by the department and the student’s provost office.

THE MINOR IN LITERATURE

The department offers a wide range of possibilities for noncontiguous minors. The options include courses in a single regional or national literature, courses in more than one literature, and a combination of language and literature courses. The minors require seven courses. *All courses taken to complete a literature minor must be taken for a letter grade.* No grade below C– is acceptable. Advanced Placement (AP) credit will not satisfy minor requirements.

Please see the department undergraduate office for specific minor requirements.

- A minor in literature will consist of seven courses as described below.
- French, German, Greek, Italian, Latin, Russian, or Spanish literature: seven courses, at least four of which must be upper-division in the same literature.
- Literatures in English, Literatures of the World, and Literature/Writing: seven courses, at least five of which must be upper-division.
- Lower-division courses applicable toward minors:

English—LTEN 21, 22, 23, 25, 26, 27, 28, 29, 60

French—LTFR 2A-B-C, 50

German—LTGM 2A-B-C

Greek—LTGK 1, 2, 3

Hebrew—JUDA 1, 2, 3 (see “[Judaic Studies](#)”)

Italian—LTIT 2A-B, 50

Latin—LTLA 1, 2, 3

Russian—LTRU 2A-B-C

Spanish—LTSP 2A-B-C-D-E, 50A-B-C

Writing—LTWR 8A-B-C

Literatures of the World—seven literature courses, at least five of which must be upper-division—usually 1) a two- or three-course lower-division sequence and 2) five upper-division courses with a single unifying theme. Students may use either the Revelle College Humanities sequence (HUM 1–5) or Eleanor Roosevelt College’s Making of the Modern World (MMW 1–6) to satisfy the lower-division sequence for the LTWL minor.

Writing minor—seven courses, at least five of which must be upper-division. The minimum of five upper-division courses must cover at least two major writing genres, with course work chosen from writing courses (LTWR) numbered 100 through 148.

Please see the department for further information and specifics regarding minors in literature.

THE GRADUATE PROGRAM

DOCTORAL DEGREE PROGRAM

The department offers a single Ph.D. in literature with concentrations in any of the fields in which members of the department do research. The C.Phil. (Candidate in Philosophy) is conferred upon all students who pass the qualifying examination and are advanced to candidacy. Ph.D. students in the doctoral program may also qualify for the M.A. upon completion of their qualifying examinations. Applicants seeking only an M.A. degree are not accepted.

Admission

The following are requirements for admission to graduate study in literature:

1. A baccalaureate or a master’s degree with a major in literature or a related field. Official transcripts required.
2. Satisfactory scores on the Graduate Record Examination (GRE) achieved within the past three calendar years. The Subject Test is not required.
3. Satisfactory score on the Test of English as a Foreign Language (TOEFL) achieved with the past two calendar years is required for international applicants.
4. Competence in reading, understanding and interpreting both literary and critical texts as well as the ability to follow seminar discussions in a second language and, for comparative literature students, in a third language as well.
5. Writing sample (twenty-five page minimum) required for all applicants.
6. Minimum of three letters of reference.

Completed applications and supporting materials must be received by the deadline posted on the department Web site (<http://literature.ucsd.edu>) for admission to the following fall quarter. Those planning to apply should take the GRE/TOEFL far enough in advance so that the scores will be available to the admissions committee in December.

Please refer to the department Web site (<http://literature.ucsd.edu>) for specific guidelines.

Course of Study

Formal study begins with coursework including a three-quarter introductory sequence (Literature/Theory 200A-B-C) which has an interdisciplinary and theoretical emphasis. During the first three years, the course of study will include at least four seminars in one literature and two in another (students in comparative literature must take at least one seminar in a third literature); at least four seminars drawn from offerings in literary theory, the second or a third literature, cultural studies, comparative literature, or composition studies; and five additional seminars open entirely to the student’s choice (four for students in comparative literature). Such “open”

seminars should generally be related to the intended dissertation field. At most, two seminars offered in other campus departments may be substituted for any of the latter group, with the advisor's permission. Students must also fulfill a historical breadth requirement by completing two seminars dealing with texts or cultural practices prior to 1800. For students with M.A. degrees the initial three-year sequence may be reduced, depending on previous course work and on the students' plans for doctoral study.

Students in comparative literature must take four of the above-described seminars in comparative literature or in other sections, provided that they be clearly comparative in nature. Comparative literature seminars taken for the first, second, or third literature requirement must be substantially focused upon the relevant language and deal with materials in the original.

Students wishing to take these courses in a literature for which seminars are not regularly offered may substitute independent study courses (298) or undergraduate courses enhanced by additional assignments. To do so, students must demonstrate through prior course work that they have already attained graduate-level competency in the literature and language in question. Approval from the comparative literature graduate advisor and the director of Graduate Studies must be obtained.

The third year is spent taking seminars and preparing for the qualifying examinations. During this year, students will register for two four-unit independent study courses (298). The first will be used to prepare reading lists for the subject-area qualifying examinations and the second will focus on the long paper required for the qualifying examinations.

The qualifying examination is usually taken during the ninth quarter of enrollment. It must be completed by the end of the tenth quarter. The fourth, fifth, and sixth years will be devoted to preparation of the dissertation

Students may write dissertations in any of the fields in which members of the department do research. These fields may include English, American, French, German, Italian, Greek, Latin, Spanish, Chinese, Japanese, Russian, Chicano, Asian-American, and African-American literature, comparative literature, literary theory, women's studies, cultural studies, early modern studies, and composition studies.

Language Requirements

Graduate students are expected to read literary and secondary texts and to follow seminar discussions or lectures in a second language (a language other than the one in which the literature of their intended specialization is written). Students in comparative literature should have in-depth knowledge of a second and third language.

To satisfy the language requirements, students must demonstrate language proficiency via completion of two graduate seminars in the literature of the second language. In addition, comparative literature students must complete one seminar in the literature of the third language. With the approval of the director of Graduate Studies, students may satisfy the language requirement by substituting an upper-division undergraduate course enhanced by additional assignments (grade of A must be

received). If upper-division courses are not available, students may take independent study courses (298) in the language. These options are only allowed when there is no graduate seminar offered in the chosen language.

Students must pass an examination in reading, interpretation, and translation in each of the two (or three in the case of comparative literature) courses taken to satisfy the second language requirement. The language requirements must be satisfied prior to the qualifying examination.

Advancement to Candidacy

Students should choose a Ph.D. advisor no later than the first quarter of the third year. The advisor, in consultation with the student, will form a qualifying examination committee. The student and the qualifying examination committee will jointly determine the nature of the long research paper, (approximately thirty pages) and the two areas of specialization on which the student will be examined in writing. After satisfactory completion of the paper and the written examinations, the student will take a two-hour oral examination. On passing the oral examination, the student is declared eligible for advancement to candidacy for the Ph.D. The C. Phil. degree is conferred upon successful advancement. Students may also be eligible for the M.A. degree upon advancement, if no previous graduate degrees have been awarded.

Students whose preparation for the qualifying examinations or whose performance during the course of the qualifying examinations is deemed unsatisfactory, will not be permitted to continue in the graduate program.

Teaching

The department requires that each Ph.D. student participate in apprentice teaching before the completion of the degree; the minimum amount required is equivalent to the duties expected of a half-time teaching assistant for three academic quarters. This teaching involves conducting, with the guidance and support of a supervising professor, discussion sections and related activities in a variety of freshman and sophomore courses. Academic credit is granted for the training given under the apprentice teaching program.

Grading

The only grading option for literature graduate courses is Satisfactory/Unsatisfactory (S/U). Students receive written evaluations of their performance in seminars. Upper-division undergraduate courses must be taken for a letter grade; students must receive a grade of A to maintain acceptable graduate status and continuation of funding.

DEPARTMENTAL PH.D. TIME LIMIT POLICIES

Students must be advanced to candidacy by the tenth quarter of study. Departmental normative time is six years. Total registered time at UC San Diego cannot exceed eight years.

FINANCIAL SUPPORT

Ph.D. students entering the program with a B.A. may be supported (either by employment or fellowships) for six years. Students who have an M.A. and have been given transfer credit may be supported for five years. Such support depends upon the funds available, the number of students eligible, and the rate of progress.

MASTER'S DEGREE PROGRAM

The requirement for the M.A. degree is completion of forty-eight total units distributed as follows:

1. LTTH 200A, 200B, 200C (twelve units). A required introductory theory sequence generally taken during the first year in the Ph.D. program.
2. Twenty-eight units of graduate seminars. Students may take a maximum of twelve units of enhanced upper-division course work, when graduate seminars are not available in student's specialization. A maximum of eight units may be taken outside of the Department of Literature.
 - Sixteen units of course work in primary literature of concentration.
 - Eight units of course work in secondary literature (in a language other than that of the student's principal concentration).
 - Four units of course work open to the student's choice.
3. Eight units of guided research (LTX 298), culminating in an acceptable written and oral comprehensive examination.

Although Ph.D. students sometimes elect to terminate their studies in our department with a master's degree, we do not admit students to a master's degree program in literature.

Master of Fine Arts Program

The Master of Fine Arts (M.F.A.) in Writing is a two-year residency program that offers a degree in the areas of fiction and poetry, and is designed for students who are interested in innovative and interdisciplinary approaches to narrative and poetics. The program is also distinguished by its commitment to community building, alternative forms of literary distribution, and transborder exchange.

The M.F.A. Program is small, with typically eight new students admitted each year. The intimate nature of the program allows students to work very closely with the writing faculty, as well as to receive support in the form of research assistantships and/or teaching assistantships.

The M.F.A. in Writing is part of the Department of Literature, which also offers a doctoral program in literature that emphasizes cultural studies, gender studies, postcoloniality, and critical theory. The M.F.A. Program co-exists with a thriving undergraduate writing major, and benefits from a long-established reading series and the university's Archive for New Poetry, which holds the papers of George Oppen, Lyn Hejinian, Susan Howe, Alice Notley, James Schuyler, Ron Silliman, and many other important figures. With strong ties to the Departments of Visual Arts, Theatre and Dance, Communication, and Music, and situated at one of the top-rated science campuses in the country, the program encourages

its students to generate writing informed by other disciplines and media. In recognition of the diverse community we serve, our location on the border with Mexico, and the resources offered by our faculty, we look forward to offering bilingual workshops in Spanish and English as the program develops.

The M.F.A. Program in Writing offers students a unique opportunity to develop as writers in a community that integrates a multiplicity of collaborative, interdisciplinary, and theoretical approaches by which to complete a literary project.

Program

The Graduate Program in Writing is a two-year program. The M.F.A. degree is awarded upon the satisfactory completion of at least six quarters of registration, seventy-two units of required course work, a preliminary reading or presentation after the first year, a completed manuscript or project, and a final reading or presentation.

1. Four-unit course in Writing and Theory.
2. Four-unit course in Modern Art Movements and Aesthetics.
3. Twelve units of graduate seminars (or upper-division course in literature or guided independent study) in literature.
4. Twenty units of writing workshops within a specific genre or in a combination of genres.
5. Four to twelve units of graduate-level courses in either an art practice or theory outside of the writing program. This could be in visual arts, music, or theatre, or in graduate seminars offered by the Department of Literature in a language other than English.
6. Eight to twelve units of guided research culminating in an acceptable manuscript of poetry, fiction, or creative nonfiction (which may include collaboration with other genres or media). A discussion of no more than one hour follows submission of the manuscript.
7. Twelve units of apprentice teaching and/or research assistantship at UCSD.

Additional program information available on the department Web site (<http://literature.ucsd.edu/grad/mfawriting/>).

Admission

The following are requirements for admission to the M.F.A. program:

1. A baccalaureate degree from an accredited institution of higher education, with training comparable in standard and content to that provided by the University of California. Official transcripts are required.
2. Satisfactory score on the Test of English as a Foreign Language (international applicants only).
3. Writing sample.
4. Three letters of recommendation.

Additional information is available on the department Web site (<http://literature.ucsd.edu/grad/mfawriting/>). Completed applications and support-

ing materials must be received by the application deadline for admission the following fall quarter.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

CHINESE LITERATURE

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTCB 101. Readings in Contemporary Chinese Literature (4)

Intended for students who have the competence to read contemporary Chinese texts, poetry, short stories, and criticism in vernacular Chinese. May be repeated for credit as topics vary.

COMPARATIVE LITERATURE

GRADUATE

PREREQUISITE: graduate standing or consent of instructor.

LTCO 202C. History of European Criticism and Aesthetics (4)

A core course for comparative literature, strongly recommended for all graduate students in the comparative literature program. A historical survey of criticism and aesthetics divided as follows: 202C, Romanticism to late nineteenth century.

LTCO 210. Classical Studies (4)

Analysis of significant works of the Greek and Roman traditions, with attention to their interest for later European literature. May be repeated for credit as topics vary.

LTCO 214. The Bible and Critical Theory (4)

Reading biblical texts (Hebrew Bible and New Testament) from the perspective of different theoretical methods in literary criticism and cultural studies. Theoretical coverage will vary but may include, for example, postmodernist, postcolonialist, psychoanalytic, gender, and ideological readings of biblical texts.

LTCO 252. Modernism (4)

A sample investigation into the concept of period. Will deal with the question of the existence of modernism, the description of the phenomenon, and the causes to which it is to be attributed. May be repeated for credit as topics vary.

LTCO 274. Genre Studies (4)

A consideration of a representative selection of works relating to a theme, form, or literary genre. May be repeated for credit as topics vary.

LTCO 281. Literature and Film (4)

A study of literature and film in relation to one another, to critical and aesthetic theories, and to historical context. May be repeated for credit when topics vary.

LTCO 282. Literature and Philosophy (4)

Questions and problems from the history of philosophy or from the various fields of philosophy (e.g., epistemology, ethics, logic) in their interaction with intellectual issues and questions addressed by literary criticism and theory. Repeatable for credit when topics vary.

LTCO 283. Literature and Political Philosophy (4)

An inquiry into philosophical texts viewed as influential in comparative literature and political science (Plato, Aristotle, Augustine, Aquinas, Machiavelli, More, Hobbes, Locke, Hume, Kant, Herder, Hegel, Nietzsche, Kojeve, Foucault, Rawls, et al.). May be repeated for credit as topics vary.

LTCO 284. Literature and Ethics (4)

The longstanding relationship of literary studies and ethics or the arts of life. From Plato, Aristotle, Renaissance treatises, Kant to Foucault and others. May be repeated for credit as topics vary.

LTCO 285. Literature and Aesthetics (4)

Research in literary theory and aesthetic philosophies. Single and multiple authors and topics; Plato and Aristotle, Renaissance treatises, Winckleman, Kant and Hegel in the Enlightenment, Warburg, Heidegger and Panofsky, contemporary art theory, et al. May be repeated for credit as topics vary.

LTCO 286. Topics in Islam and Modernity (4)

A survey of developments in the Islamic world during the period of European colonial domination and its aftermath, with special attention to the works of leading Muslim thinkers (e.g., Sayid Ahmed Khan, Muhammad Abduh, Hasan al Banna, Ruhallah Khomeini, among others). May be repeated for credit as topics vary.

LTCO 287. Culture and Political Theory (4)

A comparative approach of political theory based on historical periods (with the tools of new historicism), various cultures (inspired by anthropological research), and referring to the most important philosophical thinkers from Western and non-Western traditions. May be repeated for credit as topics vary.

LTCO 289. History of the Book (4)

Questions and problems from the history of the book, the history of libraries, materialist bibliography, epistemology, as they relate to literary scholarship and theory. May be repeated for credit as topics vary.

LTCO 295. M.A. Thesis (1–8)

Research for the master's thesis. Opened for repeated registration up to eight units. (Satisfactory/Unsatisfactory grades only.) **Prerequisite:** enrolled in M.A. program.

LTCO 296. Research Practicum (1–12)

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

LTCO 297. Directed Studies: Reading Course (1–12)

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

LTCO 298. Special Projects: Writing Course (1–12)

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

LTCO 299. Dissertation (1–12)

Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

LITERATURE/CULTURAL STUDIES

LOWER-DIVISION

LTCS 50. Introduction to Cultural Studies (4)

An introduction to cultural studies with a focus on the following areas: literary and historical studies, popular culture, women's studies, ethnic studies, science studies, and gay/lesbian studies. Particular emphasis on the question of "cultural practices" and their social and political conditions and effects.

LTCS 52. Topics in Cultural Studies (4)

This course is designed to complement LTCS 50, Introduction to Cultural Studies. In this course, cultural studies methods are further introduced and applied to various concrete topics in order to illustrate the practical analysis of culture and cultural forms.

LTCS 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen. **Prerequisites:** none.

LTCS 98. Directed Group Studies (4)

Directed group study on a topic or in a field not included in the regular department curriculum by special arrangement with a faculty member. (P/NP only.) **Prerequisites:** lower-division standing, completion of at least thirty units of undergraduate study at UCSD, minimum 3.0 GPA at UCSD, consent of instructor, and completed and approved Special Studies form.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTCS 100. Theories and Methods in Cultural Studies (4)

Reading in some of the major theoretical texts that have framed work in cultural studies, with particular emphasis on those drawn from critical theory, studies in colonialism, cultural anthropology, feminism, semiotics, gay/lesbian studies, historicism, and psychoanalytic theory.

LTCS 102. Practicing Cultural Studies (4)

Survey and application of methods central to cultural studies as a critical social practice, examining the relationship between cultural studies and social transformation. Students will study varieties of material culture, and experiment with techniques of reading, interpretation, and intervention.

LTCS 110. Popular Culture (4)

A reading of recent theory on popular culture and a study of particular texts dealing with popular cultural practices, both contemporary and noncontemporary, as sites of conflict and struggle. Repeatable for credit when topics vary.

LTCS 111. Special Topics in Popular Culture in Historical Context (4)

Exploration of forms of popular culture in different historical and geographical contexts. Topics may include: folklore, dime novels and other types of popular literature, racial performances, popular religions, theatrical melodrama, photojournalism, and early film. Repeatable for credit when readings and focus vary.

LTCS 115. Performance Culture (4)

An investigation of different types of performances such as theatrical genres ranging from melodrama and minstrelsy to various cultural rituals and speech acts. From the perspective of literary studies, performance studies, postcolonial theory, ethnography and theatre history, the course explores race, gender, sexuality, and nation through performance.

LTCS 118. Comedy (4)

Comedy in fiction and film from ancient times to contemporary, including the Bible, Aristophanes, Shakespeare, and modern writers and film makers.

LTCS 120. Historical Perspectives on Culture (4)

The course will explore the relation among cultural production, institutions, history, and ideology during selected historical periods. In considering different kinds of texts, relations of power and knowledge at different historical moments will be discussed. Repeatable for credit when topics vary.

LTCS 125. Cultural Perspectives on Immigration and Citizenship (4)

Introduction to the studies of cultural dimensions of immigration and citizenship. Examines the diverse cultural texts—literature, law, film, music, the televisual images, etc., that both shape and are shaped by immigration and the idea of citizenship in different national and historical contexts.

LTCS 130. Gender, Race/Ethnicity, Class, and Culture (4)

The course will focus on the representation of gender, ethnicity, and class in cultural production in view of various contemporary theories of race, sex, and class. Repeatable for credit when topics vary.

LTCS 131. Topics in Queer Cultures/ Queer Subcultures (4)

This course examines the intersection of sex, sexuality, and popular culture by looking at the history of popular representations of queer sexuality and their relation to political movements for gay and lesbian rights. Repeatable for credit when readings and focus vary.

LTCS 132. Special Topics in Social Identities and the Media (4)

A study of media representation and various aspects of identity, such as gender, sexuality, race, ethnicity, social class, culture, and geopolitical location. Students will consider the various media of film, television, alternative video, advertising, music, and the Internet. Repeatable for credit when readings and focus vary.

LTCS 133. Globalization and Culture (4)

Studies of cultural dimensions of immigration and citizenship. This course examines the diverse cultural texts—literature, law, film, music, the televisual images, etc., that both shape and are shaped by immigration and the idea of citizenship in different national and historical contexts.

LTCS 135. Interdisciplinary Approaches to Lesbian, Gay, Bisexual, and Transgender Studies (4)

Introduction to interdisciplinary examination of human sexuality and, especially, lesbian, gay, bisexual, and transgender identities and desires. Juxtaposes perspectives from humanities, social sciences, and natural sciences. Introduces queer theory to understand sexuality in relation to phenomena such as government, family, culture, medicine, race, gender, and class.

LTCS 141. Special Topics in Race and Empire (4)

The role of race and culture within the history of empires; may select a single empire for consideration, such as France, Britain, U.S., or Japan, or choose to examine the role of race and culture in comparative histories of colonialism. Repeatable for credit when readings and focus vary.

LTCS 145. National Cultures in Colonial and Postcolonial Contexts (4)

Studies of emergence of national cultures under colonial rule and their transformations in the process of decolonization. Investigation of ideological constructions of such cultural institutions as modern national language, national history and historiography, national literary canon, and folk literature and culture.

LTCS 150. Topics in Cultural Studies (4)

The course will examine one or more forms of cultural production or cultural practice from a variety of theoretical and historical perspectives. Topics may include: contemporary debates on culture, genres of popular music/fiction/film, AIDS and culture, the history of sexuality, subcultural styles, etc. Repeatable for credit when topics vary.

LTCS 160. Cultural Studies Approaches to Popular Music (4)

An investigation of different types of popular music genres, cultures, and practices such as hip hop, punk rock, R&B, jazz, country, and dance music cultures. From the perspective of ethnography and cultural and performance studies, the course explores race, gender, sexuality, and the negotiations of local, as well as national communities and subcultures via popular music.

LTCS 165. Special Topics: The Politics of Food

This course will examine the representation and politics of food in literary and other cultural texts. Topics may include: food and poverty, the fast food industry, controversies about seed, sustainable food production, myths about hunger, eating and epistemology, aesthetics, etc. Repeatable for credit up to three times when topics vary.

LTCS 170. Visual Culture (4)

The course will focus on visual practices and discourses in their intersection and overlap, from traditional media, print,

and photography to film, video, TV, computers, medical scanners, and the Internet.

LTCS 171. Topics in Television and Popular Media (4)

Examining the relationship between television and national culture, students will study the emergence of TV as a domestic technology, the history of race and gender in television programming, and the global politics of television distribution. Repeatable for credit when readings and focus vary.

LTCS 172. Special Topics in Screening Race/ Ethnicity, Gender and Sexuality (4)

Exploring both Hollywood and international filmmaking, an exploration of screen representations with attention to race/ethnicity, gender, and sexuality in different historical and linguistic contexts. Historical periods may extend from silent, through wartime and cold war, to contemporary era of globalization. Repeatable for credit when readings and focus vary.

LTCS 173. Topics in Violence and Visual Culture (4)

This course focuses on the critical study of representations of violence, such as war, genocide, sexual violence, and crime, across a range of media, including literature, film, photography, and other forms of visual culture. Repeatable for credit when readings and focus vary.

LTCS 192. Senior Seminar in Literatures in Cultural Studies (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

LTCS 198. Directed Group Study (4)

Directed group research, under the guidance of a member of the faculty, in an area not covered in courses currently offered by the department. (P/NP only.) **Prerequisite:** permission of the department.

LTCS 199. Special Studies (2 or 4)

Individual reading in an area not covered in courses currently offered by the department. (P/NP only.) **Prerequisite:** permission of the department.

GRADUATE

PREREQUISITE: graduate standing or consent of instructor.

LTCS 201. Theories and Methods of Analysis in Cultural Studies (4)

Contemporary theories of cultural studies. The seminar will concentrate on major interpretive approaches drawn from several areas of cultural and political analysis, including historicism, Marxist theory, feminism, structuralism, psychoanalytic theory, semiotics, postmodernist studies, gay and lesbian studies, and others. The particular focus and approach may vary. Repeatable for credit.

LTCS 210. History and Culture (4)

This seminar will focus on the cultural practices of a particular historical period as a means of analyzing the relation between culture/ideology and economic and political modes of production and domination. Topic, historical period, and theoretical approach may vary. Repeatable for credit.

LTCS 220. Film/TV/Video Studies (4)

The seminar will concentrate on genres or subgenres within film/TV/video studies or on a stand of film/TV/video theory. Possible topics may include: horror film, melodrama, sitcoms/soaps/talk shows, music videos, black or queer cinema, etc. Repeatable for credit.

LTCS 222. Topics in Theory and History of Film (4)

This course will consider various theoretical approaches to film texts (historical-materialist, feminist, psychoanalytic, semiotic) as well as the history of film, the political economy of film production and distribution, exhibition practices,

and spectatorship in national and transnational contexts. Repeatable for credit when topics vary.

LTCS 225. Interdisciplinary and Historical Analysis of Cultural Texts (4)

The seminar will focus on a particular historical period and examine a variety of cultural texts vis-a-vis related historical, economic, political, and sociological discourses. The conjunction and disjunction of approaches will be explored in relation to specific texts. Repeatable for credit.

LTCS 250. Topics in Cultural Studies (4)

This seminar will be organized around any of various topic areas relating to cultural studies. These might include studies in colonialism, historicism, gender, sexuality, social institutions, popular culture, subaltern practices, etc. May be repeated for credit as topics vary.

LTCS 255. Cultural Studies, Colonialism, and Decolonialism (4)

This course considers different approaches to the study of colonialism in a variety of national contexts. Educational, legal, religious, military, and cultural apparatuses of colonialism, theories of decolonization, the "postcolonial" and feminist critiques of "modernity"/modernization will also be studied. May be repeated for credit when topics vary.

LTCS 256. Cultural Studies of Technoscience (4)

The course will explore work in cultural studies, feminist studies, and queer theory of scientific practices altering social relations, cultural identities, and conceptions of "nature." Issues may include the AIDS pandemic, genetic research, electronic communities, reproductive technologies, and other topics. May be repeated for credit when topics vary.

LTCS 260. National Cultures (4)

Selected topics on the construction of national cultural identities. Investigation of the dynamics of canon formation and nation building in specific historical contexts. May be repeated for credit when topics vary.

LTCS 296. Research Practicum (1-12)

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

LTCS 297. Directed Studies: Reading Course (1-12)

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

LTCS 298. Special Projects: Writing Course (1-12)

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral proResearch toward the dissertation. Open only to Ph.D. students who have advanced to candidacy. Repeatable for credit.

LITERATURES IN ENGLISH

LOWER-DIVISION

LTEN 21. Introduction to the Literature of the British Isles: Pre-1660 (4)

An introduction to the literatures written in English in Britain before 1660, with a focus on the interaction of text and history.

LTEN 22. Introduction to the Literature of the British Isles: 1660-1832 (4)

An introduction to the literatures written in English in Britain and Ireland between 1660 and 1832, with a focus on the interaction of text and history.

LTEN 23. Introduction to the Literature of the British Isles: 1832-Present (4)

An introduction to the literatures written in English in Britain, Ireland, and the British Empire (and the former British Empire) from 1832 to the present, with a focus on the interaction of text and history.

LTEN 25. Introduction to the Literature of the United States, Beginnings to 1865 (4)

An introduction to the literatures written in English in the United States from the beginnings to 1865, with a focus on the interaction of text and history.

LTEN 26. Introduction to the Literature of the United States, 1865 to the Present (4)

An introduction to the literatures written in English in the United States from 1865 to the present, with a focus on the interaction of text and history.

LTEN 27. Introduction to African American Literature (4)

A lecture discussion course that examines a major topic or theme in African American literature as it is developed over time and across the literary genres of fiction, poetry, and belles lettres. A particular emphasis of the course is how African American writers have adhered to or departed from conventional definitions of genre.

LTEN 28. Introduction to Asian-American Literature (4)

This course provides an introduction to the study of the history, communities, and cultures of different Asian-American people in the United States. Students will examine different articulations, genres, conflicts, narrative forms, and characterizations of the varied Asian experience.

LTEN 29. Introduction to Chicano Literature (4)

This course provides an introduction to the literary production of the population of Mexican origin in the United States. Students will examine a variety of texts dealing with the historical (social, economic, and political) experiences of this heterogeneous population.

LTEN 60. Topics in Ethnic American Literature (4)

A lecture and discussion course that critically examines the literary and cultural production emerging out of racialized, ethnic, and immigrant communities in the United States. Course may include fiction, poetry, novels, plays, popular culture, and film.

LTEN 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen. **Prerequisites:** none.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTEN 104. Literatures of Medieval England (4)

Lecture/discussion course focusing on literature written in England before 1500. Topics may include themes (e.g., gender, social critique) or focus on specific genre (drama, romance, religious literature). May be repeated for credit when topics vary.

LTEN 107. Chaucer (4)

A study of Chaucer's poetic development, beginning with *The Book of the Duchess* and *The Parliament of Fowls*, including *Troilus and Criseyde*, and concluding with substantial selections from *The Canterbury Tales*.

LTEN 110. The Renaissance: Themes and Issues (4)

Major literary works of the Renaissance, an exciting period of social and cultural transformation in England as elsewhere in Europe. Topics may include a central theme (e.g., humanism, reformation, revolution), a genre (e.g., pastoral), or comparison with other arts and sciences.

LTEN 112. Shakespeare I: The Elizabethan Period (4)

A lecture/discussion course exploring the development of Shakespeare's dramatic powers in comedy, history, and tragedy, from the early plays to the middle of his career. Dramatic forms, themes, characters, and styles will be studied in the contexts of Shakespeare's theatre and his society.

LTEN 113. Shakespeare II: The Jacobean Period (4)

A lecture/discussion course exploring the rich and varied achievements of Shakespeare's later plays, including the major tragedies and late romances. Dramatic forms, themes, characters, and styles will be studied in the contexts of Shakespeare's theatre and his society.

LTEN 114. Shakespeare III: Stage, Film, and Television (4)

A lecture/discussion/laboratory course involving the close study of six to eight plays representative of Shakespeare's artistic career with particular emphasis upon the interrelation of Elizabethan plays and the stage and the critical implications of transposing plays to film and television. (Generally offered in summer session only.)

LTEN 115A. The Sixteenth Century: Themes and Issues (4)

Selected topics concerned with sixteenth-century English literature as a whole.

LTEN 117A. The Seventeenth Century: Themes and Issues (4)

Selected topics in English literature during a period of social change, religious controversy, emergence of the "New Science", and the English Civil War. Readings chosen from writers including Jonson, Donne, Bacon, Milton, Marvell, and Dryden, among others. Repeatable for credit.

LTEN 118. Milton (4)

A critical examination of the major works, including *Paradise Lost*, by an author who was both a central figure in English political life in a revolutionary age and, in the view of most critics, the greatest non-dramatic poet in the English language. The course will study his poetic development in a variety of historical contexts.

LTEN 119. Restoration Literature (4)

The literature of a period following twenty years of civil war and revolution which saw the reopening of theatres and the rise of the professional writer. Topics may include Restoration comedy and tragedy; satire; neoclassical literary theory.

LTEN 120A. The Eighteenth Century: Themes and Issues (4)

Selected topics in English literature during an age of satiric writing, the shift from neoclassicism to romanticism, the emergence of the novel, and the expansion of the reading and writing public among the middle class and women. Writers such as Defoe, Pope, Swift, Richardson, Johnson, Burney, Wollstonecraft. May be repeated for credit when topics vary.

LTEN 124. The Nineteenth Century: Themes and Issues (4)

Selected topics in nineteenth-century British literature and culture, drawing on both romantic and Victorian periods: e.g., relationships between literature and imperialism, social and political debate, gender issues, religion, or science; or continuities between romantic and Victorian authors.

LTEN 125A. Romanticism: Themes and Issues (4)

Selected topics concerned with the romantic period as a whole.

LTEN 125B. First Generation Romantic Poets (4)

The poets who came of age during the French Revolution and who inaugurated literary modes that continue in our own time: Wordsworth, Coleridge, Blake, and their contemporaries.

LTEN 125C. Second Generation Romantic Poets (4)

Byron, Keats, Shelley, and their contemporaries.

LTEN 127A. The Victorian Period: Themes and Issues (4)

Selected topics concerned with Victorian literature as a whole.

LTEN 127B. Victorian Poetry (4)

Tennyson, Browning, Arnold, Clough, Hopkins, and their contemporaries.

LTEN 130. Modern British Literature (4)

Selected topics concerned with modern British literature; study of various authors, issues, and trends in literatures of the British Isles from the mid-1850s through the end of

the twentieth century. Repeatable for credit when topics vary. (Replaces the former LTEN 130A and 130B)

LTEN 132. Modern Irish Literature (4)

The Irish Revival and its aftermath: Yeats, Synge, O'Casey, Joyce, Beckett, and their contemporaries. Repeatable for credit when topics vary.

LTEN 134. Twentieth-Century British Poetry (4)

Survey of many poets of the United Kingdom including Scotland and Ireland. Included: War poems (1914–18, 1940–45), '30s poems of social commitment, the Movement (1950s), recent postmodern figures (Hughes, Prynne).

LTEN 140. The Early Nineteenth-Century British Novel (4)

Includes the work of Jane Austen, Charlotte Bronte, Emily Bronte, Mary Shelly, and Charles Dickens.

LTEN 141. The High Victorian Novel (4)

Dickens, Thackeray, Trollope, Charlotte Bronte, Emily Bronte.

LTEN 142. The End of Victorianism (4)

The work of Robert Louis Stevenson, H.G. Wells, Thomas Hardy, Rudyard Kipling, and Joseph Conrad.

LTEN 143. The English Novel in the Eighteenth Century (4)

This course studies the writing of the novel in the eighteenth century. The focus of the course may be an introduction to selected major writers and texts, or a particular issue or problem in the literary and social history of the novel. May be repeated for credit when topics vary.

LTEN 144. The English Novel in the Nineteenth Century (4)

This course studies the writing of the novel in English during the nineteenth century. The focus of the course may be a survey of the nineteenth century (an introduction to selected major writers and texts), or a particular issue or problem in the literary and social history of the novel. May be repeated for credit when topics vary.

LTEN 145. The English Novel in the Twentieth Century (4)

This course studies the writing of the novel in English during the twentieth century. The focus of the course may be an introduction to selected major writers and texts, or a particular issue or problem in the literary and social history of the novel. May be repeated for credit when topics vary.

LTEN 146. Women and English/American Literature (4)

Selected topics concerning women and anglophone literature. Topics include women writers, the literary representation of women, and women as readers. May be repeated for credit when topics vary.

LTEN 148. Genres in English and American Literature (4)

An examination of one or more genres in English and/or American literature, for example, satire, utopian fiction, autobiography, landscape poetry, the familiar essay. May be repeated for credit as topics vary.

LTEN 149. Themes in English and American Literature (4)

A consideration of one of the themes that recur in many periods of English or American literature, for instance, love, politics, the role of women in society. May be repeated for credit as topics vary.

LTEN 150. Gender, Text, and Culture (4)

This course studies representations of the sexes and of their interrelationship in various forms of writing produced during different phases of English history. Emphasis will be placed upon connections of gender and of literature to other modes of social belief, experience, and practice. Repeatable for credit when topics vary.

LTEN 151. Topics: Literature and the Environment (4)

This course will explore the vital relationship between literature and the environment, investigating how literary representations of the land and/or its nonhuman inhabitants at different historical periods have influenced attitudes toward the natural world. May be taken for credit three times as topics vary.

LTEN 152. The Origins of American Literature (4)

Studies in American writing from the Puritans to the early national period (1620–1830), with emphasis on the thrust and continuity of American culture, social and intellectual, through the beginnings of major American writing in the first quarter of the nineteenth century.

LTEN 153. The Revolutionary War and the Early National Period in U.S. Literature (4)

A critical examination of how writing of various kinds—political, philosophical, and literary—functioned in the construction of the political body of the new American republic and the self-conception of its citizens.

LTEN 154. The American Renaissance (4)

A study of some of the chief works, and the linguistic, philosophical, and historical attitudes informing them, produced by such authors as Emerson, Hawthorne, Melville, Dickinson, and Whitman during the period 1836–1865, when the role of American writing in the national culture becomes an overriding concern.

LTEN 155. Interactions Between American Literature and the Visual Arts (4)

An exploration of the parallels between the work of individual writers, or movements, in American literature and the style and content of the work of certain visual artists. The writers studied are always American; the artists or art movements may represent non-American influences on these American writers. May be repeated for credit as topics vary.

LTEN 156. American Literature from the Civil War to World War I (4)

A critical examination of works by such authors as Mark Twain, Henry James, Kate Chopin and Edith Wharton, who were writing in an age when the frontier was conquered and American society began to experience massive industrialization and urbanization.

LTEN 158. Modern American Literature (4)

A critical examination of American literature in several genres produced between the turn of the century and World War II. Attention will be given to historical and cultural contexts for defining American modernism. Repeatable for credit when topics vary.

LTEN 159. Contemporary American Literature (4)

A critical examination of American literature in several genres produced since World War II. Attention will be given to historical and cultural contexts for defining American postmodernism. Repeatable for credit when topics vary.

LTEN 160. Ideas and Photographic Images in American Culture (4)

Relate the history of photography in America to the history of ideas in American culture. It assumes that photographers think in images and through their images participate in cultural discourse. Repeatable for credit when topics vary.

LTEN 172. American Poetry II—Whitman through the Modernists (4)

Reading and interpretation of American poets from Whitman through the principal modernists—Pound, H.D., Eliot, Moore, Stevens, and others. Lectures will set the appropriate context in sociocultural and literary history.

LTEN 174. American Fiction II—Since Middle James (4)

Reading and interpretation of American fiction from Henry James through the principal modernists—Fitzgerald, Stein, Welty, Faulkner, and others. Lectures will set the appropriate context.

LTEN 175A. New American Fiction—Post-World War II to the Present (4)

Reading and interpretation of American fiction from the mid-1940s to the present. Lectures will set the appropriate context in sociocultural and literary history. May be repeated for credit when topics vary.

LTEN 175B. New American Poetry—Post-World War II to the Present (4)

Reading and interpretation of American poets whose work has made its major impact since the last war, for instance Charles Olson, Robert Creeley, Denise Levertov, Adrienne Rich, Allen Ginsberg, Frank O'Hara, and John Ashbery.

Lectures will set the appropriate context in sociocultural and literary history. May be repeated for credit as topics vary.

LTEN 176. Major American Writers (4)

A study in depth of the works of major American writers. May be repeated for credit as topics vary.

LTEN 177. California Literature (4)

Reading and interpretation of such novelists as London, Norris, Steinbeck, West, and Didion and such poets as Jeffers, Rexroth, Everson, Duncan, and Snyder. May be repeated for credit as topics vary.

LTEN 178. Comparative Ethnic Literature (4)

A lecture-discussion course that juxtaposes the experience of two or more U.S. ethnic groups and examines their relationship with the dominant culture. Students will analyze a variety of texts representing the history of ethnicity in this country. Topics will vary.

LTEN 180. Chicano Literature in English (4)

Introduction to the literature in English by the Chicano population, the men and women of Mexican descent who live and write in the United States. Primary focus on the contemporary period.

LTEN 181. Asian American Literature (4)

Selected topics in the literature by men and women of Asian descent who live and write in the United States. Repeatable for credit when topics vary.

LTEN 182. African-American Humor (4)

African-American humor has historically been divided, consisting of that created by and for a black audience, and that performed for a white audience. We will investigate the origins of this division, and the ways in which African-American humor has shaped American culture, from ca. eighteenth century to today.

LTEN 183. African American Prose (4)

Analysis and discussion of the novel, the personal narrative, and other prose genres, with particular emphasis on the developing characteristics of African American narrative and the cultural and social circumstances that influence their development.

LTEN 184. African American Poetry (4)

Close reading and analysis of selected works of African American poetry as they reflect styles and themes that recur in the literature.

LTEN 185. Themes in African American Literature (4)

An intensive examination of a characteristic theme, special issue, or period in African American literature. May be repeated for credit when topics vary.

LTEN 186. Literature of the Harlem Renaissance (4)

The Harlem Renaissance (1917–39) focuses on the emergence of the "New Negro" and the impact of this concept on black literature, art, and music. Writers studied include Claude McKay, Zora N. Hurston, and Langston Hughes. Special emphasis on new themes and forms.

LTEN 187. Black Music/Black Texts: Communication and Cultural Expression (4)

Explores roles of music as a traditional form of communication among Africans, Afro-Americans, and West-Indians. Special attention given to poetry of black music, including blues and other forms of vocal music expressive of contestatory political attitudes.

LTEN 188. Contemporary Caribbean Literature (4)

This course will focus on contemporary literature of the English-speaking Caribbean. The parallels and contrasts of this Third World literature with those of the Spanish- and French-speaking Caribbean will also be explored.

LTEN 189. Twentieth-Century Postcolonial Literatures (4)

The impact of British colonialism, national independence movements, postcolonial cultural trends, and women's movements on the global production of literary texts in English. Course is organized by topic or geographical/historical location. May be repeated for credit when topics vary.

LTEN 190. Seminars (4)

These seminars are devoted to a variety of special topics, including the works of single authors, genre studies, problems in literary history, relations between literature and the history of ideas, literary criticism, literature and society, and the like. The student may enroll in more than one section in a single quarter.

LTEN 192. Senior Seminar in Literatures in English (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisite:** department stamp and/or consent of instructor.

LTEN 196. Honors Thesis (4)

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTWL 191. Oral exam. **Prerequisites:** department approval.

LTEN 198. Directed Group Study (4)

Research seminars and research, under the direction of a member of the faculty. May be repeated for credit three times. (P/NP grades only.) **Prerequisite:** department approval.

LTEN 199. Special Studies (2 or 4)

Tutorial; individual guided reading in an area not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) **Prerequisite:** department approval.

GRADUATE

PREREQUISITE: graduate standing or consent of instructor.

LTEN 214. Topics in Middle English Literature (4)

Consideration of one or more major figures, texts, or trends in Middle English literature. May be repeated for credit as topics vary.

LTEN 222. Elizabethan Studies (4)

Selected topics in the study of literary, dramatic, and other Elizabethan cultural texts. Emphasis will be upon articulations among a range of discourses, practices, and institutions. May be repeated for credit when topics vary.

LTEN 231. Restoration and Eighteenth-Century English Literature (4)

Consideration of one or more figures, texts, or trends in Restoration and eighteenth-century English literature, including Dryden, Pope, Swift, the early novel, satire. May be repeated for credit as topics vary.

LTEN 243. Early American Literature and Culture (4)

Consideration of one or more major figures, texts, or trends in Colonial and/or Revolutionary period American Literature, in particular, the relationship between literature and culture.

LTEN 245. Nineteenth-Century American Studies (4)

Consideration of some of the principal writers and movements in nineteenth-century American literature. May be repeated for credit as topics vary.

LTEN 246. Victorian Literature (4)

Consideration of one or more major figures, texts, or trends in the Victorian period. May be repeated for credit as topics vary.

LTEN 252. Studies in Modern American Literature and Culture (4)

Consideration of one or more major figures, texts, or trends in American literature, in particular the relationship between literature and culture. May be repeated for credit as topics vary.

LTEN 254. Topics in U.S. Minority Literatures and Cultures (4)

Consideration of one or more topics in "minority" traditions of cultural production in the United States, with an

emphasis on the relationship among history, politics, and culture. May be repeated for credit as topics vary.

LTEN 255. Studies in Anglo-American Modernism (4)

A seminar on general topics relating to the study of modernism, utilizing cross-cultural, transnational approaches. Although individual literary texts may provide the focus, this seminar will investigate theoretical and methodological issues relating to modernist cultural studies in general.

LTEN 256. Postcolonial Discourses (4)

A survey of selected responses to imperialism and colonialism as presented in cultural texts produced by colonized or once-colonized peoples. Related issues to be examined: gender dynamics, class, representing others, mimicry, language, cultural theory, and the politics of literary genres. May be repeated for credit when topics vary.

LTEN 258. Studies in Anglophone African and/or African Diaspora Literature and Culture (4)

Consideration of one or more major figures, texts, performance or trends in literature and culture of Africa and/or the African Diaspora. Various theories and methodologies may be applied to the representations being studied. Repeatable for credit as topics vary.

LTEN 259. Transnational Literary Studies (4)

New developments in the study of literature in diverse frameworks, including but not limited to: globalization, queer theory, diaspora studies, environmentalism, world literary systems, international literary awards, transnational feminism, literary markets, human rights discourse, and translation studies.

LTEN 271. Genres in English (4)

Consideration of one or more genres present in English and/or American literature; for instance, the ballad, landscape poetry, comedy, satire, the familiar essay. May be repeated for credit when topics vary.

LTEN 272. Cultural Traditions in English (4)

The study of writing produced over an extended period of time by members of an identifiable cultural formation as defined, e.g., by political/social ideology, class, religion, ethnicity, or sexual preference. May be repeated for credit when topics vary.

LTEN 281. Practicum in Literary Research and Criticism (4)

This course will focus on strategies for framing, organizing, and drafting projects in literary research. Students will study and apply various forms of literary methodology and will learn about recent developments in bibliography, textual editing, and research. May be repeated twice for credit as topics vary.

LTEN 295. M.A. Thesis (1-8)

Research for the master's thesis. Opened for repeated registration. **Prerequisite:** must be enrolled in M.A. program.

LTEN 296. Research Practicum (1-12)

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

LTEN 297. Directed Studies: Reading Course (1-12)

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

LTEN 298. Special Projects: Writing Course (1-12)

Similar to a 297, but a paper is required. Papers are usually on subject not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

LTEN 299. Dissertation (1-12)

Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

LITERATURES IN FRENCH

LOWER-DIVISION

Language and Literature Courses

Ordinarily, students entering the French literature program elect one of the following sequences: LTFR 2A, 2B, and 2C; or 2A, 2B, and 50.

LTFR 2A. Intermediate French I (5)

First course in a three-quarter sequence designed to prepare students for upper-division French courses. The course is taught entirely in French and emphasizes the development of reading ability, listening comprehension, and conversational and writing skills. Basic techniques of literary analysis. **Prerequisites:** LIFR 1C/CX or its equivalent, score of 3 on French language AP exam or consent of instructor.

LTFR 2B. Intermediate French II (5)

Second course in a three-quarter sequence designed to prepare students for upper-division French courses. The course is taught entirely in French and emphasizes the development of reading ability, listening comprehension, and conversational and writing skills. Basic techniques of literary analysis. **Prerequisites:** LTFR 2A or its equivalent, score of 4 on French language or score of 3 on French literature AP exams or consent of instructor.

LTFR 2C. Intermediate French III: Composition and Cultural Contexts (4)

Designed to improve writing and conversational skills. Develop written expression in terms of organization or ideas, structure, vocabulary. Grammar review. Discussions of contemporary novel and film. May be taken in lieu of LTFR 50 as a prerequisite for upper-division courses. **Prerequisites:** LTFR 2B or its equivalent, score of 5 on French language or score of 4 on French literature AP exams or consent of instructor.

LTFR 21. Conversation Workshop I (1)

Designed to allow students to practice and develop their oral skills by expanding the vocabulary necessary to discuss abstract ideas and by building up the confidence necessary to participate in literature classes. **Prerequisite:** LIFR 1C/1CX or 1D/1DX or LTFR 2A or LTFR 2B or LTFR 2C or LTFR 50 or consent of instructor.

LTFR 31. Conversation Workshop II (1)

A one-credit, one class-a-week course to develop and maintain oral skills at an advanced level by discussing current cultural issues of the francophone world. **Prerequisite:** LTFR 2B or consent of instructor.

LTFR 50. Intermediate French III: Textual Analysis (4)

Third course in a three-quarter sequence designed to prepare students for upper-division French courses. The course is taught entirely in French and emphasizes the development of reading ability, listening comprehension, and conversational and writing skills. It also introduces the student to basic techniques of literary analysis. **Prerequisites:** LTFR 2B or its equivalent, score of 5 on French language AP exam, or consent of instructor.

LTFR 60A. French for Reading Knowledge I (2)

A course designed for undergraduate and graduate students interested in developing reading skills only. No previous knowledge of French required. Texts are taken primarily from the humanities and social sciences.

LTFR 60B. French for Reading Knowledge II (2)

A continuation of the course for undergraduate and graduate students interested in developing reading skills only. No previous course work in French required, though recommended. Texts are taken primarily from the humanities and social sciences.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. All upper-division courses are taught in French. Additional prerequisites may be specified below.

Students are strongly encouraged to take LTFR 115 and 116 before enrolling in other upper-division French literature courses.

LTFR 115. Themes in Intellectual and Literary History (4)

Course in a two-quarter sequence designed as an introduction to French literature and literary history. Each quarter will center on a specific theme or problem. It is recommended that majors whose primary literature is French take this sequence as early as possible. **Prerequisite:** LTFR 50 or LTFR 2C.

LTFR 116. Themes in Intellectual and Literary History (4)

Course in a two-quarter sequence designed as an introduction to French literature and literary history. Each quarter will center on a specific theme or problem. It is recommended that majors whose primary literature is French take this sequence as early as possible. **Prerequisite:** LTFR 50 or LTFR 2C.

LTFR 121. The Middle Ages and the Renaissance (4)

Major literary works of the Middle Ages and Renaissance as seen against the historical and intellectual background of the period. Medieval texts in modern French translation. May be repeated for credit as topics vary. **Prerequisite:** LTFR 115 or 116.

LTFR 123. Eighteenth Century (4)

Major literary works and problems of the eighteenth century. May be repeated for credit as topics vary. **Prerequisite:** LTFR 115 or 116.

LTFR 124. Nineteenth Century (4)

Major literary works of the nineteenth century. May be repeated for credit as topics vary. **Prerequisite:** LTFR 115 or 116.

LTFR 125. Twentieth Century (4)

Major literary works and problems of the twentieth century. May be repeated for credit as topics vary. **Prerequisite:** LTFR 115 or 116.

LTFR 141. Topics in Literatures in French (4)

Examines one or more periods, themes, authors, and approaches in French literature. Topics will vary with instructor. May be repeated for credit. **Prerequisite:** LTFR 115 or 116.

LTFR 142. Topics in Literary Genres in French (4)

An examination of one or more major or minor genres of French literature: for example, drama, novel, poetry, satire, prose poem, essay. **Prerequisite:** LTFR 115 or 116.

LTFR 143. Topics in Major Authors in French (4)

A study in depth of the works of a major French writer. Recommended for students whose primary literature is French. May be repeated for credit as topics vary. **Prerequisite:** LTFR 115 or 116.

LTFR 144. Topics in Literature and Ideas in French (4)

This course will center on writers or movements of international literary, cultural, or ideological significance. May be repeated for credit when topics vary. **Prerequisite:** LTFR 115 or 116.

LTFR 145. Contemporary Thought in French (4)

Presentation of major currents and debates in contemporary philosophy, linguistics, psychoanalysis, anthropology, and social and feminist theory that have led to major changes in French culture and literary studies. **Prerequisite:** LTFR 115 or 116.

LTFR 164. Topics in Modern French Culture (4)

A course on changing topics such as France during the 60s, contemporary social and cultural structures (the school system, economy, political parties), myths of America in France, etc. May be repeated for credit as topics vary. **Prerequisite:** LTFR 115 or 116.

LTFR 170. Topics in French Film (4)

May include close analysis of films made in the French-speaking world from 1895 to the present; study of film theory, history, criticism; social contexts of films' emergence and changing contexts of reception; particular movements, styles, or individual directors' work. **Prerequisite:** LTFR 115 or 116.

LTFR 192. Senior Seminar in Literatures in French (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

LTFR 196. Honors Thesis (4)

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTWL 191. Oral exam. **Prerequisite:** department approval.

LTFR 198. Directed Group Study (4)

Research seminars and research, under the direction of a member of the faculty. (P/NP grades only.) **Prerequisite:** department approval.

LTFR 199. Special Studies (2 or 4)

Tutorial; individual guided reading in areas of French literature not normally covered in courses. (P/NP grades only.) **Prerequisite:** departmental approval.

GRADUATE

PREREQUISITE: graduate standing or consent of instructor.

LTFR 240. Topics in French Literature (4)

An examination of one or more major topics in French literature. May be repeated for credit when topics vary.

LTFR 295. M.A. Thesis (1-8)

Research for the master's thesis. Opened for repeated registration up to eight units. **Prerequisite:** must be enrolled in M.A. program.

LTFR 296. Research Practicum (1-12)

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

LTFR 297. Directed Studies: Reading Course (1-12)

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

LTFR 298. Special Projects: Writing Course (1-12)

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

LTFR 299. Dissertation (1-12)

Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

LITERATURES IN GERMAN

LOWER-DIVISION

Language and Literature Courses

LTGM 2A. Intermediate German I (5)

LTGM 2A follows the basic language sequence of the Department of Linguistics and emphasizes the development of reading ability, listening comprehension, and conversational and writing skills. The course includes grammar review and class discussion of reading and audio-visual materials. Specifically, the course prepares students for LTGM 2B and 2C. **Prerequisite:** LTGM 1C/1CX or its equivalent or score of 3 on AP German language exam or consent of instructor.

LTGM 2B. Intermediate German II (5)

LTGM 2B is a continuation of LTGM 2A for those students who intend to practice their skills in reading, listening comprehension, and writing on a more advanced level. The literary texts are supplemented by readings from other disciplines as well as audio-visual materials. **Prerequisite:** LTGM 2A or score of 4 on AP German language exam or consent of instructor.

LTGM 2C. Intermediate German III (4)

A course designed for students who wish to improve their ability to speak and write German. Students will read and discuss a variety of texts and films, and complete the grammar review begun in 2A. 2C emphasizes speaking, writing, and critical thinking, and prepares students for upper-division course work in German. **Prerequisite:** LTGM 2B or equivalent or score of 5 on AP German language exam or consent of instructor.

LTGM 60A. German for Reading Knowledge I (2)

A program for graduate and undergraduate students interested in developing reading skills only. No previous knowledge of German required. Texts are taken primarily from the humanities and social sciences, and include selections from publishers' catalogs, scholarly articles, and books.

LTGM 60B. German for Reading Knowledge II (2)

A continuation of the program for graduate and undergraduate students interested in developing reading skills only. No previous knowledge of German required, though recommended. Texts are taken primarily from the humanities and social sciences and include selections from publishers' catalogs, scholarly articles, and books.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTGM 100. German Studies I: Aesthetic Cultures (4)

This course offers an overview of German aesthetic culture in its various forms (literature, film, art, music, and architecture) and methods of analysis. Materials will explore the diversity of aesthetic production from the eighteenth century to the present.

LTGM 101. German Studies II: National Identities (4)

This course offers an overview of issues in contemporary and historical German cultures. How has national identity been constructed in the past? What does it mean to be a German in the new Europe? Materials include fiction, historical documents, films, and the Internet.

LTGM 123. Eighteenth-Century German Literature (4)

Major literary works as seen against the historical and intellectual background of the period. May be repeated for credit when topics vary.

LTGM 126. Twentieth-Century German Literature (4)

Major literary works, authors, or movements of the twentieth century. May be repeated for credit as topics vary.

LTGM 130. German Literary Prose (4)

The development of major forms and modes of German literary prose. May be repeated for credit as topics vary.

LTGM 131. German Dramatic Literature (4)

The development of the drama in German. May be repeated for credit as topics vary.

LTGM 132. German Poetry (4)

The development of major forms and modes of German verse. May be repeated for credit as topics vary.

LTGM 190. Seminars in German Culture (4)

These seminars are devoted to a variety of special topics, including the works of single authors, genre studies, problems in literary history, relations between literature and the history of ideas, literary criticism, literature and society, and the like. May be repeated for credit as topics vary.

LTGM 192. Senior Seminar in Literatures in German (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small

group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisite:** department stamp and/or consent of instructor.

LTGM 196. Honors Thesis (4)

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTWL 191. Oral exam. **Prerequisite:** department approval.

LTGM 198. Directed Group Study (4)

Research seminars and research, under the direction of a member of the faculty. May be repeated for credit. (P/NP grades only.) **Prerequisite:** department approval.

LTGM 199. Special Studies (2 or 4)

Tutorial; individual guided reading in areas of German literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) **Prerequisite:** department approval.

GRADUATE

PREREQUISITE: graduate standing or consent of instructor.

LTGM 242. Nineteenth-Century German Literature (4)

Consideration of one or more major figures, texts, or trends in nineteenth-century German literature. Topic varies. May be repeated for credit.

LTGM 272. Genres, Trends, and Forms (4)

Seminars on literary genres, trends, movements, schools, and on aspects of literary forms and structures in any given era or over a certain period of time. May be repeated for credit as topics vary.

LTGM 295. M.A. Thesis (1)

Research for the master's thesis. Opened for repeated registration up to eight units. **Prerequisite:** must be enrolled in M.A. program.

LTGM 296. Research Practicum (1–12)

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

LTGM 297. Directed Studies: Reading Course (1–12)

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

LTGM 298. Special Projects: Writing Course (1–12)

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

LTGM 299. Dissertation (1–12)

Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

GREEK LITERATURE

(See also listings under "[Classical Studies](#).")

LOWER-DIVISION

LTGK 1. Beginning Greek (4)

Study of ancient Greek, including grammar and reading.

LTGK 2. Intermediate Greek (I) (4)

Continuation of study of ancient Greek, including grammar and reading. **Prerequisite:** LTGK 1 or equivalent.

LTGK 3. Intermediate Greek (II) (4)

Continuation of study of ancient Greek, including grammar and reading of texts. **Prerequisites:** LTGK 1 and 2 or equivalent.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTGK 101. Greek Composition (4)

Greek prose composition. Corequisites: student must be concurrently enrolled in upper-division Literature/Greek course numbered 110 or above.

LTGK 110. Archaic Period (4)

Readings, in Greek, of texts from the archaic period. May be repeated for credit as topics vary. **Prerequisites:** LTGK 1, 2, 3 or equivalent.

LTGK 112. Homer (4)

Readings from the works of Homer. **Prerequisites:** LTGK 1, 2, 3 or equivalent.

LTGK 113. Classical Period (4)

Readings, in Greek, of texts from the fifth and fourth centuries B.C. May be repeated for credit as topics vary. **Prerequisites:** LTGK 1, 2, 3 or equivalent.

LTGK 118. Hellenistic Period (4)

Reading, in Greek, of texts from Hellenistic period. **Prerequisites:** LTGK 1, 2, 3 or equivalent.

LTGK 120. Topics in New Testament Greek (4)

Readings, in Greek, in the Greek New Testament. May be repeated for credit as topics vary. **Prerequisites:** LTGK 1, 2, 3 or equivalent.

LTGK 130. Tragedy (4)

Readings, in Greek, of one or more of the works of the classical tragedians Aeschylus, Sophocles, and Euripides. May be repeated for credit as topics vary. **Prerequisites:** LTGK 1, 2, 3 or equivalent.

LTGK 131. Comedy (4)

Readings, in Greek, of one or more of the works of Aristophanes. May be repeated for credit as topics vary. **Prerequisites:** LTGK 1, 2, 3 or equivalent.

LTGK 132. History (4)

Readings, in Greek, in the works of the ancient historians, including Herodotus, Thucydides, Xenophon, and others. May be repeated for credit as topics vary. **Prerequisites:** LTGK 1, 2, 3 or equivalent.

LTGK 133. Prose (4)

Readings, in Greek, in the works of ancient prose writers. May be repeated for credit as topics vary. **Prerequisites:** LTGK 1, 2, 3 or equivalent.

LTGK 135. Lyric Poetry (4)

Readings, in Greek, of the works of the ancient lyric poets. May be repeated for credit as topics vary. **Prerequisites:** LTGK 1, 2, 3 or equivalent.

LTGK 192. Senior Seminar in Literatures in Greek (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in Literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisite:** department stamp and/or consent of instructor.

LTGK 198. Directed Group Study (4)

Directed group study in areas of Greek literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) **Prerequisite:** department approval.

LTGK 199. Special Studies (2 or 4)

Tutorial; individual guided reading in areas of Greek literature not normally covered in courses. May be repeated

for credit three times. (P/NP grades only.) **Prerequisite:** department approval.

GRADUATE

PREREQUISITE: graduate standing or consent of instructor.

LTGK 297. Directed Studies (1–12)

Guided and supervised reading in a broad area of Greek literature. Offered for repeated registration.

LTGK 298. Special Projects (4)

Treatment of a special topic in Greek literature. Offered for repeated registration.

HEBREW LITERATURE

Please see "[Near Eastern Literatures](#)" under "[Literatures of the World](#)."

LITERATURES IN ITALIAN

LOWER-DIVISION

(See "[Department of Linguistics](#)" for other course offerings in first-year Italian.)

LTIT 1A. The Language of Italian Culture I (4)

A beginning course in Italian language based on cultural texts: a short mystery, short movies, and pop music lyrics. An integrated cultural approach to the study of language that emphasizes conversation, grammar, and dramatic flair. No prior study of Italian required.

LTIT 1B. The Language of Italian Culture II (4)

A continued study of the elements of Italian conversation and grammar based on cultural texts: an opera libretto, a short mystery, short movies. **Prerequisite:** LTIT 1A or consent of instructor.

LTIT 1C. The Language of Italian Culture III (4)

Further study of Italian conversation and grammar based on cultural texts: a short novel, folk music lyrics. Preparation for the second-year Italian literature/language sequence. **Prerequisite:** LTIT 1B or consent of instructor.

LTIT 2A. Intermediate Italian I (5)

A second-year course in Italian language and literature. Conversation, composition, grammar review, and an introduction to literary and nonliterary texts. **Prerequisite:** LTIT 1C or LIIT 1C/1CX or its equivalent or a score of 3 on AP Italian Language and Culture Exam or placement result of 3 or 4 on the Language Placement Exam–Italian or consent of instructor.

LTIT 2B. Intermediate Italian II (5)

Continuation of second-year Italian language and literature. Reading, writing, conversation, grammar review, and an introduction to literary genres and contemporary Italian culture and society. **Prerequisite:** LTIT 2A or its equivalent, or consent of instructor, or a score of 4 on the AP Italian Language and Culture exam.

LTIT 50. Advanced Italian (4)

This course constitutes the sixth and final quarter of the Italian language sequence. It offers an intensive study of Italian grammar, drills in conversation and composition, and readings in modern Italian literature. **Prerequisite:** LTIT 2A and 2B, or consent of instructor.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTIT 100. Introduction to Literatures in Italian (4)

Reading and discussion of selections from representative authors. Review of grammar as needed. May be repeated for credit three times when topics vary. **Prerequisite:** LTIT 50 or its equivalent, or consent of instructor, or a score of 5 on the AP Italian Language and Culture exam.

LTIT 110. Italian Literature (4)

Topics in Italian literature: regional, historic, thematic. Texts will be read in Italian. May be repeated for credit when topics vary. **Prerequisite:** LTIT 100.

LTIT 113. Love, War, and Conquest in the Italian Renaissance (4)

A critical reading of Italian Renaissance texts with special attention to those themes, forms, and ideological conflicts still operative in today's culture. May be repeated for credit when topics vary.

LTIT 115. Medieval Studies (4)

Studies in medieval culture and thought with focus on one of the "three crowns" of Italian literature: Dante, Boccaccio, or Petrarca. May be repeated for credit when course content varies.

LTIT 122. Studies in Modern Italian Culture (4)

Politics, literature, and cultural issues of twentieth-century Italy. May be repeated for credit when topics vary. **Prerequisite:** LTIT 50.

LTIT 137. Studies in Modern Italian Prose (4)

A study of the chief modern Italian prosatori, including D'Annunzio, Calvino, Pavese, Pasolini, etc.

LTIT 143. Major Italian Authors (4)

A study in depth of the works of a major Italian author. May be repeated for credit when topics vary. **Prerequisite:** LTIT 100 or permission of instructor.

LTIT 161. Advanced Stylistics and Conversation (4)

Analysis of Italian essays, journalism, literature. Intensive practice in writing and Italian conversation. **Prerequisite:** LTIT 100 or consent of instructor.

LTIT 192. Senior Seminar in Literatures in Italian (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisite:** department stamp and/or consent of instructor.

LTIT 196. Honors Thesis (4)

Senior thesis research and writing for students who have been accepted for the literature honors program and who have completed LTWL 191. Oral examination. **Prerequisite:** department approval.

LTIT 198. Directed Group Study (4)

Directed group study in areas of Italian literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) **Prerequisite:** department approval.

LTIT 199. Special Studies (2 or 4)

Tutorial; individual guided reading in areas of Italian literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) **Prerequisite:** department approval.

KOREAN LITERATURE**LOWER-DIVISION****LTKO 1A. Beginning Korean: First Year I (5)**

Students develop beginning-level skills in the Korean language, beginning with an introduction to the writing and sound system. The remainder of the course will focus on basic sentence structures and expressions. **Prerequisite:** placement test required.

LTKO 1B. Beginning Korean: First Year II (5)

Students develop beginning-level skills in the Korean language, beginning with an introduction to the writing and sound system. The remainder of the course will focus on basic sentence structures and expressions. **Prerequisite:** LTKO 1A.

LTKO 1C. Beginning Korean: First Year III (5)

Students develop beginning-level skills in the Korean language, beginning with an introduction to the writing and sound system. The remainder of the course will focus on basic sentence structures and expressions. **Prerequisite:** LTKO 1B.

LTKO 2A-B-C. Intermediate Korean: Second Year I-II-III (5-5-5)

This course will help students develop intermediate-level skills in the Korean language. Upon completion of this course, students are expected to have good command of Korean in various daily conversational situations. **Prerequisites:** LTKO 1C or placement test for 2A; 2A is prerequisite for 2B; 2B for 2C.

LTKO 3. Advanced Korean: Third Year (5)

This course will help students develop advanced-level skills in the Korean language. Upon completion of this course, students are expected to have good command of Korean in various formal settings and to understand daily news broadcasts/newspapers. **Prerequisites:** LTKO 2C or placement test and consent of instructor.

LTKO 50. Intermediate Readings and Composition (4)

Designed to enhance reading and writing skills. We will read and discuss a variety of materials, including newspaper and magazine articles, short essays, and prose fiction. Writing exercises will stress improving students' ability to express themselves as well as their critical responses to reading. **Prerequisites:** LTKO 2C and/or recommendation of instructor.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTKO 100. Readings in Korean Literature and Culture (4)

Majors issues in modern Korean history from colonial period to present, such as Japanese colonization, division, U.S./Soviet occupation, the Korean War, and authoritarian rule, industrialization, labor/agrarian movement and cultural/social issues, emerging within the globalized economy in South Korea. **Prerequisite:** reading knowledge of Korean (two years college-level Korean or equivalent).

LTKO 192. Senior Seminar in Literatures in Korean (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

LATIN LITERATURE

(See also listings under "[Classical Studies](#).")

LOWER-DIVISION**LTLA 1. Beginning Latin (4)**

Study of Latin, including grammar and reading.

LTLA 2. Intermediate Latin (I) (4)

Study of Latin, including grammar and reading. **Prerequisite:** LTLA 1 or equivalent.

LTLA 3. Intermediate Latin (II) (4)

Study of Latin, including grammar and reading. **Prerequisite:** LTLA 2 or equivalent.

LTLA 4. Intensive Elementary Latin (12)

Equivalent of LTLA 1, 2, and 3. Given in summer session only.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTLA 100. Introduction to Latin Literature (4)

Reading and discussion of selections from representative authors of one or more periods. Review of grammar as needed. **Prerequisite:** LTLA 3 or equivalent.

LTLA 111. Pre-Augustan (4)

Readings, in Latin, in the works of Roman writers of the pre-Augustan period. May be repeated for credit as topics vary. **Prerequisites:** LTLA 1, 2, 3 or equivalent.

LTLA 114. Vergil (4)

Readings from the works of Vergil. **Prerequisites:** LTLA 1, 2, 3 or equivalent.

LTLA 116. Silver Latin (4)

Readings, in Latin, in the works of Roman writers of the Silver Age. **Prerequisites:** LTLA 1, 2, 3 or equivalent.

LTLA 131. Prose (4)

Readings, in Latin, of the work of Roman prose writers. May be repeated for credit as topics vary. **Prerequisites:** LTLA 1, 2, 3 or equivalent.

LTLA 132. Lyric and Elegiac Poetry (4)

Readings, in Latin, in the works of lyric and elegiac poets. May be repeated for credit as topics vary. **Prerequisites:** LTLA 1, 2, 3 or equivalent.

LTLA 133. Epic (4)

Readings in Latin in the works of the Roman epic poets. May be repeated for credit as topics vary. **Prerequisites:** LTLA 1, 2, 3 or equivalent.

LTLA 134. History (4)

Readings, in Latin, in the works of Roman historians. May be repeated for credit as topics vary. **Prerequisites:** LTLA 1, 2, 3 or equivalent.

LTLA 135. Drama (4)

Readings, in Latin, in the works of Roman dramatists. Repeatable for credit when topics vary. **Prerequisite:** LTLA 3 or equivalent; LTLA 100 recommended.

LTLA 192. Senior Seminar in Literatures in Latin (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

LTLA 198. Directed Group Study (4)

Directed group study in areas of Latin literature not normally covered in courses. May be repeated three times. (P/NP grades only.) **Prerequisite:** department approval.

LTLA 199. Special Studies (2 or 4)

Tutorial; individual guided reading in areas of Latin literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) **Prerequisite:** department approval.

GRADUATE

PREREQUISITE: graduate standing or consent of instructor.

LTLA 297. Directed Studies (1-12)

Guided and supervised reading in a broad area of Latin literature. Offered for repeated registration.

LTLA 298. Special Projects (4)

Treatment of a special topic in Latin literature. Offered for repeated registration.

PORTUGUESE LITERATURE

LOWER-DIVISION

LTPR 2A. Intermediate Portuguese I: Foundations (5)

Intermediate course in Portuguese language, emphasizing the development of verbal communication, listening comprehension, and reading and writing skills. Conducted in Portuguese, it includes reviews of grammar and vocabulary, weekly compositions, and class discussions. **Prerequisite:** LIPO 1C/CX or 1D/DX or the equivalent or consent of instructor.

LTPR 2B. Intermediate Portuguese II: Readings and Composition (5)

Continuation of LTPR 2A. Conducted in Portuguese, this course reviews major grammatical points with an emphasis on critical reading and the interpretation of Portuguese-language texts through class discussions, vocabulary development, and written compositions. **Prerequisite:** LTPR 2A or equivalent or consent of instructor.

LTPR 2C. Intermediate Portuguese III: Cultural Topics and Composition (4)

Continuation of LTPR 2B. This course emphasizes writing and verbal communication skills. It includes discussions of cultural topics, grammatical reviews, and composition writing, further developing students' abilities to comprehend and interpret articles, essays, and longer pieces of fictional/nonfictional texts. **Prerequisite:** LTPR 2B or equivalent or consent of instructor.

LTPR 50. Topics in Brazilian Literature in Portuguese for Spanish Speakers (4)

Introductory Portuguese language and literature course designed especially for speakers of Spanish. Will build on students' knowledge of Spanish, enabling them to acquire competence in language structures of Portuguese and introducing them to Brazilian texts in Portuguese.

RUSSIAN LITERATURE

LOWER-DIVISION

LTRU 1A-B-C. First-Year Russian (5-5-5)

First-year Russian, with attention to reading, writing, and speaking.

LTRU 2A-B-C. Second-Year Russian (5-5-5)

Second-year Russian grammar, with attention to reading, writing, and speaking. **Prerequisites:** LTRU 1A-B-C or equivalent.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

Note: Many Russian literature courses are cross-listed as courses in European and Eurasian Literatures (LTEU). Lectures and discussions are conducted in English, and students may choose whether to do the reading and writing assignments in translation, in which case they should enroll for the course under its LTEU rubric, or in Russian, in which case they should enroll under the LTRU rubric. Other courses are offered in English translation with one-unit Foreign Language Discussion Sections (XL course number suffix) for students who wish to read and discuss some or all of assignments in Russian.

LTRU 104A-B-C. Advanced Practicum in Russian (4-4-4)

Development of advanced skills in reading, writing, and conversation. Course based on written and oral texts of various genres and styles. Individualized program to meet specific student needs. Prerequisite for 104A: LTRU 2C or equivalent.

LTRU 110A-B-C. Survey of Russian and Soviet Literature in Translation, 1800–Present (4-4-4)

A study of literary works from Pushkin to the present. LTRU 110A is not a prerequisite for LTRU 110B, and LTRU 110B is not a prerequisite for LTRU 110C.

110A. 1800–1860

110B. 1860–1917

110C. 1917–present

LTRU 123. Single Author in Russian Literature in Translation (4)

Study of the works of a single Russian author. May be repeated for credit as topics vary.

LTRU 150. Russian Culture (4)

An introduction to Russia's past and present through the cross-disciplinary study of literature, the visual and performing arts, social and political thought, civic rituals, popular entertainments, values and practices from 1825 to the present. **Prerequisite:** upper-division standing.

LTRU 150XL. Russian Culture: The Modern Period—Foreign Language Discussion Section (1)

Students will exercise advanced Russian language skills to read and discuss materials in LTRU 150. This section is taught by the course professor, has no final examination, and does not affect the student's grade in the parent course. **Prerequisites:** co-registration in LTRU 150; four quarters of Russian language study or the equivalent.

LTRU 192. Senior Seminar in Literatures in Russian (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisite:** department stamp and/or consent of instructor.

LTRU 198. Directed Group Study (4)

Directed group study in areas of Russian literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) **Prerequisites:** upper-division standing and permission of department.

LTRU 199. Special Studies (2 or 4)

Tutorial; individual guided reading in areas of Russian literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) **Prerequisites:** upper-division standing and permission of department.

LITERATURES IN SPANISH

LOWER-DIVISION

Language and Literature Courses

Students entering the Spanish language/literature program must have completed one year of college-level Spanish (Linguistics/Spanish 1C/1CX) or its equivalent at another institution or have the consent of the instructor. Ordinarily, students take LTSP 2A, 2B, 2C, and one or more courses from the 50 sequence. Native speakers are encouraged to take LTSP 2D, 2E.

LTSP 2A. Intermediate Spanish I: Foundations (5)

Course is taught in Spanish, emphasizing the development of reading ability, listening comprehension, and writing skills. It includes grammar review, weekly compositions, and class discussions. Successful completion of LTSP 2A satisfies the requirement for language proficiency in Revelle College. **Prerequisite:** completion of LISP 1C/1CX or LISP 1D/DX, or the equivalent or score of 3 on AP Spanish Language Exam, or placement result of 3 or 4 the Language Placement Exam—Spanish, or consent of instructor.

LTSP 2B. Intermediate Spanish II: Readings and Composition (5)

Review of major points of grammar with emphasis on critical reading and interpretation of Spanish texts through class discussions, vocabulary development, and written compositions. It is a continuation of LTSP 2A. **Prerequisites:** LTSP 2A or score of 4 on AP Spanish language or 3 on AP Spanish literature exams or consent of instructor.

LTSP 2C. Intermediate Spanish III: Cultural Topics and Composition (4)

Continuation of LTSP 2B, with special emphasis in writing and translation. It includes discussion of cultural topics as well as grammar review and composition, further developing the ability to read articles, essays, and longer pieces of fiction/nonfictional texts. **Prerequisites:** LTSP 2B or equivalent or score of 5 on AP Spanish language or 4 on AP Spanish literature exams or consent of instructor.

LTSP 2D. Intermediate/Advanced Spanish: Spanish for Bilingual Speakers (4)

Spanish for native speakers. Designed for bilingual students seeking to become biliterate. Reading and writing skills stressed with special emphasis on improvement of written expression and problems of grammar and orthography. Prepares native speakers with little or no formal training in Spanish for more advanced courses. **Prerequisite:** native speaking ability and/or recommendation of instructor.

LTSP 2E. Advanced Readings and Composition for Bilingual Speakers (4)

Second course in a sequence designed for bilingual students seeking to become biliterate. Special emphasis given to improvement of written expression, grammar, and orthography. Prepares bilingual students with little or no formal training in Spanish for more advanced course work. **Prerequisites:** LTSP 2D and/or recommendation of instructor.

LTSP 21. Conversation Workshop I (1)

Allows students with a basic grounding in Spanish to discuss a variety of topics related to literary and cultural issues. Vocabulary development, use of idiomatic expression, and advancement of oral proficiency in Spanish. May be taken as an adjunct to lower-division LTSP courses. Recommended for students planning to study abroad. **Prerequisite:** LISP 1C/1CX or LISP 1D/1DX or LTSP 2A or 2B or 2C or 2D or 2E or 50A or 50B or 50C.

LTSP 31. Conversation Workshop II (1)

Enhances intermediate/advanced students' command of spoken Spanish through debates on literary and cultural issues and the formulation and expression of thoughts in Spanish. May be taken as an adjunct to lower- and upper-division LTSP courses. Recommended for students planning to study abroad. **Prerequisite:** LISP 1C/1CX or LISP 1D/1DX or LTSP 2A or 2B or 2C or 2D or 2E or 50A or 50B or 50C.

LTSP 41. Conversation and Orthography Workshop (1)

The workshop format of this course allows students to attain a stronger command of skills in matters of Spanish orthography, spelling, punctuation, and accent rules. May be taken as an adjunct to lower- or upper-division LTSP courses. Recommended for students planning to study abroad. **Prerequisite:** LISP 1C/1CX or LISP 1D/1DX or LTSP 2A or 2B or 2C or 2D or 2E or 50A or 50B or 50C.

LTSP 50A. Readings in Peninsular Literature (4)

An introduction to Peninsular literature, this course offers a selection of authors and genres, introducing students to literary analysis through reading extensive texts in Spanish. Two or more quarters of LTSP 50 are suggested before proceeding to upper-division courses. **Prerequisite:** LTSP 2C or 2D or 2E or the equivalent.

LTSP 50B. Readings in Latin American Literature (4)

An introduction to Latin American literature, this course offers a selection of authors and genres, introducing students to literary analysis through reading extensive texts in Spanish. Two or more quarters of LTSP 50 are suggested before proceeding to upper-division courses. **Prerequisite:** LTSP 2C or 2D or 2E or the equivalent.

LTSP 50C. Readings in Latin American Topics (4)

An introduction to major topics in Latin American literature, this course focuses on the literature of a particular

region, period, or movement. Introduces students to literary analysis through reading extensive texts in Spanish. **Prerequisite:** LTSP 2C or 2D or 2E or consent of instructor.

LTSP 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

Note: As of fall 1992, students must have taken at least one (but preferably two) course(s) in the LTSP 50A-B-C sequence with a grade of C- or better before enrolling in upper-division courses. Without fulfillment of this prerequisite, students must obtain the consent of the instructor of the requested course.

LTSP 100. Major Works of the Middle Ages (4)

Major Spanish literary works of the Middle Ages and Renaissance as seen against the historical and intellectual background of this period. **Prerequisite:** LTSP 50A, 50B, or 50C, or consent of instructor.

LTSP 107. Literature of the Fifteenth Century (4)

Survey of cultural texts including courtly romances, political poetry, Columbus's letters, and the tragicomedia La Celestina. Issues of gender, blood purity, social estates, and colonialism will be discussed. Repeatable for credit when topics vary. **Prerequisite:** LTSP 130A or consent of instructor.

LTSP 115. Early Modern Spanish Cultural Production (4)

Study of writing and/or spectacle in Spain in the sixteenth and seventeenth centuries. Close reading of texts and analysis of ideological and historical context. Topics may include the comedia (public theatre), religious drama, poetry, or early narrative forms such as the picaresque novel. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50A.

LTSP 116. Representations of Spanish Colonialism (4)

Analysis of selected materials that represent the cultural and political relationship between Spain and its colonies. Close reading of literary texts and historical documents. Specific periods covered will fall between the origins of empire in the early sixteenth century to the demise of imperial Spain in 1898; topics may include cultural exchanges between Spain and Latin America, the Philippines, or the U.S. Southwest. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50A.

LTSP 119AB. Cervantes: Teatro y Novelas (4)

Study of Cervantes's innovations in the short narrative form and theatrical production during the late sixteenth and early seventeenth centuries. Special attention to textual structures and ideological elements such as gender, religion, and early modern conceptions of ethnicity, "race," and nation. This course fulfills the Cervantes requirement for Spanish literature majors. **Prerequisites:** LTSP 50A and 50B or 50C or consent of instructor.

LTSP 119C. Cervantes: Don Quixote (4)

Close reading of the 1605 and 1615 texts with special attention to the social and cultural background of the early seventeenth century in Spain. **Prerequisites:** LTSP 50A and either 50B or 50C.

LTSP 122. The Romantic Movement in Spain (4)

This course will explore the historical context of the emergence of a Romantic movement in Spain, particularly the links between Romanticism and liberalism. Major Romantic works in several genres will be studied in depth. **Prerequisite:** upper-division standing or consent of instructor.

LTSP 123. Topics in Modern Spanish Culture (4)

Investigation of selected topics concerning Spanish cultural production after 1800. Topics might focus on a genre (film, popular novel, theater) or on the transformations of a theme or metaphor (nation, femininity, the uncanny). Repeatable for credit as topics vary. **Prerequisite:** LTSP 50A.

LTSP 125. Spanish Modernisms (4)

Analysis and discussion of forms, movements, and issues arising in Spanish culture between 1898 and 1936 in relation to the loss of empire, accelerating modernization and new social movements. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50A.

LTSP 129. Spanish Writing after 1939 (4)

Analysis and discussion of literary production during and after the Franco dictatorship. May focus on specific genres, sub-period, or issues. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50A.

LTSP 130A. Development of Spanish Literature (4)

An introduction to the major movements and periods of Spanish literary history, centered on close reading of representative texts, but aimed at providing a sense of the scope of Spanish literature and its relation to the course of Spain's cultural and social history. This course is required of all Spanish literature majors. It is strongly recommended that this course be taken before any other upper-division Spanish (peninsular) literature course. **Prerequisites:** LTSP 50A and either 50B or 50C.

LTSP 130B. Development of Latin American Literature (4)

An introduction to major movements and periods in Latin American literature, centered on a study of key works from pre-Columbian to the present time. Texts will be seen within their sociohistorical context and in relation to main artistic trends of the period. This course is required of all Spanish literature majors. It is strongly recommended that this course be taken before any other upper-division Latin American literature course. **Prerequisites:** LTSP 50A and either 50B or 50C.

LTSP 133. Contemporary Latin American Literature (4)

A study of the major literary works and problems in Latin America from 1900 to the present as seen against the historical context of the period. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 134. Literature of the Southern Cone (4)

Study of movements, traditions, key authors, or major trends in Argentine, Paraguayan, Uruguayan, and Chilean literatures, such as gaucho poetry, the realist novel, modern urban narratives, and the Borges School, etc. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 135A. Mexican Literature before 1910 (4)

Explores the relationships among cultural production, politics, and societal changes in Mexico before the 1910 Revolution, specifically the roles of intellectuals and popular culture in nation-building and modernization. Readings may include didactic literature and historiographic writings, forms of popular discourse, as well as novels and poetry. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 135B. Modern Mexican Literature (4)

Study of popular novels, movements, traditions, key authors, or major trends in modern Mexican literature. May be repeated for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 136. Andean Literatures (4)

Study of movements, traditions, key authors, or major trends in Peruvian, Ecuadorian, and Bolivian literatures, such as indigenismo, urban narrative, and the works of authors such as Vallejo, Icaza, Arguedas, Vargas Llosa. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 137. Caribbean Literature (4)

Study of movements, traditions, key authors, or major trends in Caribbean literature in Spanish, such as the romantic movement, the literature of independence, the essay tradition, Afro-Antillean literature, the historical novel. May be repeated for credit as topics vary.

LTSP 138. Central American Literature (4)

Study of movements, traditions, key authors, or major trends in the literatures of Guatemala, El Salvador, Nicaragua, Honduras, Costa Rica, and Panama, such as the anti-imperialist novel, indigenismo, guerrilla poetry, and testimonio. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 140. Latin American Novel (4)

A study in depth of selected novelists of Latin America. May be organized around a specific theme or idea which is traced in its development through the narratives. Course may be repeated for credit when topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 141. Latin American Poetry (4)

A critical study of some of the major poets of Latin America, focusing on the poet's central themes, the evolution of poetic style, and the significance of the poetry to the historical context. May be repeated as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 142. Latin American Short Story (4)

Readings and interpretation of the Latin American short story. Focus is primarily nineteenth and/or twentieth century. May be repeated for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 150A. Early Latino/a-Chicano/a Cultural Production: 1848 to 1960 (4)

Cross-disciplinary study of nineteenth- and early twentieth-century Latino/a-Chicano/a literature, folklore, music, testimonio, or other cultural practices. Specific periods covered will fall between the immediate aftermath of the Treaty of Guadalupe Hidalgo to the Cuban revolution. Repeatable for credit when topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 150B. Contemporary Chicano/a-Latino/a Cultural Production: 1960 to Present (4)

Cross-disciplinary study of late twentieth-century Latino/a-Chicano/a literature, the visual and performing arts, film, or other cultural practices. Specific periods covered will fall between the Kennedy years to the era of neoliberalism and the creation of "Hispanic" or Latino identities. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 151. Topics in Chicano/a-Latino/a Cultures (4)

Cross-disciplinary study of late twentieth-century Chicano/a-Latino/a literature, the visual and performing arts, film, or other cultural practices. Representative areas of study are social movements, revolution, immigration, globalization, gender and sexuality, cultures of the U.S.-Mexico border, and Chicano/a-Mexicano/a literary relations. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 153. Chicano/a and Latino/a Poetry (4)

A study of themes and issues in the poetic production of Latino communities in the U.S. Every effort will be made to select texts in Spanish but some may be bilingual. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 154. Latino/a and Chicano/a Literature (4)

This course will study the representation of a variety of social issues (immigration, racism, class differences, violence, inter/intra-ethnic relations, etc.) in works written in Spanish by Latino/a and Chicano/a writers. Repeatable for credit as topics, texts, and historical periods vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 160. Spanish Phonetics (4)

A comparative study of the English and Spanish phonetic systems. Includes a study of the organs of articulation, manner of articulation stress and intonation patterns, as well as dialectal variations of Spanish. **Prerequisites:** upper-division standing, LTSP 50A or 50B or 50C, or consent of instructor.

LTSP 162. Spanish Language in the United States (4)

A sociolinguistic study of the popular dialects in the U.S.A. and their relation to other Latin American dialects. The course will cover phonological and syntactic differences between the dialects as well as the influence of English on the Southwest dialects.

LTSP 166. Creative Writing (4)

A workshop designed to foster and encourage writing in Spanish of students working on short forms of fiction. The workshop will include discussions of techniques and intensive writing. **Prerequisites:** completion of LTSP 50A-B-C or consent of instructor.

LTSP 170. Contemporary Theories of Cultural Production (4)

Selected readings in recent cultural and literary theory. Students will be exposed to a variety of methodologies drawn from the Latin American, European, and U.S. traditions. Final project consists of a practical "application" of a method or methods to a specific cultural object. This course is recommended for students who plan to pursue graduate work in literature. **Prerequisite:** LTSP 50A or 50B or 50C.

LTSP 171. Studies in Peninsular and/or Latin American Literature and Society (4)

Focus on the interaction between literary expression and the study of society, covering issues such as the sociology of literature, the historical novel, literature and social change, the writer as the intellectual. May be repeated for credit as topics vary.

LTSP 172. Indigenista Themes in Latin American Literature (4)

Study of the literary modes by which nineteenth- and twentieth-century authors have interpreted the themes of indigenous survival and resistance in Latin America, primarily in Mexico and the Andean region. May be repeated for credit as topics vary. **Prerequisite:** LTSP 50B or 50C.

LTSP 173. Problems in Spanish and Latin American Literary History (4)

Study of the issues involved in understanding the development process of literary expression; the problem of genre; the relation of literature to social institutions; the function of literary influence and tradition; the relation of popular and print cultures. May be repeated for credit as topics vary. **Prerequisite:** LTSP 50A or 50B or 50C.

LTSP 174. Topics in Culture and Politics (4)

Study of the relationships between cultural production (literature, film, popular cultures), social change, and political conflict, covering topics such as colonialism, imperialism, modernization, social movements, dictatorship, revolution. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50A or 50B or 50C.

LTSP 175. Gender, Sexuality, and Culture (4)

This course will examine issues of gender, sexuality, and culture in Spanish, Latin American, and/or Chicana/o literatures. Repeatable for credit as topics, texts, and historical periods vary. **Prerequisite:** LTSP 50A or 50B or 50C.

LTSP 176. Literature and Nation (4)

Study of literature as a means through which the nation has been imagined and as a site of debates over national identity and citizenship. Course materials may focus on Spain and/or Latin America. Repeatable for credit as topics vary. **Prerequisite:** LTSP 50A or 50B or 50C.

LTSP 177. Literary and Historical Migrations (4)

This course will focus on a variety of Latin American and/or Spanish intra- and inter-national migrations throughout the world and on the literature produced by these exiles or immigrants. Repeatable for credit as topics, texts, and historical periods vary. **Prerequisite:** LTSP 50A or 50B or 50C.

LTSP 178. Latin American Social Movements (4)

Course will examine the historical context and cultural production associated with social movements in Latin America. Repeatable for credit as regions, constituencies, and historical periods vary. **Prerequisite:** LTSP 50A or 50B or 50C, or consent of instructor.

LTSP 192. Senior Seminar in Literatures in Spanish (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with

preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

LTSP 196. Honors Thesis (4)

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTWL 191. Oral Exam. **Prerequisite:** department approval.

LTSP 198. Directed Group Study in Spanish Literature (4)

Research seminars and research, under the direction of a member of the faculty. May be repeated for credit three times. (P/NP grades only.) **Prerequisites:** upper-division standing and department approval.

LTSP 199. Special Studies (2 or 4)

Tutorial: individual guided reading in areas of Spanish literature not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) **Prerequisites:** upper-division standing and department approval.

GRADUATE

PREREQUISITE: graduate standing or consent of instructor.

LTSP 224. Golden Age Studies (4)

Consideration of one or more major figures, texts, trends, or problems in Spanish Golden Age studies. May be repeated for credit as topics vary.

LTSP 252. Topics in Modern Spanish Literature and Culture (4)

Major trends and figures considered in the context of late nineteenth- and twentieth-century Spanish culture. May be repeated for credit as topics vary.

LTSP 258. Spanish American Prose (4)

Consideration of one or more major figures, texts, trends, or problems in Spanish American prose. May be repeated for credit as topics vary.

LTSP 272. Literature and Society Studies (4)

Special topics in practical criticism involving social and economic historical perspectives. May be repeated for credit as topics vary.

LTSP 275. Latin American(ist) Literary and Cultural Theories Since the 1960s (4)

A historical survey of late twentieth-century literary and cultural criticism in and about Latin America, focusing on questions of political economy and periodization, cultural heterogeneity and transculturation, gender and sexuality, and the relationships between literary, popular, and mass cultures.

LTSP 295. M.A. Thesis (1-8)

Research for the master's thesis. Open for repeated registration up to eight units. (S/U grades only.)

LTSP 296. Research Practicum (1-12)

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

LTSP 297. Directed Studies: Reading Course (1-12)

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

LTSP 298. Special Projects: Writing Course (1-12)

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

LTSP 299. Dissertation (1-12)

Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

LITERATURE/THEORY

Courses in theory may apply to various literature majors. Please consult your advisor.

Additional theory courses are offered in the various department sections. See quarterly course descriptions in the Department of Literature office, first floor LIT building.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTTH 110. History of Criticism (4)

A critical and interpretive review of some of the major documents in criticism from the classical period to the present time.

LTTH 115. Introduction to Critical Theory (4)

A critical review of major contemporary theories of the nature of literature, its sociocultural function, and appropriate modes of evaluation.

LTTH 150. Topics in Critical Theory (4)

Selected topics in critical theory such as: a particular mode of literary theory; comparative study of theories of text and image; a problem or theme in the history of theory; issues involved in the relationship between fiction and other discourses (science, law, history, philosophy, music). Repeatable for credit when topics vary.

LTTH 198. Directed Group Study (4)

Directed group study, under the guidance of a member of the faculty, in an area not covered in courses currently offered by the department (P/NP only)

LTTH 199. Special Studies (2 or 4)

Individual reading in an area not covered in courses currently offered by the department. (P/NP only).

GRADUATE

PREREQUISITE: graduate standing or consent of instructor.

LTTH 200A. Text/Culture/Critical Practice (4)

An introduction to theories and practices of literary and cultural criticism. Topics may vary, but emphasis will be on terminology, methods of readings, modes of interdisciplinary analysis and argumentation, recent debates on questions of theory, history, textual scholarships, etc. **Prerequisites:** registered doctoral student in literature and department stamp.

LTTH 200B. Problems in Contemporary Literary Theory (4)

The focus is feminist literary/cultural theories and their relations with major contemporary theoretical discourses (e.g., psychoanalysis, poststructuralism, and various forms of historicism). **Prerequisites:** LTTH 200A, registered doctoral student in literature, and department stamp.

LTTH 200C. Cultural Perspectives and Cultural Criticism (4)

Literary and cultural relations between the First and Third Worlds, colonialism and neo-colonialism, orality and literacy, construction of ethnicity, formation of canon, and popular culture and the market. **Prerequisites:** LTTH 200B, department stamp, and registered doctoral student in literature.

LTTH 201. Contemporary Theoretical Debates and Critical Discourses (4)

An introduction to a wide range of theoretical and methodological issues, schools of thought, and interpretative styles in contemporary literary studies. Required of all M.A. students in the Department of Literature, normally in their first quarter in the program. **Prerequisite:** admission to the M.A. program in the Department of Literature or consent of instructor.

LTTT 220. Theories of Literary Criticism (4)

Close study of any of the several bodies of literary theory currently applied to literary criticism: psychoanalytic, Marxist, historicist, semiotic, feminist, hermeneutic, reader-response, among others. May be repeated for credit when topics vary.

LTTT 250. Writing and Theory (4)

An overview of issues in modern critical theory as they pertain to writers. Will focus on issues of textuality, cultural forms, and aesthetics as they impact the process and meaning of writing. **Prerequisite:** department approval.

LTTT 255. Modern Art Movements and Aesthetics (4)

An introduction to modernist aesthetics with a focus on art and literary movements. Particular attention to be placed on relationships between modern literary movements (realism, imagism, surrealism) and their counterparts in visual arts, music, dance, and theater, and the ways in which literary movements are components of or responses to issues of political and social identity. **Prerequisite:** department approval.

LTTT 296. Research Practicum (1–12)

Research project to be developed by a small group of students under the continued direction of individual faculty members. Primarily a continuation of a previous graduate seminar. The 296 courses do not count toward the seminar requirement. Repeatable for credit.

LTTT 297. Directed Studies: Reading Course (1–12)

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. No paper required. The 297 courses do not count toward the seminar requirement. Repeatable for credit.

LTTT 298. Special Projects: Writing Course (1–12)

Similar to a 297, but a paper is required. Papers are usually on subjects not covered by seminar offerings. Up to two 298s may be applied toward the twelve-seminar requirement of the doctoral program. Repeatable for credit.

LTTT 299. Dissertation (1–12)

Research for the dissertation. Offered for repeated registration. Open only to Ph.D. students who have advanced to candidacy.

LITERATURES OF THE WORLD**AFRICAN LITERATURES**

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTAf 110. African Oral Literature (4)

Survey of various genres of African and oral literary traditions. Oral narrative genres, investigation of proverb, riddle, praise poetry, and epic. Development and use of a methodology to analyze aspects of performance, composition, and education in oral traditional systems.

LTAf 120. Literature and Film of Modern Africa (4)

This course traces the rise of modern literature in traditional African societies disrupted by the colonial and neocolonial experience. Contemporary films by African and Western artists will provide an additional insight into the complex social self-images of the continent.

LITERATURES OF THE AMERICAS

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

Foreign language discussion sections (XLs) may be offered in conjunction with courses taught in translation. Students enrolled in these joint courses may use them to fulfill major, minor, and secondary literature requirements. Please see the undergraduate office for further information.

LTAM 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

LTAM 100. Latino/a Cultures in the United States (4)

An introductory historical and cultural overview of the various Latino/a populations in the U.S. with a study of representative cultural texts.

LTAM 101. Early Latino/a-Chicano/a Cultures: 1848–1960 (4)

A cross-disciplinary study of nineteenth- and early twentieth-century Latino/a-Chicano/a literature, the visual and performing arts, and other cultural practices. May be repeated for credit as topics vary.

LTAM 102. Contemporary Chicano/a-Latino/a Cultural Production: 1960 to Present (4)

A cross-disciplinary study of late twentieth-century Latino/a-Chicano/a literature, the visual and performing arts, and other cultural practices. May be repeated for credit as topics vary.

LTAM 105. Gender and Sexuality in Latino/a Cultural Production (4)

A study of the construction of differences in gender and sexual orientation in Latino/a-Chicano/a literature and other cultural production with an emphasis on examining various theoretical/ideological perspectives on these issues. May be repeated for credit as topics vary.

LTAM 106. Modern Chicana and Mexican Women Writings (4)

A study of themes and issues in the writings of Chicana and Mexican women with a view toward establishing connections while recognizing national and cultural differences between the two. May be repeated for credit as topics vary.

LTAM 107. Comparative Latino/a and U.S. Ethnic Cultures (4)

A comparative and intersecting study of Latino/a and other U.S. ethnic cultures. Literary texts will be viewed as "windows" into real time and spaces where cultures meet and mix. May be repeated for credit as topics vary.

LTAM 108. Chicano/a and Latino/a Cultures: Intellectual and Political Traditions (4)

The course will center on Chicano/a-Latino/a writers and movements of literary, intellectual, cultural, or political significance. Texts may be read in the original language or in English. May be repeated for credit as topics vary.

LTAM 109. Cultural Production of the Latino/a Diasporas (4)

A study of the cultural production of Latino/a immigrant groups with a focus on the literary representation of homeland, national culture, and the forces that led to migration. May be repeated for credit as topics vary.

LTAM 110. Latin American Literature in Translation (4)

Reading of representative works in Latin American literature with a view to literary analysis (form, theme, meaning), the developmental processes of the literature, and the many contexts: historical, social, cultural. Texts may be read in English. May be repeated for credit as topics vary.

LTAM 111. Comparative Caribbean Discourse (4)

Comparative survey of Caribbean literatures from the Spanish, French, English, and Dutch Caribbean. Literary texts trace historical paradigms including the development of plantation slavery, emancipation, the quest for nationhood, migration, and transnational identities. Films and music may complement discussion.

LTAM 130. Reading North by South (4)

An analysis of the readings and appropriations of European and U.S. traditions by Latin American, Caribbean, and Filipino writers. The course addresses philosophies, ideologies, and cultural movements and explores the specific literary strategies used by authors in constructing their particular "cosmovisión."

LTAM 132. The Dark Side of Enlightenment in Spain, the Americas, and the Philippines (4)

This course deals with the cultural production of Spain, the Philippines, Latin America, and the U.S. to examine views (both optimistic and pessimistic) on the Enlightenment as a mode of conducting scientific investigation of nature, constituting forms of government, and imagining the future. May be repeated for credit as topics vary.

LTAM 140. Topics in Culture and Politics (4)

Study of the relationships between cultural production (literature, film, popular culture), social change, and political conflict, covering topics such as colonialism, imperialism, modernization, social movements, dictatorship, and revolution. Repeatable for credit when topics vary.

LTAM 192. Senior Seminar in Literatures of the Americas (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

EAST ASIAN LITERATURES

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

Foreign language discussion sections (XLs) may be offered in conjunction with courses taught in translation. Students enrolled in these joint courses may use them to fulfill major, minor, and secondary literature requirements. Please see the undergraduate office for further information.

LTEA 100A. Classical Chinese Poetry in Translation (4)

A survey of different genres of traditional Chinese poetry from various periods.

LTEA 100B. Modern Chinese Poetry in Translation (4)

A survey of Chinese poetry written in the vernacular from 1918 to 1949.

LTEA 100C. Contemporary Chinese Poetry in Translation (4)

A survey of Chinese poetic development from 1949 to the present.

LTEA 110A. Classical Chinese Fiction in Translation (4)

The course will focus on a few representative masterpieces of Chinese literature in its classical age, with emphasis on the formal conventions and the social or intellectual presuppositions that are indispensable to their understanding. May be repeated for credit when topics vary.

LTEA 110B. Modern Chinese Fiction in Translation (4)

A survey of representative works of the modern period from 1919 to 1949. May be repeated for credit when topics vary.

LTEA 110C. Contemporary Chinese Fiction in Translation (4)

An introductory survey of representative texts produced after 1949, with particular emphasis on the social, cultural, and political changes. May be repeated for credit when topics vary.

LTEA 120A. Chinese Films (4)

A survey of representative films from different periods of Chinese cinematic development. Priority may be given to Chinese Studies majors and Literature majors. Repeatable for credit when topics vary.

LTEA 120B. Taiwan Films (4)

A survey of "New Taiwan Cinema" of the Eighties and Nineties. Priority may be given to Chinese Studies majors and Literature majors. Repeatable for credit when topics vary.

LTEA 120C. Hong Kong Films (4)

An examination of representative works of different film genres from Hong Kong. Priority may be given to Chinese Studies majors and Literature majors. Repeatable for credit when topics vary.

LTEA 132. Later Japanese Literature in Translation (4)

An introduction to later Japanese (kogo) literature in translation. Will focus on several "modern" works, placing their form in the historical context. No knowledge of Japanese required. Repeatable for credit when topics vary.

LTEA 136. Special Topics in Japanese Literature (4)

The course will focus on important problematics of literary studies as they relate to Japan (e.g., "feminism," "modernity," "literary mode of production," "Orientalism and nativism"). No knowledge of Japanese required. May be repeated for credit as topics vary.

LTEA 138. Japanese Films (4)

An introduction to Japanese films. Attention given to representative Japanese directors (e.g., Ozu), form (e.g., anime), genre (e.g. feminist revenge horror), or historical context in which films are produced. Priority may be given to Japanese studies majors and literature majors.

LTEA 140. Modern Korean Literature in Translation from Colonial Period (4)

A survey of modern Korean prose fiction and poetry from the colonial period. Exploration of major issues such as Japanese colonization, rise of left-wing and right-wing nationalisms, construction of national culture, and relations between tradition and modernity.

LTEA 141. Modern Korean Literature in Translation from 1945 to Present (4)

A survey of modern Korean prose fiction and poetry from 1945 to the 1990s. Examination of literary representations of national division, the Korean War, accelerated industrialization, authoritarian rule, and the labor/agrarian movements.

LTEA 142. Korean Film, Literature, and Popular Culture (4)

A study of modern Korean society and its major historical issues as represented in film, literature, and other popular cultural media such as TV and music video. We will explore additional issues such as cinematic adaptations of prose fiction, fluid distinctions between popular literature and "serious" literature, and the role of mass media under authoritarian rule.

LTEA 143. Gender and Sexuality in Korean Literature and Culture (4)

A study of constructions of gender and sexuality in pre-modern and modern Korean societies. We will discuss literary works as well as historical and ethnographic works on gender relations, representations of masculinity and femininity, and changing roles of men and women in work and family.

LTEA 144. Korean American Literature and Other Literatures of Korean Diaspora (4)

An examination of the experiences of the Korean diaspora linked to the historical contexts of modern Korea, Japan, the United States, and other countries. We will focus on literature both about Korea and the Korean immigrant experience written in the United States but will also read from and about other Korean diasporic contexts.

LTEA 145. Literature, History, and Colonial and Postcolonial Modernity in Korea (4)

Comparative examination of historiographical and literary representations of major issues such as nationalism, industrialization, class division, gender, and sexuality. Literary re-writings of modern Korean history and recent revisionist historiographical works and trends.

LTEA 151. Readings in Tagalog Literature and Culture I (4)

Course will concentrate on selections of literature, history, and cultural texts (painting, drama, religious artifacts) of the 1896 Philippine revolution and the succeeding U.S. takeover of the Philippines. Intermediate fluency in speaking, reading, and writing Tagalog. Repeatable for credit when topics vary.

LTEA 152A. Topics in Filipino Literature and Culture (Nineteenth Century–World War II) (4)

Surveys the authors, intellectual currents, and cultural politics of Filipino culture from the 1850s to World War II. Topics may include the legacy of Spanish colonialism, European enlightenment, and the emergence of nationalism and socialism, and Filipino literature in English. May be repeated for credit as topics vary.

LTEA 152B. Topics in Filipino Literature and Culture (World War II–Present) (4)

Surveys the authors, intellectual currents, and cultural politics of Filipino culture from World War II to the present. Topics may include the dual lingua franca, the birth of "Filipino-American" literature, the culture of dictatorship, and new approaches to narrative. May be repeated for credit as topics vary.

LTEA 198. Directed Group Study (4)

Research seminars and research, under the direction of a faculty member.

LTEA 199. Special Studies (2 or 4)

Tutorial; individual guided reading in areas not normally covered in courses. (P/NP grades only.)

EUROPEAN AND EURASIAN LITERATURES**LOWER-DIVISION****LTEU 87. Freshman Seminar (1)**

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

Foreign language discussion sections (XLs) may be offered in conjunction with courses taught in translation. Students enrolled in these joint courses may use them to fulfill major, minor, and secondary literature requirements. Please see the undergraduate office for further information.

LTEU 105. Medieval Studies (4)

Studies in medieval culture and thought with focus on one of the "three crowns" of Italian literature: Dante, Boccaccio, or Petrarca. May be repeated for credit when course content varies.

LTEU 109. Studies in Eighteenth-Century European Literature (4)

Topics to be considered include the age of sensibility, enlightenment, neoclassicism. Attention given to historical and cultural contexts.

LTEU 110. European Romanticism (4)

Attention given to historical and cultural contexts. Topics to be considered include the concept of nature, the reaction to science, the role of the imagination.

LTEU 130. German Literature in Translation (4)

One or more aspects of German literature, such as major authors, the contemporary novel, nineteenth-century poetry, German expressionism. Texts may be read in English or the original language. May be repeated for credit as topics vary.

LTEU 137. Seminars in German Culture (4)

These seminars are devoted to a variety of special topics, including the works of single authors, genre studies, problems in literary history, relations between literature and the history of ideas, literary criticism, literature and society, and the like.

LTEU 139. Marx/Nietzsche/Freud (4)

Intensive examination of the major ideas of all three writers, with special attention to the literary styles and problematic aspects of their work.

LTEU 140. Italian Literature in Translation (4)

One or more periods and authors in Italian literature. Texts will be read in English. May be repeated for credit as topics vary.

LTEU 145. Studies in Modern Italian Poetry (4)

Study of the chief modern Italian poets, including Montale, Ungaretti, and Quasimodo, with attention to long, poetic form and contemporary Italian culture. May be repeated for credit as topics vary.

LTEU 146. Studies in Modern Italian Prose (4)

A study of the chief modern Italian prosatori including D'Annunzio, Calvino, Pavese, Pasolini, etc. Repeatable for credit.

LTEU 147. Women in Italy (4)

A study of historical, political, and literary texts regarding women and feminism in Italian society.

LTEU 150A-B-C. Survey of Russian and Soviet Literature in Translation, 1800 to the Present (4-4-4)

A study of literary works from Pushkin to the present.

150A. 1800–1860

150B. 1860–1917

150C. 1917–present

LTEU 154. Russian Culture (4)

An introduction to Russia's past and present through the cross-disciplinary study of literature, the visual and performing arts, social and political thought, civic rituals, popular entertainments, values and practices from 1825 to the present.

LTEU 158. Single Author in Russian Literature in Translation (4)

A study of literary works by a single Russian author. All readings will be in English. May be repeated for credit when authors vary.

LTEU 192. Senior Seminar in European and Eurasian Literatures (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisite:** department stamp and/or consent of instructor.

NEAR EASTERN LITERATURES

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

Foreign language discussion sections (XLs) may be offered in conjunction with courses taught in translation. Students enrolled in these joint courses may use them to fulfill major, minor, and secondary literature requirements. Please see the undergraduate office for further information.

LTNE 101. The Bible: The Narrative Books (4)

Examination of the Biblical accounts in their ancient Near Eastern context. Emphasis will be placed on literary- and form-criticism and textual analysis. Attention to related literature and to archaeological data; consideration of theological issues. Repeatable for credit as topics vary.

LITERATURES OF THE WORLD

In both lower- and upper-division world literature courses, texts may be read in English translation

when necessary, and lectures and discussions are conducted in English.

Foreign language discussion sections (XLs) may be offered in conjunction with courses taught in translation. Students enrolled in these joint courses may use them to fulfill major, minor, and secondary literature requirements. Please see the undergraduate office for further information.

LOWER-DIVISION

LTWL 4A-B-C-D-F-M. Film and Fiction in Twentieth-Century Societies (4)

A study of modern culture and of the way it is expressed and understood in novels, stories, and films. The sequence aims at an understanding of relationship between the narrative arts and society in the twentieth century, with the individual quarters treating fiction and film of the following language groups. 4A French, 4B German, 4C Asian, 4D Italian, 4M multiple national literatures and film, 4F Spanish.

LTWL 19A-B-C. Introduction to the Ancient Greeks and Romans (4-4-4)

An introductory study of ancient Greece and Rome, their literature, myth, philosophy, history, and art.

LTWL 50. Introduction to Literary and Cultural Studies (4)

A preliminary survey of issues and problems raised by literary and cultural studies. Discussion will focus on basic terms in literary analysis (narrative, genre, character, poetics) and on rhetorical techniques for writing advanced expository papers in literary and cultural topics. It is designed for both non-majors and students who anticipate becoming majors in literature who would like a broad-based introduction to the field.

LTWL 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

LTWL 99. Lower-Division Independent Study (4)

Independent study at the lower-division level, in an area not covered by the department's regular course offerings, under the direction of a member of the Literature Department faculty. **Prerequisites:** lower-division standing; cumulative 3.0 GPA.

TWS 21-22-23-24-25-26. Third World Literatures (4-4-4-4-4-4)

(See entry under "Third World Studies" heading.)

The courses in this sequence are equivalent to world literature courses. The sequence satisfies Marshall College general-education requirements.

UPPER-DIVISION

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

LTWL 100. Mythology (4)

A study of various bodies of myth: their content, form, and meaning. May be repeated for credit as topics vary.

LTWL 102. Women in Antiquity (4)

Selected topics in classical culture, including women and myth, women in Greek and Roman society, and the representation of women in classical literature. May be repeated for credit when topics vary.

LTWL 106. The Classical Tradition (4)

Greek and Roman literature in translation. May be repeated for credit as topics vary.

LTWL 107. Prose Fiction (4)

Aspects of prose fiction. Not confined to a single national literature. Texts may be read in English. May be repeated for credit as topics vary.

LTWL 108. Words and Their Vicissitudes (4)

The history of English and its forebears, focusing on the quirky nature of semantic change in order to equip students with a basis for evaluating metaphor, metonymy, and other forms of verbal deviance.

LTWL 110B. Folk and Fairy Tales (4)

A study of folk and fairy tales from various cultures, from the point of view of literary form, psychological meaning, and cultural function. May be repeated for credit as topics vary.

LTWL 111. Medieval Studies (4)

A lecture/discussion course designed to explore a variety of topics in medieval literatures and cultures. Topics may include a genre or combination of genres (e.g., drama, romance, lyric, allegory), or a central theme (e.g., the Crusades or courtly love).

LTWL 114. Children's Literature (4)

A study of literature written for children in various cultures and periods. May be repeated for credit as topics vary.

LTWL 115. Contemporary Literature (4)

A study of novels and authors of the present and recent times. May be repeated for credit as topics vary.

LTWL 116. Adolescent Literature (4)

A study of fiction written for the young adult in various cultures and periods. Consideration will be given to the young adult hero in fiction. May be repeated for credit as topics vary.

LTWL 120. Popular Literature and Culture (4)

A study of various popular forms—such as pop music, cult books, film, fashion, magazines, graphic arts—within a broader cultural context. Focus may be on a particular genre (e.g., best sellers) or era (e.g., the sixties). May be repeated for credit when topics vary.

LTWL 122. Fantasy (4)

Reading and analysis of various works that fall into several categories of the fantastic—e.g., heroic, gothic, irrealist, postmodern—with particular attention to the cultural uses of myth, folklore, and fantasy, and to the psychological and structuralist theories of same. May be repeated for credit when topics vary.

LTWL 123. Vampires in Literature (4)

A study of representations of the vampire through a variety of methodological perspectives with an emphasis on historical context and cultural symbolism.

LTWL 124. Science Fiction (4)

An exploration of the genre—past and present, in literature and the visual media—as a cultural response to scientific and technological change, as modern mythmaking, and as an enterprise serving a substantial fan subculture. May be repeated for credit when topics vary.

LTWL 128. Introduction to Semiotics and Applications (4)

Semiotics, basically a theory of signification, describes the models and conceptual constructs through which meaning is grasped and produced. Background in the history of semiotics and its dominant models.

LTWL 129. Wisdom: The Literature of Authority (4)

What is wisdom? Does wisdom refer to a specific type of discourse; a literary genre; a specific content that holds true transculturally and transtemporally? This class will consider these questions by reading literature from diverse times and places.

LTWL 135. The Buddhist Imaginary (4)

An introduction to the imaginative universe of Indian Buddhism, with a focus on the connection between cosmological models and liberative practices. In this class we read Buddhist narrative and doctrinal literatures, supplemented by archaeological and art historical artifacts.

LTWL 137. Sanskrit (4)

Study of classical Sanskrit, including grammar and reading.

LTWL 138. Critical Religion Studies (4)

Selected topics, texts, and problems in the study of religion. May be repeated for credit when content varies.

LTWL 139. Gnosticism: The Religious Underground from Late Antiquity to the New Age (4)

A survey of Gnostic currents in religious thought which influenced the Abrahamic traditions of Judaism, Christianity, and Islam, and which resurfaced periodically as heretical challenges to these mainstream traditions and their doctrinal orthodoxies.

LTWL 140. Novel and History in the Third World (4)

This course sets out to explore the relation between the novel and the "dependent" history of the Third World, contrasting and comparing the uses of history in the European novel as defined in the theoretical analysis of Lukacs with uses of history in the Third World novel. An analysis of major themes and movements common to selected ethnic literature in the United States and national literatures in the Third World.

LTWL 141. Islam and Modernity (4)

A survey of developments in the Islamic world during the period of European colonial domination and its aftermath, with special attention to the works of leading Muslim thinkers (e.g., Sayid Ahmed Khan, Muhammad Abdou, Hasan al Banna, Ruhallah Khomeini, among others).

LTWL 142. Islam: The Origins and Spread of a World Religion (4)

An investigation of the historical and textual beginnings of Islam; the development of the religion in the early Middle Ages; and an examination of the formalization of schools of Islamic law and the confrontation between Suuni and Shii versions of praxis. Concludes with the rise of Islamic modernism and the roots of Islamic fundamentalism.

LTWL 145. South Asian Religious Literatures: Selected Topics (4)

One or two topics in the religious literature of South Asia will be examined in depth. Repeatable for credit when topics vary.

LTWL 147. Readings in Mahayana Buddhism (4)

Students read and discuss Mahayana Buddhist literature, including sutra and narrative literatures, confessional works, doctrinal treatises, and tantric verse. Recommended: completion of LTWL 129 or LTWL 135.

LTWL 149. The Last Turn of the Century in the West (4)

A multi-media examination of the momentous cultural and intellectual changes that accompanied the last turn of the century (nineteenth–twentieth) in the West. Areas covered include literature, philosophy, visual arts, music, religion, social movements, and scientific thought.

LTWL 150. Modernity and Literature (4)

Explores the various cross-cultural historical, philosophical, and aesthetic ideas which formed the basis of most twentieth-century literature. Literature from the Americas, Europe, Asia, and Africa will be studied through lectures and the reading of texts in English translation. Repeatable for credit when topics vary.

LTWL 151. Religion and Politics (4)

Course surveys the historical and theoretical relationships between religion and politics in contemporary South West Asia, focusing on the interplay of religious movements and politics by looking at countries such as Egypt, Iraq, Israel, Lebanon, Saudi Arabia, Syria, and Turkey.

LTWL 152. Introduction to Islam (4)

An exploration of the history and religion of Islam, with focus on theological debates, mystical traditions, and ritual life of Islamic societies from the seventh century to the modern period. The rise of Islamist movements in contemporary history will also be discussed.

LTWL 153. Literature, Religion, and Culture in Iran (4)

This interdisciplinary course will explore the relationship between culture and religion in the Persian literature from the Abbasid to postrevolutionary Iranian history.

LTWL 154. Literature: Public Sphere (4)

Course focuses on the contentious notion of "public sphere," surveying its historical rise and various theoretical

debates in defining the term, ranging from political, social, feminist theories to postcolonial studies.

LTWL 155. Gender Studies (4)

The study of the construction of sexual differences in literature and culture. May be repeated for credit when topics vary.

LTWL 157. Iranian Film (4)

Course sets out to explore the history and theory of Iranian films in the context of the country's political, cultural, and religious settings since 1945. Students are expected to watch and discuss Iranian films, particularly the postrevolutionary films of Kiarostami and Mokhbabaf.

LTWL 158A. Topics in the New Testament (4)

Literary and socio-historical considerations of the diverse writings that developed into the New Testament. Topics include Jewish origins of the "Jesus movement" within Greco-Roman culture; varying patterns of belief/practice among earliest communities; oral tradition and development of canon.

LTWL 158B. Topics in Early Christian Texts and Cultures (4)

This course investigates the manner in which texts shape religious identities on the individual and communal level in sociohistorical and cultural contexts: various topics include portraits of Jesus, saints lives, death and afterlife, martyrdom, demonology, apocalypticism, Christianity, and empire.

LTWL 158C. Topics in Other Christianities (4)

A survey of the Christian texts that comprise the fatalities of the battles defining Christian canon: e.g., apocryphal acts, non-canonical gospels, and "Gnostic" texts. Considers the social communities, theological views, religious identities, and practices reflected in largely forgotten texts.

LTWL 160. Women and Literature (4)

This course will explore the relationship between women and literature, i.e., women as producers of literature, as objects of literary discourse, and as readers. Foreign language texts will be read in translation. May be repeated for credit as topics vary.

LTWL 165. Literature and the Environment (4)

With primarily American (and a couple of English) readings, the course inquires into the relation of human and nonhuman nature. Topics include wilderness, animals, Native American thought, women in nature, description as a kind of writing, the spirituality of place.

LTWL 166. The Yiddish Novel (4)

Yiddish literature is much more than folksongs and jokes. We will read major American and European works by Nobel laureate I.B. Singer, his brother I.J. Singer and sister Esther Krejtzman, Sholem Aleichem, Mendele, Chava Rozenfarb, and others. (In English translation.)

LTWL 167. Russia and the Jewish Imagination from the Enlightenment to the Present (4)

Course explores Russian Jewish literature, from Hassidic tales to Gary Shteyngart's *Absurdistan*. We will read works translated from Hebrew, Yiddish, and Russian. Written before, during, and since the Soviet period, including literature produced in Russia, Israel, and the U.S.

LTWL 168. Death and Desire in India (4)

This class investigates the link between desire and death in classical and modern Hindu thought. It considers the stories of Hindu deities, as well as the lives of contemporary South Asian men and women, in literature and film.

LTWL 172. Special Topics in Literature (4)

Studies in specialized literary, philosophic, and artistic movements, approaches to literature, literary ideas, historical moments, etc.

LTWL 176. Literature and Ideas (4)

The course will center on writers or movements of international literary, cultural, or ideological significance. The texts studied, if foreign, may be read either in the original language or in English. May be repeated for credit as topics vary.

LTWL 180. Film Studies and Literature: Film History (4)

The study of film history and its effects upon methods of styles in literary history. Repeatable for credit when topics vary.

LTWL 181. Film Studies and Literature: Film Movement (4)

Study of analogies between literary movements and film movements. Repeatable for credit when topics vary.

LTWL 183. Film Studies and Literature: Director's Work (4)

Methods of criticism of author's work applied to the study and analysis of film director's style and work. Repeatable for credit when topics vary.

LTWL 184. Film Studies and Literature: Close Analysis of Filmic Text (4)

Methods of literary analysis applied to the study of shots, sequences, poetics, and deep structure in filmic discourse. Repeatable for credit when topics vary.

LTWL 191. Honors Seminar (4)

Explorations in critical theory and method. This course, designed to prepare students to write an honors thesis, is open only to literature majors invited into the department's Honors Program.

LTWL 192. Senior Seminar in Literatures of the World (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

LTWL 195. Apprentice Teaching (0 or 4)

Undergraduate instructional assistance. Student must (1) prepare reading materials assigned by the professor; (2) lead student discussions; (3) assist professor in grading; and (4) prepare report to professor at conclusion of quarter concerning his/her work.

LTWL 196. Honors Thesis (4)

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTWL 191. Oral exam. **Prerequisite:** department approval.

LTWL 198. Directed Group Study (4)

Research seminars and research, under the direction of faculty member. **Prerequisite:** department approval.

LTWL 199. Special Studies (2 or 4)

Tutorial; individual guided reading in areas of literature (in translation) not normally covered in courses. May be repeated for credit three times. (P/NP grades only.) **Prerequisites:** upper-division standing and department approval.

GRADUATE

LTWL 500. Apprentice Teaching in Literature (2 or 4)

Consideration of pedagogical methods appropriate to undergraduate teaching in literature courses under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

LTWL 501. Apprentice Teaching in Humanities (2 or 4)

Consideration of pedagogical methods appropriate to undergraduate teaching in humanities sequences under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

LTWL 503. Apprentice Teaching in Marshall College (2 or 4)

Consideration of pedagogical methods appropriate to undergraduate teaching in Marshall College courses under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

LTWL 504. Apprentice Teaching in Warren College (2 or 4)

Consideration of pedagogical methods appropriate to undergraduate teaching in Warren College courses under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

LTWL 506. Apprentice Teaching in Roosevelt College (2 or 4)

Consideration of pedagogical methods appropriate to undergraduate teaching in Eleanor Roosevelt College courses under the supervision of instructor of course. Doctoral students in literature are required to participate in undergraduate teaching for a minimum of twelve units (two to four units per quarter) prior to completion of the Ph.D. degree.

WRITING/LITERATURE

LOWER-DIVISION

LTWR 8A. Writing Fiction (4)

Study of fiction in both theory and practice. Narrative technique studied in terms of subjectivity and atmosphere, description, dialogue, and the editing process will be introduced through readings from the history of the novel and short story. Writing exercises accompany reading assignments. **Prerequisite:** completion of college writing requirement.

LTWR 8B. Writing Poetry (4)

Study and practice of poetry as artistic and communal expression. Techniques of composition (traditional forms, avant garde techniques, dramatic monologue, performance poetry, and new genre) studied through written and spoken examples of poetry. Writing exercises accompany reading assignments. **Prerequisite:** completion of college writing requirement.

LTWR 8C. Writing Nonfiction (4)

Study of nonfictional prose in terms of genre and craft. Techniques of composition (journalism, essay, letters, reviews) will be studied through written examples of the genre. Practical imitations and exercises accompany the reading assignments. Prerequisite to upper-division non-fiction prose workshops. **Prerequisite:** completion of college writing requirement.

UPPER-DIVISION

Departmental approval is required for enrollment in all upper-division literature/writing courses.

PREREQUISITE: upper-division standing or consent of instructor. Additional prerequisites may be specified below.

(See "[Department of Theatre and Dance](#)" for course offerings in dramatic writing.)

Prose Fiction, Poetry, Media Workshops

LTWR 100. Short Fiction Workshop (4)

A workshop for students with some experience and special interest in writing fiction. This workshop is designed to encourage regular writing in the short forms of prose fiction and to permit students to experiment with various forms. There will be discussion of student work, together with analysis and discussion of representative examples of short fiction from the present and previous ages. May be taken for credit three times. **Prerequisites:** LTWR 8A; department approval.

LTWR 101. Writing Fiction in Spanish (4)

A workshop for students with interest in writing fiction in Spanish. Includes discussion of student work, together with analysis and discussion of representative examples of short fiction from the present and previous ages. A working knowledge of Spanish is required. May be taken for credit three times. **Prerequisites:** LTWR 8A; LTSP 50A or 50B or 50C; department approval.

LTWR 102. Poetry Workshop (4)

A workshop for students with some experience and special interest in writing poetry. This workshop is designed to encourage regular writing of poetry. There will be discussion of student work, together with analysis and discussion of representative examples of poetry from the present and previous ages. May be taken for credit three times. **Prerequisites:** LTWR 8B; department approval.

LTWR 104A. The Novella I (4)

A two-quarter workshop for fiction writers ready to explore a longer form, and committed to developing a single piece over the course of two consecutive quarters. In addition to analyzing student work, we will read and discuss a wide range of published novellas. Two-quarter sequence; students must complete LTWR 104A and LTWR 104B in order to receive final grade in both courses. **Prerequisites:** LTWR 100; department approval.

LTWR 104B. The Novella II (4)

A continuation of LTWR 104A in which fiction writers complete the novella manuscripts they began during the previous quarter. Each student will produce a novella of at least fifty revised pages by the end of the quarter. We will continue to read and discuss published novellas with a particular emphasis on narrative strategy, structure, and revision. Two-quarter sequence; students must complete LTWR 104A and LTWR 104B in order to receive final grade in both courses. **Prerequisites:** LTWR 104A; department approval.

LTWR 106. Science Fiction, Fantasy, and Irrealism Workshop (4)

In this workshop, students will practice skills of narration, characterization, and style with particular attention to the demands of non-realistic genres, especially the challenge of suspending disbelief in fictional environments that defy conventional logic. Readings and lectures will accompany writing exercises. May be taken for credit three times. **Prerequisites:** LTWR 8A; department approval.

LTWR 113. Intercultural Writing Workshop (4)

This course is an introduction to modes of writing from other cultural systems vastly different from the cultural-aesthetic assumptions of Anglo-American writing. While disclosing the limitations of the English language, this course attempts to provide new language strategies for students. May be taken for credit three times. **Prerequisites:** LTWR 8A, 8B, or 8C; department approval.

LTWR 114. Graphic Texts Workshop (4)

From illuminated manuscripts to digital literature, from alphabets to concrete poems, from artists' books to comics, this course explores the histories and techniques of combinatory image/word literary arts. The course may emphasize specific movements or genres. May be taken for credit three times. **Prerequisites:** LTWR 8A or 8B or 8C; department approval.

LTWR 115. Experimental Writing Workshop (4)

This workshop explores writing for which the traditional generic distinctions of prose/poetry, fiction/ documentary, narrative/discourse do not apply. Students taking this course will be asked to challenge the boundaries of literature to discover new forms and modes of expression. May be taken for credit three times. **Prerequisites:** LTWR 8A, 8B, or 8C; department approval.

LTWR 119. Writing for Performance (4)

A workshop and survey of experimental approaches to the writing and production of performance works in a range of literary genres. Emphasis will be placed on the integration of written texts with non-verbal elements from the visual arts, theater, and music. **Prerequisite:** LTWR 8A or 8B, to be determined by quarterly offerings of LTWR 119; department approval.

Nonfiction Prose Workshops**LTWR 120. Personal Narrative Workshop (4)**

A workshop designed to encourage regular writing of all forms of personal experience narrative, including journals, autobiography, firsthand biography, and firsthand chronicle. Instructor and students will discuss student work as well as published personal narratives. May be taken for credit three times. **Prerequisites:** LTWR 8A, 8B, or 8C; department approval.

LTWR 121. Media Writing Workshop (4)

Workshop focusing on the review, the op-ed piece, the column, the blurb, the profile, the interview, and "content-providing" for Web sites. We'll examine current examples of media writing; students will produce a body of work and critique one another's productions. May be taken for credit three times. **Prerequisites:** LTWR 8C; department approval.

LTWR 122. Writing for the Sciences Workshop (4)

A workshop in writing about science for the public. Students will study and then construct metaphors or analogues which introduce readers to scientific perplexities. Completion of LTWR 8A, 8B, or 8C highly recommended. May be repeated for credit three times. **Prerequisite:** department approval.

LTWR 124. Translation of Literary Texts Workshop (4)

A writing workshop on the theory and practice of literary translation. Students will translate literary texts and workshop with the instructor and other course members. Selected readings in translation theory. May be taken for credit three times. **Prerequisites:** LTWR 8A, 8B, or 8C; department approval.

LTWR 126. Creative Nonfiction Workshop (4)

A writing, reading, and critical-thinking workshop designed to produce nonfiction pieces that fall outside the limits of the essay form. Included are travel narratives, memoir, and information-based writing that transform their own materials into compelling literature. May be repeated for credit three times. **Prerequisites:** LTWR 8C; department approval.

LTWR 129. Distributing Literature Workshop (4)

Workshop designed to critique and engage the means of distributing literature within culture. Publishing from "zine" through mainstream publication; Web publishings; readings and "slams"; publicity and funding; colloquia with writers; politics and literature; and the uses of performance and media. May be taken for credit three times. **Prerequisites:** LTWR 100, LTWR 102, or LTWR 120; department approval.

Writing Process, Written Discourse, and Writing Pedagogy

These courses are not writing workshop courses like those listed above. Rather, they examine various aspects of writing as a field of study and writing pedagogy. Writing majors who plan to teach writing may be particularly interested in these courses. See the department for applicability of these courses to the writing major requirements.

Note: As of fall 1991, all writing majors are required to take one course chosen from offerings numbered LTWR 140–148 to fulfill one of their upper-division requirements.

LTWR 143. Stylistics and Grammar (4)

A close look at sentence-level features of written discourse—stylistics and sentence grammars. Students will review recent research on these topics and experiment in their own writing with various stylistic and syntactic options. **Prerequisite:** department approval.

LTWR 144. The Teaching of Writing (4)

Wide reading in current theory and practice of teaching writing in schools and colleges. Careful attention to various models of classroom writing instruction and to different approaches in the individual conference. Students in this course may observe instruction in the UCSD college writing programs or tutor freshman students in those programs. **Prerequisite:** department approval.

LTWR 148. Theory for Writers/Writing for Theory (4)

Hybrid workshop offering writing students a working knowledge of literary theory while exposing literature students to practical techniques from poetry, fiction, and nonfiction to refresh their writing of theoretical nonfiction texts. Discussion of student work and published work. **Prerequisite:** department approval.

Directed Study and Special Study**LTWR 192. Senior Seminar in Literatures in Writing (1)**

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in literature (at the upper-division level). Senior seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

LTWR 195. Apprentice Teaching (4)

Undergraduate instruction assistance. Students will 1) assist TA in editing students' writing for LTWR 8A and 8C during class and outside of class; and 2) prepare a paper and report for the professor at the end of the quarter. **Prerequisite:** LTWR 144

LTWR 196. Honors Thesis (4)

Senior thesis research and writing for students who have been accepted for the Literature Honors Program and who have completed LTWR 191. Oral exam. **Prerequisite:** department approval.

LTWR 198. Directed Group Study (2 or 4)

Directed group study in areas of writing not normally covered in courses. (P/NP grades only.) Repeatable for credit when areas of study vary.

LTWR 199. Special Studies (2 or 4)

Tutorial; individual guidance in areas of writing not normally covered in courses. (P/NP grades only.) May be taken for credit three times. **Prerequisites:** upper-division standing and department approval.

GRADUATE

PREREQUISITE: graduate standing or consent of instructor.

LTWR 200. Fiction Workshop (4)

A weekly meeting between a faculty member, guest fiction writers, and a small group of M.F.A. students for focused discussion of new student writing produced during the time of the workshop. The workshop guides students toward beginning the full-length manuscript that will constitute their M.F.A. project. **Prerequisite:** department approval.

LTWR 202. Poetry Workshop (4)

A weekly meeting between a single faculty member, occasional guest poets, and a small group of M.F.A. students engaged in a discussion of new student work produced during the time of the workshop. There will be assigned readings and some writing exercises to give the course focus. **Prerequisite:** department approval.

LTWR 215. Cross-Genre Workshop (4)

In the generative workshop, writers create intergenre works and practice unconventional workshoping techniques that function less as editorial roundtables and more as discussions of the relationships between aesthetics and culture. **Prerequisite:** department approval.

LTWR 260. Autoethnographies of Literacy (4)

Designed for public school teachers, this writing seminar concerns ethnographic and autoethnographic studies of "literate" and "illiterate" in the United States.

LTWR 271. Theory and Practice of College Writing Instruction (4)

In this course we will explore the implications for writing instruction of current discourse theory and of linguistics (sentence-level and text-level). We will also review research on writing instruction and look carefully at several models of classroom instruction and individual conferencing.

LTWR 272. Research in Composing and Writing Discourse (4)

This course will survey current research on composing and written discourse. It will also explore various problems and issues in designing research studies.

LTWR 282. Writing States (4)

This course will be a cross-genre writing workshop where graduate students in literature with some experience in creative writing can work with other writers and broaden their own practices. The seminar will read selected texts that spur specific writing assignments. Students who already have a new or ongoing writing project can workshop that as an alternative to doing assignments. The group will critique one another's efforts, each participant creating a twenty-page manuscript. Also at the end of the quarter the students will collectively agree on a project—a reading, performance, video, or publishing project that will document the workshop.

LTWR 295. M.F.A. Thesis (1-12)

Research for master's thesis. Offered for repeated registration. Open only to M.F.A. students. **Prerequisite:** department approval.

LTWR 298. Directed Studies: Writing Course (1-12)

This course may be designed according to an individual student's needs when seminar offerings do not cover subjects, genres, or authors of interest. May be applied toward the guided research or graduate seminar in literature requirement of the M.F.A. program. Repeatable for credit. **Prerequisite:** department approval.

The Making of the Modern World

OFFICE: Eleanor Roosevelt College, Administration Building
<http://roosevelt.ucsd.edu/mmw/>

The Making of the Modern World (MMW) is an interdisciplinary, six-course program that provides a broad, global overview of the past from the dawn of human history and early societies (MMW 1) to social, environmental, economic, and political challenges facing the contemporary world (MMW 6). It is designed to encourage students to think historically, comparatively, and in an interdisciplinary manner about both the past and the present. MMW also provides instruction in university-level writing and analysis as students examine and interpret both primary and secondary source material. ERC students entering UC San Diego as freshmen are required to complete the full MMW sequence (six quarters), while transfer students, entering UCSD as upper classmen, are only required to take any three quarters, usually including the transfer specific course MMW 4T. Each course includes lectures, discussion sections, and writing assignments. Courses in the sequence may be taken for a letter grade only.

Students in the Making of the Modern World 2 and 3 (offered in winter and spring quarters respectively) fulfill their University of California composition requirement by receiving intensive instruction in university-level writing. Subject matter for writing instruction is drawn from or related to course material. Instruction in writing is provided in discussion sessions, which meet twice each week. Each of these two writing-intensive quarters carries six units of credit. Students must have satisfied the university's Entry Level Writing requirement in English composition before enrolling in the Making of the Modern World 2 or 3.

For further details on Eleanor Roosevelt College requirements, see "Eleanor Roosevelt College, General-Education Requirements."

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

TRADITIONS

1. Prehistory and the Birth of Civilization (4)

This quarter introduces students to what is known about early humans, including the evolution of the human body and the reconstruction of Paleolithic and Neolithic cultures. It examines contemporary hunting-and-gathering and tribal societies and illuminates the complexity of such cultures with respect to mythology and oral tradition, interpersonal relations, and ecological practices. The course will conclude with an analysis of the emergence of large agrarian societies and the earliest great settled communities and civilizations. Three hours of lecture, one hour of

discussion. Open to Eleanor Roosevelt College students only. (Letter grade only.) (F)

2. The Great Classical Traditions (6)

An introduction to five major classical civilizations of the ancient world. Equal attention will be given to the ancient Near East, Greece, India, China, and the Roman Republic, all of which have left legacies to the present. The course covers the great early systems of religious and social thought, using an approach that combines history and social science. This course includes intensive instruction in writing expository prose. Three hours of lecture, two hours of writing and discussion sections. **Prerequisite:** satisfaction of the UC Entry Level Writing requirement. Open to Eleanor Roosevelt College students only. (Letter grade only.) (W)

3. The Medieval Heritage (6)

A survey of the period from about 29 BCE to 1200 CE, this quarter concentrates on the development of China from the Han to the Sung dynasties, the growth and eventual dissolution of the Roman Empire, the development of Christianity, and the rise of Islam. This course includes intensive instruction in university-level writing. Three hours of lecture, two hours of writing and discussion sections. **Prerequisite:** satisfaction of the UC Entry Level Writing requirement. Open to Eleanor Roosevelt College students only. (Letter grade only.) (S)

TRANSFORMATIONS

4. New Ideas and the Clash of Cultures (4)

An examination of the world from 1200 to 1750, the course focuses on the transition from medieval to modern by addressing philosophical, social, political, economic, and technological changes in Asia, Europe, and Islamic territories. Topics may include the Mongol invasions and their impact; the European Renaissance, Reformation, and Scientific Revolution; Islamic and Chinese empires; exploration and trade; and European expansion into the Americas. Three hours of lecture, one hour of discussion. **Prerequisites:** satisfaction of the UC Entry Level Writing requirement; successful completion of MMW 2 and/or MMW 3. Open to Eleanor Roosevelt College students only. (Letter grade only.) (F)

4T. Understanding the Premodern World (Transfer Students Only) (4)

This course is designed specifically for transfer students and provides a background to major trends and issues addressed in previous MMW courses. MMW 4T also reviews and strengthens students' analytical, research, and writing skills. This course helps students adjust to the UCSD environment by preparing them for writing and research for other MMW courses and beyond. A research paper is due at the end of this term. Three hours of lecture, one hour of discussion. **Prerequisites:** transfer student and satisfaction of the UC Entry Level Writing Requirement. Open to Eleanor Roosevelt College students only. (Letter grade only.) (F)

5. Revolution, Industry, and Empire (4)

A consideration of the great changes in European society from the late eighteenth century to the Russian Revolution, and their impact on the non-Western world. Topics include industrialization, the rise of nationalism and the nation-state, Western imperialism, and the colonial experience. Developments in non-Western countries during this period will be examined from their own internal perspective. Three hours of lecture, one hour of discussion. **Prerequisites:** satisfaction of the UC Entry Level Writing requirement; successful completion of MMW 2, MMW 3, and/or MMW 4. Open to Eleanor Roosevelt College students only. (Letter grade only.) (W)

6. Twentieth Century and Beyond (4)

The course begins with a consideration of the causes and consequences of World War I, and then looks at the post-war crisis of liberal values and institutions. It addresses the deepening of crisis in the thirties, especially evident in the emergence of ideological politics and extreme nationalism in the context of worldwide depression. This period of crisis provides the background for understanding World War II. Attention is then devoted to the cold war, the competition

between capitalism and communism, and the process of decolonization. The course ends with a discussion of the collapse of communism and the emerging world order (or disorder). Three hours of lecture, one hour of discussion. **Prerequisites:** satisfaction of the UC Entry Level Writing requirement; successful completion of MMW 2, MMW 3, MMW 4, and/or MMW 5. Open to Eleanor Roosevelt College students only. (Letter grade only.) (S)

Management, Rady School of

PROFESSORS

Uri Gneezy, Ph.D., *Management/Strategy*
Vish Krishnan, Ph.D., *Innovation, Technology, and Operations*
Harry M. Markowitz, Ph.D., *Finance*
Craig R.M. McKenzie, Ph.D., *Management/Strategy and Psychology*
David A. Schkade, Ph.D., *Management/Strategy and Associate Dean*
Robert S. Sullivan, Ph.D., *Dean*
Allan Timmermann, Ph.D., *Finance*

ASSOCIATE PROFESSORS

Karsten Theil Hansen, Ph.D., *Marketing*
Jun Liu, Ph.D., *Finance*
Rossen Valkanov, Ph.D., *Finance*
Kevin Zhu, Ph.D., *Innovation, Technology, and Operations*

ASSISTANT PROFESSORS

On Amir, Ph.D., *Marketing*
Terrence W. August, Ph.D., *Innovation, Technology, and Operations*
Sylvain Champonnois, Ph.D., *Finance*
Sanjiv Erat, Ph.D., *Innovation, Technology, and Operations*
Ayelet Gneezy, Ph.D., *Marketing*
Nikolay V. Halov, Ph.D., *Finance*
Dominique Olie Lauga, Ph.D., *Management/Strategy*
Dongmei Li, Ph.D., *Finance*
Thomas A. Roemer, Ph.D., *Innovation, Technology, and Operations*
Pamela K. Smith, Ph.D., *Management/Strategy*

<http://rady.ucsd.edu>

THE MASTER OF BUSINESS ADMINISTRATION (M.B.A.)

REQUIREMENTS FOR ADMISSION

Students interested in pursuing the M.B.A. degree program at UC San Diego's Rady School of Management (RSM) must have earned a B.A., or its equivalent, with training comparable to that provided by the University of California. A minimum scholastic average of 3.0 or better is required for course work completed in upper-division or prior graduate study. No specific undergraduate major or course work is required for admission, though preparation in quantitative methods (such as calculus and statistics) is strongly encouraged. Prior business course work is not necessary. Students who do not have adequate quantitative preparation at the time of admission will need to complete preparatory course work before matriculation.

The admissions committee assesses professional and organizational experience in terms of scope or level of responsibility, evidence of contribution or success, and evidence of career progression or of

growth in responsibility. The full-time M.B.A. does not require professional work experience; however, the school believes that some prior experience in organizations and teams is critical to effective learning in the M.B.A. program. Most students in the full-time M.B.A. class will have some post-graduate professional experience. FlexWeekend and FlexEvening M.B.A. students are working professionals; no specific number of years of work experience is required.

Applicants must submit two letters of recommendation from individuals who can attest to their professional and leadership skills and to their potential for business leadership.

Applicants are required to submit the Graduate Management Admission Test (GMAT) scores (verbal, quantitative, and analytical writing). (Indicate code #4836.) A minimum score of 550 on the paper/pencil version and a minimum score of 213 on the computer-based version of the Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English. Students who score below 600 on the paper/pencil or 250 on the computer-based TOEFL examination are strongly encouraged to enroll in an English-as-a-second-language program before beginning graduate work. The International English Language Testing System (IELTS) is also accepted with a minimum score of 7.

Interviews are required for admission to the M.B.A. program. Interviews are by invitation after review of the completed application.

The full-time M.B.A. is a two-year, full-time program. The FlexWeekend M.B.A. is twenty-four months, including two summers, and is scheduled on alternate weekends to accommodate the needs of working professionals. The FlexEvening M.B.A. is thirty months, including summers, and is scheduled two nights per week to accommodate the needs of working professionals.

The school's M.B.A. application is available online at the school's Web site.

THE M.B.A. CURRICULUM (NINETY-TWO UNITS)

The M.B.A. curriculum (ninety-two units) is made up of a set of core disciplinary and skill-oriented courses with an emphasis on industry sectors, unstructured electives, and the Professional Seminar. The basic curriculum is the same for the full-time and Flex students.

Industry Sector Emphasis

The Rady School's M.B.A. is designed to allow students to develop depth in industry sectors of particular interest. Selection of an industry is not required. The program combines a solid core, an integrative course sequence focused on innovation, a strong elective curriculum, a commitment to leadership development, and an emphasis on cutting-edge industry sectors.

Core Curriculum

The core curriculum provides a comprehensive education in the fundamentals of business and

management and lays a strong foundation for further study.

Electives

Students may choose from electives in the full range of business and management disciplines, including accounting, finance, management, marketing, operations and information technology, and strategy. In addition, students may, with approval, take graduate courses offered elsewhere on campus. Prospective students are advised to consult the RSM Office of Admissions for a list of planned elective courses.

Professional Seminar

The Professional Seminar is a one-credit course offered each quarter. The seminar brings business leaders and experts to campus to speak to students and provides workshops focused on professional and leadership development and on personal and career effectiveness. The seminar may be taken multiple times for credit.

Internships

Full-time M.B.A. students are strongly encouraged to participate in internships during the summer between the two years of the academic program. Part-time internships are also available during the academic year. Internships are coordinated through M.B.A. Career Connections, the school's career center.

Executive Mentor Program

The Rady School's Executive Mentor program matches small groups of M.B.A. students with senior business executives. Mentors work directly with their groups, offering perspective, guidance, and expertise based on their deep experience in business. Mentors help guide M.B.A. students as they map out areas for personal and professional development, gain understanding of career progression and the skills and abilities required for successful leadership, and seek feedback about opportunities and areas of concern.

Career Services

M.B.A. Career Connections, the Rady School's career center, provides students with expertise, guidance, and resources to successfully manage their careers. Services and resources of M.B.A. Career Connections are available to all M.B.A. students, with some limitations for those sponsored by their employers. For full-time M.B.A. students, the center's personalized approach to career management begins before the student's first quarter and continues throughout the program. M.B.A. Career Connections actively works to identify opportunities for students and to enable students to build strong professional networks.

Career services include career assessment, individual career coaching, career fairs, workshops, employer presentations and panels, internship and career employment listings, and on-campus interviews. Specialized M.B.A. career workshops focus on resume writing, interviewing skills (including videotaped mock interviews), effective job search strategies, and job offer evaluation and negotiation.

THE PH.D. IN MANAGEMENT

The Rady School offers a Ph.D. in management designed to prepare graduates for careers in academic research. Only students who intend to pursue a doctorate should apply; the department does not enroll students who seek a master's degree as a terminal degree.

Students with undergraduate preparation in various areas of the social and physical sciences may apply to the program. Students who elect to specialize in management science and finance are required to have additional mathematical knowledge, such as advanced calculus and statistics.

To be considered for admission candidates must

- Hold an undergraduate degree from an accredited college or university.

- Complete the UCSD Application for Admission with application fee.
- Submit test scores from the Graduate Management Admissions Test (GMAT) or Graduate Record Examination (GRE) taken within five years of the date of application. Official Test of English as a Foreign Language (TOEFL) exam scores are required of applicants whose primary language is not English or who graduate from a university at which the language of instruction was not English.
- Submit two copies of official transcripts from all colleges and universities attended.
- Submit three letters of recommendations that speak to the candidate's potential as a researcher.
- Submit a statement of purpose.
- Take "Mathematics for Economists" from the UCSD economics department prior to the start of the first fall quarter.

Note: At the discretion of the Admissions Committee, personal interviews may be required.

Program instruction includes formal core and domain/methodology course work, directed study in close consultation with faculty in preparation for a research career, and individual research required for the student's dissertation. The core curriculum consists of a mathematics review and two course sequences designed to ensure that students are educated in the fundamentals of economic and social sciences. Individual students may be required to take additional courses depending upon educational background. The domain/methodology course requirement helps the student acquire the deep domain knowledge and methodological skills required to conduct research in his or her areas of interest.

The main Ph.D. requirements are that a student completes the core and elective course work, qualifying examinations, original research papers and presentations, a dissertation acceptable to the doctoral committee, and a final oral examination on the dissertation. Rather than a separate qualifying exam on each topic, students will be required to pass graduate course exams with a cumulative GPA of 3.6. If a student does not have the 3.6 (A-) average, the topic qualifying exams will be required.

Ph.D. students must be in residence a total of six quarters, three of which must be spent in continuous

residence at the Rady School on the San Diego campus. A minimum of three quarters of residency must pass between the date of formal advancement to candidacy and the date of the final examination.

Nonresident students who have failed to establish California residency after the first year will be responsible for their own tuition.

Normative time (defined as that period of time in which students under normal circumstances are expected to complete their doctoral program) is four to five years, based on the student's background and progress. The maximum length of time that a student may remain a pre-candidate for the Ph.D. degree is three years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

A detailed description of the Ph.D. program is available on the Internet at <http://management.ucsd.edu/phd/> or by contacting the Ph.D. program coordinator at radyphd@ucsd.edu. Residence and other campuswide regulations are described in the graduate studies section of this catalog.

THE ACCOUNTING MINOR

The Rady School of Management's accounting minor is designed to provide students a breadth of understanding of accounting theory, practices, and applications. The minor will appeal to students who envision careers in the accounting profession. Because of accounting's broad application, these careers would span across public accounting firms, corporate accounting departments, and governmental, nonprofit, and nongovernmental organizations. For many students, this will be their first step in achieving a Certificate in Public Accounting, C.P.A.

ACCOUNTING MINOR REQUIREMENTS

The accounting minor will consist of seven courses that cover the key accounting principles, processes, and applications. Required courses include two lower-division courses and five upper-division courses:

Lower-Division Courses

MGT 4. Financial Accounting or Econ. 4: Financial Accounting

MGT 5. Managerial Accounting

Upper-Division Courses

MGT 131A. Intermediate Accounting A

MGT 131B. Intermediate Accounting B

MGT 132. Auditing

MGT 135. Federal Taxation—Companies

MGT 136. Advanced Accounting

In order to count toward the minor, all courses must be taken for a letter grade and students must earn a C- or better in each course. Lower-division transfer credits for courses that are clearly equivalent in scope and content to lower-division courses required for the accounting minor will be accepted from regionally accredited United States institutions and from foreign institutions recognized by the Rady School of Management.

C.P.A. Accounting Requirements

A student who completes nine Rady accounting courses (the seven courses required for the minor plus two electives for a total of thirty-six quarter units) will have met the accounting portion of the educational requirement for their C.P.A.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION UNDERGRADUATE COURSES

MGT 4. Financial Accounting (4)

Recording, organizing and communicating financial information to business entities. Cross-listed with Econ. 4.

MGT 5. Managerial Accounting (4)

Internal accounting fundamentals, including cost behavior, cost application methods, overhead allocation methods, break-even analysis, budgeting, cost variance analysis, inventory management, and capital budgeting.

UPPER-DIVISION UNDERGRADUATE COURSES

MGT 103. Product Marketing and Management (4)

Defining markets for products and services, segmenting these markets, and targeting critical customers within segments. Strategies to position products and services within segments. The critical role of pricing as well as market research, product management, promotion, selling, and customer support. **Prerequisite:** upper-division standing.

MGT 110. Business: Innovative Enterprise Creation and Management (4)

Introductory course covering new innovative venture fundamentals and life cycles. Emphasis on theory, history, and current paradigms in: business models, financial and marketing basics, growth strategies, communications, and establishing and working in teams. Offered in summer only. **Prerequisite:** upper-division standing or consent of instructor.

MGT 111. Business: Introduction to Technology Business Start-up Process (4)

Students learn to: recognize, screen, and test the feasibility of technology-based business opportunities; determine market demand and financial and other resource requirements, make mini-business plans for start-up, growth, and harvesting. Offered in summer only. **Prerequisite:** upper-division standing or consent of instructor.

MGT 112. Global Business Strategy (4)

Will examine the advantages and complications of the multinational organization with emphasis on translating marketing, financing, and operating plans in light of geographical, cultural, and legal differences across the globe. Will also cover organizational considerations for transglobal management. **Prerequisites:** MGT 103 and MGT 181.

MGT 121A. Innovation to Market A (4)

Consider new project concepts. Discern market needs, competitive environment, and determine "go to market" strategy. Research potential markets, customers, partners, and competitors. Consider price versus attributes, alternative distribution channels, gaining unfair advantage. Examine the need and structure of a start-up team. **Prerequisite:** upper-division standing.

MGT 121B. Innovation to Market B (4)

Build a business plan. Establish intellectual property rights. Provide financial projections and determine financing needs. Explore investment sourcing, business valuation, and harvesting opportunities. Determine operational plans and key employee requirements. **Prerequisite:** upper-division standing.

MGT 131A. Intermediate Accounting A (4)

Preparation and interpretation of accounting information under both FASB and IASB guidelines pertaining to revenue and expense recognition, receivables, and inventories. **Prerequisites:** upper-division standing and MGT 5 and either MGT 4 or Econ. 4.

MGT 131B. Intermediate Accounting B (4)

Preparation and interpretation of accounting information under both FASB and IASB guidelines pertaining to property plant and equipment, leases, intangible assets, investments, long-term debt, and stockholders' equity. **Prerequisite:** MGT 131A.

MGT 132 Auditing (4)

Theory and practice of the attest process; planning and implementing the audit of the financial statements and internal control over financial reporting to ensure compliance with applicable requirements. **Prerequisite:** MGT 131B.

MGT 133. Advanced Cost Accounting (4)

Covers cost accumulation and analysis, for both manufacturing cost components and service activities, budgeting and cost projections, cost variance analysis, relevant costs, and capital investment analysis. **Prerequisite:** MGT 131B.

MGT 134. Federal Taxation—Individuals (4)

Covers theory and practical application of federal income tax regulations for individuals pertaining to gross income, adjusted gross income, itemized deductions, business operations, passive activities, property transactions, deferred income recognition, and reporting standards. **Prerequisite:** MGT 132.

MGT 135 Federal Taxation—Companies (4)

Covers the theory and practical application of federal income tax regulations for corporations and other enterprises pertaining to formulations, annual operations, distributions, liquidations, reorganizations, affiliations, and reporting standards. **Prerequisite:** MGT 132.

MGT 136. Advanced Accounting (4)

Covers accounting topics related to consolidated financial statements, variable interest entities, foreign currency translation, segment reporting, and business combinations. **Prerequisite:** MGT 135.

MGT 164. Organizational Leadership (4)

Will study alternative organizational structures, their stakeholders and cultures and use in meeting strategic enterprise priorities. Insights into motivational factors, communications networks, alternative leadership styles, and change management. Attention given to what the organization measures, controls, and rewards. **Prerequisite:** upper-division standing.

MGT 166. Business Ethics and Corporate Responsibility (4)

Will cover ethical conduct issues for leaders from a wide array of organizations and industries including consideration of differences among global trading partners. The issues impacting corporate responsibility will be examined as will full-cycle cost analysis of products and services. **Prerequisite:** upper-division standing.

MGT 172. Business Project Management (4)

Addresses effective practices for management of business projects. Includes both project management processes—scheduling, milestone setting, resource allocation, budgeting, risk mitigation—and human capital management—communication, teamwork, leadership. Also considers requirements for effectively working across functional and organizational boundaries. **Prerequisite:** upper-division standing.

MGT 174. Supply Chain and Operations Management (4)

Will cover process design and optimization, inventory control and forecasting, vendor selection and management, operations, planning and management, global distribution techniques, material, labor, and overhead costing, and work-in-process tracking and valuation, quality control along with organizational issues. **Prerequisite:** upper-division standing.

MGT 181. Enterprise Finance (4)

Will cover debt and equity financing of the enterprise, the role of commercial banks, venture firms, and investment banks; along with enterprise valuation, cash flow management, capital expenditure decisions, return on investment, economic value add, and foreign currency translation. **Prerequisite:** upper-division standing.

MGT 199. Directed Independent Study (4)

Directed individual study or research by special arrangement and under supervision of a faculty member. **Prerequisites:** consent of instructor and departmental approval; approved Special Studies form.

M.B.A. APPROVED COURSE LIST**MGT 201. Marketing Strategy (4)**

Addresses formulation and implementation of marketing strategy, based on an integrative view of competitive brand strategy over the product life cycle. Provides a framework for developing marketing strategies yielding sustainable competitive advantage based on customer, competitor, industry, and environmental analysis. **Prerequisite:** admission to degree program or consent of instructor.

MGT 202. Research for Marketing Decisions (4)

Methods and applications of qualitative and quantitative marketing research to solve substantive marketing problems. Emphasis on integrating problem formulation, research design, questionnaire construction, and sampling to yield the most valuable information, and on the proper use of statistical methods. **Prerequisite:** admission to degree program or consent of instructor.

MGT 203. Consumer Behavior (4)

The course identifies the factors that influence the selection and usage of products and services. Students will be introduced to problems/decisions that include evaluating behavior; understanding the consumers' decision process, and strategies to create desirable consumer behavior. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 204. Marketing Communications (4)

This course differentiates decisions/principles considered when developing an overall communications and promotions strategy. Key decisions include the promotional mix, the design, implementation and evaluation of communications strategies, and the thinking required to develop a creative strategy. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 209. Topics in Marketing (2 or 4)

Introduces advanced topics of special interest in marketing. May be repeated for a maximum of eight credits if the topics are substantially different. Instructional methods include face-to-face lecture, case presentations, assigned readings, and online group discussions. **Prerequisite:** admission to the M.B.A. program or consent of faculty.

MGT 210. Regulation and Innovation (4)

Addresses the complex role of regulation in business innovation. Includes legal issues such as how to structure a business, whether to seek intellectual property protection, when and how to raise capital or formulate exit strategies, how to make employment decisions. **Prerequisite:** core finance course or consent of instructor.

MGT 211. CEO, the Board of Directors and Corporate Governance (4)

Provides an understanding of relationships among shareholders, managers, and boards. Focuses on the office of the chief executive officer and on the board of directors, including the roles and responsibilities of directors, and the legal, economic, managerial, and psychological issues they confront. **Prerequisite:** admission to M.B.A. program or consent of instructor.

MGT 219. Topics in Corporate Governance (2 or 4)

Introduces advanced topics of special interest in corporate governance. May be repeated for a maximum of eight credits if the topics are substantially different. Instructional methods include face-to-face lecture, case presentations, assigned readings, and online group discussions. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 220. Opportunity and Business Model Analysis (4)

Builds on core management courses and deals with identifying and assessing new technological and product opportunities. Assessment methods and frameworks will be introduced for technologies and opportunities. Various business models to profitably address market opportunities will also be discussed. **Prerequisite:** core finance course (MGT 408) or consent of instructor.

MGT 221. Topics in Innovation (2 or 4)

Advanced topics in business innovation, delivered by lecture, case discussion, and online instruction. **Prerequisite:** admission to M.B.A. program or consent of instructor.

MGT 222. Creativity and Innovation (4)

Focuses on fostering and maintaining creativity in entrepreneurial ventures and, more broadly, in general management. Reading materials, cases, classroom, and home exercises will help students understand and be able to use creativity in their own working lives. **Prerequisite:** admission to M.B.A. program or consent of instructor.

MGT 229. Topics in International Business (2 or 4)

Introduces advanced topics of special interest in international business (e.g., global supply chain and the rise of Mexican maquiladoras; entrepreneurship in Russia). May be repeated for a maximum of eight credits if the topics are substantially different. Instructional methods include face-to-face lecture, case presentations, assigned readings, and online group discussions. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 230. Strategic Cost Management (4)

The course details the knowledge and analytical skills necessary to use accounting cost information as a basis for formulating and evaluating corporate strategies. Sessions focus on the principles of strategic positioning analysis, value chain analysis, and cost driver analysis. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 239. Topics in Accounting (2 or 4)

Introduces advanced topics of special interest in accounting. May be repeated for a maximum of eight credits if the topics are substantially different. Instructional methods include face-to-face lecture, case presentations, assigned readings, and online group discussions. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 240. Decision Analysis (4)

Provides practical techniques to help structure decision problems and analyze them quantitatively. Techniques help thinking clearly about objectives, alternatives, consequences, and uncertainties, and enable logical judgments with other types of information. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 249. Topics in Decision Sciences (2 or 4)

Introduces advanced topics of special interest in management and decision sciences. May be repeated for a maximum of eight credits if the topics are substantially different. Instructional methods include face-to-face lecture, case presentations, assigned readings, and online group discussions. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 250. Biotechnology Industry, Structure, and Strategy (4)

Provides a business overview of the life-science industry, its major market segments, financial structure, and financing strategies. Develops an understanding of major industry issues and strategies, including business development, financing, partnering and alliances, emerging trends, ethical and policy issues. **Prerequisite:** completion of M.B.A. core curriculum or consent of instructor.

MGT 251. Topics in Business Strategy (2 or 4)

Advanced topics in business strategy. Instructional methods include face-to-face lecture sessions and case discussion. **Prerequisite:** admission to M.B.A. program or consent of instructor.

MGT 259. Global Business Intensive (2)

Introduces advanced topics in global business, with a regional emphasis. Instructional methods include lectures, case presentations, readings, and discussions. A substantial portion of learning outcomes will be met by visiting

businesses in another world region, observing operations, and interviewing executives. The visit to the foreign region will typically be one to two weeks and may occur outside the normal academic year. **Prerequisites:** admission to M.B.A. program (RS 76, RS 77) or consent of faculty.

MGT 260. Negotiation (4)

Examines methods of conflict resolution needed for effective management in a constantly changing business environment. Applies these tools to the broad spectrum of negotiation problems faced by the manager and professional. Includes simulations, role playing, and cases. **Prerequisite:** admission to M.B.A. program or consent of instructor.

MGT 269. Topics in Organizational Behavior (2 or 4)

Introduces advanced topics of special interest in management and organizational behavior. May be repeated for a maximum of eight credits if the topics are substantially different. Instructional methods include face-to-face lecture, case presentations, assigned readings, and online group discussions. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 270. Project Management (4)

Provides management concepts and tools to enable the more effective design, planning, and control of projects. Includes both the qualitative and quantitative aspects of project management. **Prerequisite:** admission to M.B.A. program or consent of instructor.

MGT 271. Technology Strategy (4)

Outlines tools for formulating and evaluating technology strategy. Includes an introduction to the economics of technical change, models of technological evolution, and models of organizational dynamics and innovation. Provides an understanding of how technology firms gain and sustain competitive advantage. **Prerequisite:** admission to M.B.A. program or consent of instructor.

MGT 272. New Product Development (4)

Provides comprehensive analytical coverage of the new-product development process, focusing on the basic tools, methods, and organizational structures used in new-product development and management. **Prerequisite:** admission to M.B.A. program or consent of instructor.

MGT 273. Supply Chain Management (4)

Describes the systems approach to managing the entire flow of information, materials, and services from raw materials suppliers through factories and warehouses to the end customer, which is the key to productivity and competitiveness of manufacturing and service enterprises. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 279. Topics in Operations and Technology (2 or 4)

Introduces advanced topics of special interest in management and operations. May be repeated for a maximum of eight credits if the topics are substantially different. Instructional methods include face-to-face lecture, case presentations, assigned readings, and online group discussions. **Prerequisite:** admission to M.B.A. program or consent of faculty.

MGT 280. New Venture Finance (4)

Focuses on the financing of new ventures and technological innovation. Includes perspectives of both the entrepreneur and the investor, investigating the venture-capital process and methods of financial valuation useful in the venture-capital industry and for other technology investments. **Prerequisite:** core finance course or consent of instructor.

MGT 281. Investments (4)

Examines financial theory and empirical evidence useful for making investment decisions. Topics include: portfolio theory, equilibrium models of security prices, the empirical behavior of security prices, market efficiency, and fixed-income markets and behavioral finance. **Prerequisite:** completion of M.B.A. core curriculum or consent of instructor.

MGT 282. Topics in Finance (2 or 4)

Advanced topics in finance. Instructional methods include face-to-face lecture and case discussion, as well as online

instruction. **Prerequisite:** admission to M.B.A. program or consent of instructor.

MGT 283. Financial Risk Management (4)

Explains how to identify, measure, and analyze investment risks associated with interest rates, currency exchange, and equity markets, and acquire techniques to manage and control risk through the use of over-the-counter and exchange-traded derivatives. **Prerequisite:** admission to M.B.A. program or consent of the faculty.

MGT 284. Mergers, Acquisitions, and Corporate Restructuring

Explains the mergers and acquisitions process. Topics include: history, motivation, valuation, legal framework and tax issues of M&A, anti-takeover strategies, takeover tactics, leveraged buyouts, joint venture, and strategic alliances. **Prerequisites:** Enrollment in M.B.A. program and completion of MGT 408 Finance or with consent of faculty.

MGT 291. Essentials for Business Practice (4)

Introduction to the basic functional areas of business—marketing, accounting, finance, operations/supply chain, strategy—and how they overlap and intersect in the business environment. Techniques of business planning and the role of the business manager are also examined. **Prerequisite:** non-M.B.A. graduate students only; no prerequisite courses.

MGT 292. Business Project Management (4)

Addresses effective practices for management of business projects. Includes both project management—scheduling, milestone setting, resource allocation, budgeting, risk mitigation—and human capital management—communication, teamwork, leadership. Also considers requirements for effectively working across functional and organizational boundaries. **Prerequisite:** non-M.B.A. graduate students only; no prerequisite courses.

MGT 297. Advanced Management Research Practicum (1)

Internship with approved business or governmental agency, allowing student to pursue topics raised in the management core and elective courses. Internship credit may not be applied to fulfill specific course requirements or to credits required for graduation. May be repeated with instructor consent. **Prerequisites:** consent of instructor and department stamp required.

MGT 299. Individual Directed Study (1–4)

Individual study or research under the direction of a selected faculty member. **Prerequisite:** admission to M.B.A. program or consent of instructor.

MGT 401. Professional Seminar (1)

The Professional Seminar presents up-to-date research, professional skills development, and experts and business leaders as speakers. Topics may vary by term. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 403. Quantitative Analysis (4)

Through lecture and online delivery, students will be introduced to key techniques for using data to make informed management decisions. Covers probability, statistics, decision analysis, and optimization techniques. Emphasizes managerial applications in such areas as operations management, marketing, and finance. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 404. Accounting (4)

Through lecture and online delivery, students will be introduced to the basic concepts and methods used in financial statements. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 405. Managerial Economics (4)

Through lecture and online delivery, this course will introduce students to the tools and concepts of microeconomics to analyze decision problems within technology driven firms through the coverage of microeconomic concepts relevant to managerial decision-making. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 406. Leadership Skills, Values, and Teamwork in Technology Firms (4)

Through lecture and online delivery, introduces principles of effective teamwork and leadership and of strategic

managerial communication. Provides an introduction to case study and to ethical issues confronting managers in technology or science-driven firms. Develops managerial communication skills. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 407. Marketing (4)

By taking an analytical approach to the study of marketing problems, this course provides an understanding of customers and competitors as a basis for developing, pricing, promoting, and distributing goods and services that satisfy customer and organizational objectives. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 408. Finance (4)

Through lecture and online delivery, this course will focus on basic business financial concepts with particular attention to challenges of finance in start-up and small- and medium-sized enterprises. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 409. Organizational Strategy and Human Resource Management (4)

After identifying characteristics common to technology driven firms, the implications of living in, managing, and leading such an organization are explored. Covers skills such as leadership of project teams and negotiations. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 410. Strategy (4)

Through lecture and online delivery, this course explores the strategic management of technology-driven firms focusing on the analytical tools and techniques that support strategy formulation and the related managerial skills and decision processes that foster strategy implementation. **Prerequisite:** M.B.A. "stamp" or departmental stamp.

MGT 412. Lab to Market: Opportunity and Business Model Analysis (4)

An integrated examination of competencies needed to transform innovations into profitable market opportunities. Focus on processes to generate ideas, assess which are viable business opportunities, and evolve them into products and businesses. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 413. Operations, Information Systems, and Data Analysis (4)

Through lecture and online delivery, students will be familiarized with the problems and issues confronting operations managers, and to introduce language, conceptual models, and analytical techniques that are broadly applicable in confronting such problems. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 414A. Lab to Market Workshop I (4)

Through lecture and online delivery, provides broad coverage of leading edge developments in technical and scientific research, with an eye to their potential applicability and value in business. Provides basis for project-based Lab to Market Workshop II. An IP grade will be awarded at the end of the quarter. Final grade will not be given until the completion of MGT 414B. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 414B. Lab to Market Workshop II (4)

Project-based course, requiring identification and completion of major project assessing potential business value of emerging or potential technology or science. Students work individually or in teams. Periodic class meetings include presentation of interim and final reports. **Prerequisite:** M.B.A. "stamp" or departmental stamp.

MGT 490A. Special Topics in Marketing (4)

Through lecture and online delivery, a course at an advanced level on marketing topics. Will fulfill the required elective for students in Communication and Information Technology Services (CITS) Management track. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 490B. Special Topics in Marketing (4)

Through lecture and online delivery, a course at an advanced level on marketing topics. Will fulfill the required elective for students in Management and the Life Sciences and Health Industries track. **Prerequisite:** M.B.A. student or departmental stamp.

MGT 490C. Special Topics in Marketing (4)

Through lecture and online delivery, a course at an advanced level on marketing topics. Will fulfill the required elective for students in Global Management and Policy track. **Prerequisite:** M.B.A. student or departmental stamp.

PH.D. APPROVED COURSE LIST**MGT 208A. Introduction to Management Research A (4)**

This is the first course in a three-course sequence that introduces students to the various methodologies and research paradigms employed in management research. This course covers fundamentals of empirical research methods, including research design, reliability and validity of measurements, theory building and hypothesis testing, and some history of science. **Prerequisites:** admission to Management Ph.D. program; others consent of instructor.

MGT 208B. Introduction to Management Research B (4)

Sequence introduces students to various management research and methodological paradigms, and discusses theory development, building, and validation approaches. Students with additional need for mathematical/analytical training may be asked to take additional courses that prepare for the rigors of the program. **Prerequisite:** MGT 208A.

MGT 208C. Introduction to Management Research C (4)

Sequence introduces students to various management research and methodological paradigms, and discusses theory development, building, and validation approaches. Students with additional need for mathematical/analytical training may be asked to take additional courses that prepare for the rigors of the program. **Prerequisite:** MGT 208B.

MGT 225. Behavioral Economics (4)

Introduction to formal and predictive approaches to incorporating behavioral regularities into economic theory. Covers developments in generalizing conventional economic models to allow patterns of behavior that appear to be common but are paradoxical for conventional models based on assumptions of rationality. **Prerequisites:** MGT 208A-B-C, Econ. 200A-B-C.

MGT 226. Theory of Industrial Organization and Business Strategy (4)

This course provides the theoretical underpinnings of business strategy drawing from the body of literature in industrial organization. It will complement Economics department courses on industrial organization to provide depth in business strategy. **Prerequisites:** Econ. 200A-B-C.

MGT 245. Theory of Technology and Operations Management (4)

This course addresses classical operations management models in inventory and capacity planning and control leading up to models of supply chain and supplier relationship management. **Prerequisites:** MGT 208A-B-C, Econ. 200A-B-C.

MGT 246. Research in Management and Technology Strategy (4)

This course covers the management of technology and innovation emphasizing product family design, market segmentation, technology selection, and product management. **Prerequisites:** MGT 208A-B-C, Econ. 200A-B-C, MGT 245.

MGT 247. Management and Marketing Science Models (4)

Fundamentals of analytical models in operations and marketing including product positioning models, choice models, pricing models, and distribution models. Interactions between the supply and demand issues is stressed for managerial decision making about operations and marketing variables. **Prerequisite:** MGT 208C.

MGT 255. Psychology and Decision Making (4)

This course introduces students to theories and research in the field of individual judgment and decision making. Topics include judgment under uncertainty, the psychology of risk, choice, decision framing, prospect theory, mental accounting, context effects, task effects, and regret.

Prerequisites: admission to management Ph.D. program; others consent of instructor.

MGT 256. Consumer Behavior Research (4)

This course covers concepts and theories useful in understanding and researching the behaviors of consumers. Sample topics include attitude formation and change, social influence and persuasion, communication, consumer decision making and judgment, and consumer knowledge.

Prerequisites: admission to management Ph.D. program; others consent of instructor.

MGT 257. Behavior in Organizations (4)

Theories/research about behavior of employees/managers in organizations, as individuals and in groups. Topics include motivation, design of incentive/compensation systems, impact of goals/objectives, managerial judgment/decision making, evaluation judgments, managing reactions to change, and group decision making. **Prerequisites:** admission to management Ph.D. program; others consent of instructor.

MGT 285. Financial Economics (4)

This course covers the basic concepts and important models used in finance research. The subjects include expected utility theories, stochastic dominance, portfolio math, mean-variance theory, CAPM, aggregation theorems, arbitrages, and arbitrage pricing. **Prerequisites:** Econ. 220; admission to management Ph.D. program.

MGT 286. Continuous-time Finance (4)

This course covers most powerful tools in finance, i.e., which are finance models in continuous-time setting. The subjects include dynamic portfolio selection, derivative pricing, dynamic term structure, and dynamic equilibrium models. **Prerequisite:** MGT 285.

MGT 287. Empirical Finance (4)

This course covers econometric methods including the linear regression model, serial correlation, hypothesis testing, time series analysis, and estimation of discrete choice and simultaneous equation models. **Prerequisite:** MGT 285.

MGT 288. Topics in Finance (4)

This course will cover a range of areas that could include international asset pricing models, market microstructure, investment flows, topics in corporate finance, capital structure, and some recent advances in asset pricing such as consumption-based asset pricing, and habit models. **Prerequisite:** MGT 285.

MGT 293A. Literature Review and Critique Paper (4)

This course will require the student to identify and critique the research literature in a particular area identified during the summer of first year. The student will write a review paper that identifies opportunities for further research. **Prerequisites:** none.

MGT 293B. Literature Review and Critique Presentation (4)

In this course, the student will continue work on the literature review and prepare a presentation of the gaps and opportunities identified in the literature. **Prerequisite:** MGT 293A.

MGT 293C. Original Research Paper (4)

In this course, the student will work on identifying and developing an original research problem based on the gaps identified in the literature review courses. **Prerequisites:** MGT 291, MGT 292, MGT 293B.

MGT 293D. Original Research Presentation (4)

In this course, the student will continue work on the original research problem and prepare a presentation that will prepare for candidacy. **Prerequisites:** MGT 292; MGT 293C.

MGT 294. Advanced Field Advising (4)

Each student who has not advanced to candidacy by June of the third year must enroll in and complete MGT 294 during the fall, winter, and spring quarters of the fourth year. **Prerequisite:** admission to management Ph.D. program.

MGT 295. Dissertation (4-12)

This course is taken by students actively working on their dissertation after advancing to candidacy.

Marine Biodiversity and Conservation

PROGRAM DIRECTOR

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ASSOCIATE DIRECTORS

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The master of advanced studies (M.A.S.) in Marine Biodiversity and Conservation is a unique program of study equipping its graduates with the knowledge they need to improve conservation of marine biodiversity in the world's most diverse and threatened eco-regions through development of local capacity and science-based management tools. Led by faculty of Scripps Institution of Oceanography (SIO), the program is designed to teach current and future professionals about marine ecosystems from the scientific, economic and policy perspectives, as well as provide important cultural and communications skills. The degree is most appropriate for marine resource managers in all regions of the world, practicing marine science professionals who wish to broaden their understanding and influence in this arena, science policy analysts and advocates, and natural scientists interested in obtaining a more firm grounding in the public policy and economics of marine conservation.

The M.A.S. in Marine Biodiversity and Conservation is a full-time, self-supporting degree program that most students complete in a twelve-month period, mid-June through mid-June each year. The UC San Diego graduate division confers the M.A.S. degree and the Center for Marine Biodiversity and Conservation at SIO is responsible for the academic management of the curriculum. UC San Diego Extension administers the program and provides student advising and career counseling services.

ADMISSION

New students are admitted in the summer (June) of each academic year. Prospective candidates should submit and complete the official UCSD online graduate application for admission, the application fee, one set of official transcripts from each institution attended after high school, three letters of recommendation, and a current résumé or c.v. The GRE/GMAT is not required. Candidates must normally have a minimum of three years of relevant work experience. International applicants must submit official scores from the Test of English as a Foreign Language (TOEFL). The application deadline is January 31 for the summer through spring academic program.

PROGRAM OF STUDY

The full-time degree program is designed to be completed in one year. In the summer session, classes are scheduled five days a week, eight hours a day. In the fall, summer, and spring, students take courses that are held during regularly scheduled university class hours. Students are required to complete forty-eight units of courses, comprising forty core units, including a six-unit capstone project, and eight elective units.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

CORE CURRICULUM

SIO 2955. Introduction to Marine Biodiversity and Conservation—Seminar (8)

Lectures on ecological, economic, social, and legal issues related to marine biodiversity and case studies on socio-economic and legal issues. Students are expected to attend field trips at sea and to various sites around San Diego County as part of the corequisite course. Students who have taken SIO 295 may not receive credit for SIO 2955. **Prerequisite:** consent of instructors. Corequisite: SIO 295LS and M.A.S. students only.

SIO 295LS. Introduction to Marine Biodiversity and Conservation—Lab (8)

Laboratory work on major biological taxa, field trips on biodiversity in situ, computer labs for informatic tools. Students are expected to attend field trips at sea and to various sites around San Diego County as part of the course. Students who have taken SIO 295L may not receive credit for SIO 295LS. **Prerequisite:** consent of instructor. Corequisite: SIO 2955 and M.A.S. students only.

SIO 286. Marine Science, Economics, and Policy (4)

This course investigates global issues in marine conservation and potential policy solutions. The approach is interdisciplinary, fast paced, and discussion oriented. Students will become acquainted with sufficient background in marine biology, ecology, marine and conservation economics, international law and policy as preparation for participation in discussion on real-world issues in marine conservation. Topics and instructors change each quarter. **Prerequisite:** graduate standing or consent of instructor.

MAS MBC students are required to take a minimum of four units of economics, and a minimum four units of a policy/communications course as approved by the MAS MBC program chair.

MBC 296. Capstone Independent Study Project (6)

Building on the knowledge and experience gained from the entire curriculum of the Master's in Marine Biodiversity and Conservation (M.A.S.-MBC) program, students will design

and present a specific marine conservation project. Limited to registered students in MAS-MBC program. **Prerequisite:** SIO 286. (F,W)

MBC 258. Special Topics/Marine Biology—MBC M.A.S. Forum (1)

Required course for M.A.S.-MBC students will focus on development of M.A.S. Capstone Projects and discussions covering marine conservation issues, including informal student presentations on political, economic, historical, educational, and natural science issues related to conservation and analysis of marine biodiversity. **Prerequisites:** SIO 2955 and SIO 295LS summer courses. Limited to registered students in M.A.S. Marine Biodiversity and Conservation program. (S/U grades only.) Jackson, R. Norris (F,W,S)

Electives. Varies (8)

Students enroll in eight elective units of course work relating to marine biodiversity and conservation issues that are approved by the MAS MBC program chair.

Materials Science and Engineering Program

PROFESSORS

Sungho Jin, Ph.D., MAE, Program Director
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Joseph Wang, Ph.D., NanoEngineering
James K. Whitesell, Ph.D., Chemistry and Biochemistry
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Paul Yu, Ph.D., ECE

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Yu Qiao, Ph.D., Structural Engineering

ASSISTANT PROFESSORS

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Michael Tauber, Ph.D., Chemistry and Biochemistry
Shyni Varghese, Ph.D., Bioengineering
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ADJUNCT PROFESSOR

Martin Haas, Ph.D., Biology

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Materials science and engineering is concerned with the structure, properties, and applications of materials. The university-wide Materials Science and Engineering Program (MSE) at UC San Diego aims to provide fundamental knowledge for understanding of materials with the objective of predicting, modifying, and tailoring the properties of materials to yield enhanced material performance.

The foundations of materials science are the basic sciences of physics, chemistry, mathematics, and engineering principles. The interdisciplinary nature of the program at UCSD is ideally suited to address this requirement. The graduate students in the Materials Science and Engineering Program benefit from the unique and broad combination of faculty members and research facilities existing at UCSD, in the Departments of Mechanical and Aerospace Engineering, Electrical and Computer Engineering, NanoEngineering, Physics, Chemistry and Biochemistry, Bioengineering, Structural Engineering, Scripps Institution of Oceanography, as well as the School of Medicine and the Division of Biological Sciences. Students pursuing their M.S. or Ph.D. degree in the MSE Program can have any faculty member from these participating departments and schools in UCSD as their thesis advisor or co-advisor, based on matching of the interests and/or financial support arrangements.

Of particular emphasis within the program are: a study of microstructure-property relationships; design of electronic, superconducting, magnetic, and nano materials for electronic and high-tech device and energy applications; optical and chemical materials for telecom and display applications; biomaterials and medical device materials for biotech applications; experimental investigation and theoretical modeling of the mechanical behavior of materials; and advanced composite materials for civil structures.

THE GRADUATE PROGRAM

The Materials Science and Engineering Program at UC San Diego is interdisciplinary, with participation of faculty members from several departments.

Faculty from the following departments participate in the Materials Science and Engineering Program: Mechanical and Aerospace Engineering, Physics, Scripps Institution of Oceanography, Structural Engineering, Electrical and Computer Engineering, NanoEngineering, Chemistry and Biochemistry, Bioengineering, the Division of Biological Sciences, the School of Medicine, and the School of Pharmacy. The director of the program, in consultation with the executive committee, carries out the governance of the program. The executive committee coordinates all affairs of the Materials Science and Engineering Program, including student admissions, degree requirements, graduate courses in materials science given by various participating departments, maintenance of laboratory instructional facilities, seminars, special courses, part-time instructors, and related matters.

Undergraduate preparation for pursuing the M.S. and Ph.D. in materials science and engineering at UCSD would normally include a degree in materials sciences, or in engineering or physical sciences, such as physics, chemistry, biology, geology, and related disciplines. Students are expected to have an adequate mathematics, physics, chemistry, and related basic sciences background, as well as acceptable GPA and GRE scores.

MASTER'S DEGREE PROGRAM

The program offers the M.S. degree in materials science and engineering under both the Thesis Plan I and the Comprehensive Examination Plan II; see "Graduate Studies: Master's Degree." The requirements for the M.S. degree are as follows:

1. All students must complete a total of thirty-six units.
2. All students must complete four Mandatory Core Courses and at least two of the six Elective Core Courses:
Mandatory Core Courses
MS 201A-B-C, MS 227
Elective Core Courses (required to select at least two to fulfill requirements)
MS 205A, MS 251A-B, MS 252, MS 253, PHYS 152A (Physics 211A can replace 152A with advisor's permission.) See "Courses" for description.
3. Students may include up to twelve units of undergraduate courses. These include the one undergraduate core course, Physics 152A.
4. Enroll in MATS200, as required. See "Courses" for descriptions.
5. Remaining courses to complete the thirty-six unit requirement for the MS degree may be selected from an approved list of graduate courses with the consent of a faculty advisor.
6. Students either complete a thesis (Plan I) or pass a comprehensive examination (Plan II) as described in the "Graduate Studies" section of this catalog.
7. Students must meet all other requirements established by the university.

Students who transfer with some graduate credit or an M.S. from another institution will have their records reviewed by a faculty advisor, and an appropriate individual course of study may be approved.

THE PH.D. PROGRAM

After completing the M.S. degree (or meeting equivalent requirements) and meeting the minimum standard on the comprehensive examination to be admitted to or continue in the Ph.D. program, a student must:

1. Meet all the university's residency and other requirements.
2. Successfully complete three advanced graduate courses (in addition to those required for the M.S. degree) which have been approved by the student's potential dissertation advisor.
3. Enroll in MATS200, as required. See "Courses" for descriptions.
4. Pass the Literature Review Examination. This requirement must be successfully completed within one year after passing the Comprehensive Examination.
5. Pass the Ph.D. Qualifying Examination (Senate Exam) to be advanced to Ph.D. candidacy.
6. Successfully complete and defend a dissertation which, in the opinion of the dissertation committee, contains original work that should lead to publication of at least one significant article in an appropriate refereed journal.

In principle, it should be possible to finish the M.S. degree in three quarters, and a Ph.D. in an additional three years. Ph.D. time limits are as follows: Pre-candidacy—four years; Support limit—six years; Total time limit—seven years; Normative time limit for a properly prepared B.S. student—five years. (See "Graduate Studies—Ph.D. Time Limits" for further explanation.)

DEPARTMENTAL EXAMINATION

THE COMPREHENSIVE EXAMINATION

The examination will consist of twelve questions, two from each of the six core courses. A passing grade is 60 percent for the Master's degree, and 70 percent for the Ph.D. The examination will not exceed six hours in duration. The examination is usually administered the second week in January, and a week after spring quarter finals week in June. Typically, students take the exam after one year of full-time enrollment. This exam may only be retaken once before the end of the second year of study.

THE LITERATURE REVIEW EXAMINATION

The Literature Review Examination tests the student's ability to prepare and present a comprehensive overview of a topic based on existing journal literature. It should be a comprehensive discussion of the literature, scientific theory, problems or theoretical deficiencies, and possible areas of research in some area of materials science and engineering. The topic may be in the general area in which the student plans to pursue his or her thesis research, or it may be in an unrelated field. The topic must be approved by the three faculty member committee in advance of the seminar. The Literature Review Examination is not to be a discussion of the student's research project or their research proposal. A presentation which includes the student's own

work which has not been published will constitute a no pass grade. This exam must occur within one year of the student having passed the Comprehensive Examination.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

GRADUATE

200. Graduate Seminar (0)

Each graduate student in the Materials Science and Engineering Program is expected to attend a weekly seminar in materials science or related areas. M.S. students must enroll for three quarters, Ph.D. students for six quarters, as of fall 1995. (S/U grades only.) (F,W,S)

201A. Thermodynamics of Solids (4)

The thermodynamics and statistical mechanics of solids. Basic concepts; equilibrium properties of alloy systems; thermodynamic information from phase diagrams, surfaces, and interfaces; crystalline defects. **Prerequisite:** consent of instructor.

201B. Solid State Diffusion and Reaction Kinetics (4)

Thermally activated processes, Boltzmann factor, homogeneous and heterogeneous reactions, solid state diffusion, Fick's laws, diffusion mechanisms, Kirkendall effect, Boltzmann-Matano analysis, high diffusivity paths. **Prerequisite:** consent of instructor.

201C. Phase Transformations (4)

Classification of phase transformations: displacive and reconstructive transformations: classical and nonclassical theories of nucleation: Becker-Doering, Volmer-Weber, lattice instabilities, spinodal decomposition. Growth theories: interface migration, stress effects, terrace-edge mechanisms, epitaxial growth, kinetics, and mechanics. Precipitation. Order-disorder transformations. Solidification. Amorphization. **Prerequisite:** consent of instructor. (Cross-listed with MAE 271C.)

205A. Imperfections in Solids (4)

Point, line, and planar defects in crystalline solids, including vacancies, self-interstitials, solute atoms, dislocations, stacking faults, and grain boundaries; effects of imperfections on mechanical properties; interactions of dislocations with point defects; strain hardening by micro-obstacles, precipitation, and alloying elements. **Prerequisite:** consent of instructor.

207. Surface Reactions, Corrosion, and Oxidation (4)

The nature of surfaces; nucleation and growth of surface films. Techniques for studies of surface structures and of surface films. Types of corrosion phenomena and mechanisms of corrosion. Methods of corrosion control and prevention. Mechanisms of oxidation. Control of oxidation by alloying and surface coatings. **Prerequisite:** MS 201A or consent of instructor.

211A. Mechanical Properties (4)

Review of basic concepts in mechanics of deformation; elasticity, plasticity, viscoelasticity, and creep; effects of temperature and strain-rate on inelastic flow; microstructure and mechanical properties; application of basic concepts to selected advanced materials. **Prerequisite:** consent of instructor. (Cross-listed with MAE 229.)

213A. Dynamic Behavior of Materials I (4)

Elastic waves in continuum; longitudinal and shear waves. Surface waves. Plastic waves; shock waves; Rankine-Hugoniot relations. Method of characteristics, differential and difference form of conservation equations; dynamic plasticity and dynamic fracture. Shock wave reflection and interaction. **Prerequisite:** consent of instructor. (F) (Cross-listed with MAE 273A.)

225. Materials for Magnetic Recording (4)

Properties of magnetic materials utilized as magnetic recording media and heads: magnetic structure of oxides

and metals; fine particle magnetism; micromagnetic analysis; hysteresis and reversal mechanisms of hard materials; dynamic processes and domain patterns of soft materials; thermal fluctuations; multilayer phenomena; giant magnetoresistance. **Prerequisites:** undergraduate electromagnetism and solid state physics or consent of instructor. (Cross-listed with ECE 246A.)

227. Structure and Analysis of Solids (4)

Key concepts in the atomic structure and bonding of solids such as metals, ceramics, and semiconductors. Symmetry operations, point groups, lattice types, space groups, simple and complex inorganic compounds, structure/property comparisons, structure determination with X-ray diffraction. Ionic, covalent, metallic bonding compared with physical properties. Atomic and molecular orbitals, bands versus bonds, free electron theory. **Prerequisite:** graduate student or consent of instructor.

236. Advanced Ceramic (4)

Topics include phase equilibria and crystallography, defects and thermodynamics (Kröger-Vink Notation), glass science, electrical and ionic transport behavior, Brouwer diagrams, powder synthesis and compaction, sintering theory and grain growth, mechanical, optical, magnetic, electrical properties, fuel cells. **Prerequisite:** consent of instructor.

240A. Scanning Electron Microscopy and X-Ray Microanalysis (4)

Electron optics, electron-beam-specimen interactions. Image formation in the SEM. The role of specimen and detector in contrast formation. Imaging strategies. X-ray spectral measurements. Qualitative and quantitative X-ray microanalysis. Materials specimen preparation. **Prerequisite:** consent of instructor. The laboratory section will teach the operation of the microscope to conduct material analysis via SEM.

240B. Transmission Electron Microscopy (4)

Operation and calibration of the TEM, lens defects and resolution, formation of images and diffraction patterns, electron diffraction theory (kinematic dynamical), indexing diffraction patterns, diffraction contrast. Quantitative analysis of crystal defects, phase contrast, and specimen preparation. **Prerequisite:** MS 240A or consent of instructor. The laboratory section will teach the operation of the microscope to conduct material analysis via TEM.

243. Modern Materials Analysis (4)

Analysis of the near surface of materials via ion, electron, and x-ray spectroscopies. Topics to be covered include particle solid interactions. Rutherford Backscattering, secondary ion mass spectroscopy, electron energy loss spectroscopy, particle induced x-ray emission, Auger electron spectroscopy, extended x-ray absorption fine structure and channeling. **Prerequisite:** consent of instructor. (Cross-listed with ECE 237.)

251A. Electronic and Photonic Properties of Materials (4)

The electronic and optical properties of metals, semiconductors, and insulators. The concept of the band structure. Electronic and lattice conductivity. Type I and Type II superconductivity. Optical engineering using photonic band gap crystals in one-, two-, and three-dimensions. Current research frontiers. **Prerequisites:** consent of the instructor. (Cross-listed with MAE 265A.)

251B. Magnetic Materials: Principles and Applications (4)

The basis of magnetism: classical and quantum mechanical points of view. Different kinds of magnetic materials. Magnetic phenomena including anisotropy, magnetostriction, domains, and magnetization dynamics. Current frontiers of nano-magnetics research including thin films and particles. Optical, data storage, and biomedical engineering applications of soft and hard magnetic materials. **Prerequisites:** consent of instructor. (Cross-listed with MAE 265B.)

252. Biomaterials (4)

This class will cover biomaterials and biomimetic materials. Metal, ceramic, and polymer biomaterials will be discussed. Emphasis will be on the structure-property relationships, biocompatibility/degradation issues and tissue/material interactions. Synthesis and mechanical testing of biomimetic

materials will also be discussed. **Prerequisite:** consent of instructor. (Cross-listed with MAE 266.)

253. Nanomaterials and Properties (4)

This course discusses synthesis techniques, processing, microstructural control, and unique physical properties of materials in nano-dimensions. Topics include nanowires, quantum dots, thin films, electrical transport, electron emission properties, optical behavior, mechanical behavior, and technical applications of nanomaterials. **Prerequisite:** consent of instructor. (Cross-listed with MAE 267.)

254. Frontier Micro-Electro-Mechanical Systems (MEMS) Materials and Devices (4)

Fabrication of Micro-Electro Mechanical Systems (MEMS) by bulk and surface micromachining of single crystal, polycrystal, and amorphous silicon and other materials. Performance issues including electrostatic, magnetic, piezoelectric actuations, residual stresses, deformation. Novel device applications, future trends in smart materials and nano-electro-mechanical (NEMS) systems. **Prerequisite:** consent of instructor. (Cross-listed with MAE 268.)

255. Presentations, Inventions, and Patents (4)

This course covers methodology and skills for oral and written presentations. Topics include preparation of presentation materials, presentation exercise, publication manuscripts, research work proposals, understanding and securing of inventions and intellectual properties, patent applications and licensing. **Prerequisite:** consent of instructor. (Cross-listed with MAE 269.)

256. Energy Materials and Applications (4)

This class will cover the fundamentals/engineering aspects of various energy materials based on metallic, ceramic, semiconductor; and chemical structures and their applications related to solar cells, fuel cells, batteries, fusion energy, and hydrogen storage will be discussed. (Cross-listed with MAE 278.) **Prerequisite:** consent of instructor/department stamp.

257. Polymer Science and Engineering (4)

Quantitative basic understanding of different branches of polymer science varying from polymer chemistry, characterization, thermodynamics, rheological properties, smart materials, self-assembly in biopolymers (natural) and synthetic polymers, and applications of polymers ranging from medicine to structure. (Cross-listed with BENG 242.) **Prerequisites:** graduate standing in bioengineering (BE 75) or materials science (MS 76) or consent of instructor.

258. Medical Device Materials (4)

In this interdisciplinary course, the nature, properties, and applications of various medical device materials will be discussed. The devices include coronary stents, catheters, drug delivery vehicles, and other implant, surgery, or therapeutics related devices. (Cross-listed with MAE 250.)

295. Research Conference (2)

Group discussion of research activities and progress of group members. **Prerequisite:** consent of instructor.

296. Independent Study (4)

Prerequisite: consent of instructor.

299. Graduate Research (1-12)

(S/U grades only.)

Subject to the approval of a faculty advisor, students may also choose from the following courses offered by departments participating in the Materials Science and Engineering Program (see the relevant pages of this catalog for descriptions):

MECHANICAL AND AEROSPACE ENGINEERING (MAE)

MAE 229A. Mechanical Properties (4)

MAE 231A. Foundations of Solid Mechanics (4)

MAE 231B. Elasticity (4)

MAE 232A-B-C. Finite Element Methods in Solid Mechanics (4-4-4)

MAE 233A. Fracture Mechanics (4)

MAE 233B. Micromechanics (4)

MAE 238. Stress Waves in Solids (4)

MAE 251. Structure and Analysis of Solids (4)

ELECTRICAL AND COMPUTER ENGINEERING (ECE)

ECE 230A. Solid-State Electronics (4)

ECE 230B. Solid-State Electronics (4)

ECE 230C. Solid-State Electronics (4)

ECE 237. Modern Materials Analysis (4)

ECE 246A. Materials for Magnetic Recording (4)

PHYSICS

Phys. 133/219. Condensed Matter/ Materials Science Laboratory (2)

Phys. 152B/232. Electronic Materials (4)

Phys. 211A. Solid-State Physics (5)

Phys. 211B. Solid-State Physics (4)

Mathematics

PROFESSORS

Ian S. Abramson, Ph.D., *Vice Chair*
Jim Agler, Ph.D.
Randolph E. Bank, Ph.D.
M. Salah Baouendi, Ph.D.
Edward A. Bender, Ph.D., *Emeritus*
James R. Bunch, Ph.D., *Emeritus*
Samuel R. Buss, Ph.D.
Bennett Chow, Ph.D.
Bruce K. Driver, Ph.D.
Peter F. Ebenfelt, Ph.D., *Chair*
Thomas J. Enright, Ph.D.
John W. Evans, M.D., Ph.D., *Emeritus*
Ronald J. Evans, Ph.D., *Vice Chair*
Jay P. Fillmore, Ph.D., *Emeritus*
Carl H. FitzGerald, Ph.D., *Emeritus*
Patrick J. Fitzsimmons, Ph.D.
Theodore T. Frankel, Ph.D., *Emeritus*
Michael Freedman, Ph.D., *Emeritus*
Wee Teck Gan, Ph.D.
Adriano M. Garsia, Ph.D.
Ronald K. Getoor, Ph.D., *Emeritus*
Philip E. Gill, Ph.D.
Fan Chung Graham, Ph.D., *Akamai Professor of Internet Mathematics*
Mark W. Gross, Ph.D.
Leonard R. Haff, Ph.D., *Emeritus*
Hubert Halkin, Ph.D., *Emeritus*
Guershon Harel, Ph.D.
J. William Helton, Ph.D.
Michael J. Holst, Ph.D.
James P. Lin, Ph.D.
Hans Lindblad, Ph.D.
Alfred B. Manaster, Ph.D., *Emeritus*
David A. Meyer, Ph.D.
Lei Ni, Ph.D.
Kate Okikiolu, Ph.D.
John O'Quigley, Ph.D., *Emeritus*
Dimitris Politis, Ph.D.
Jeffrey M. Rabin, Ph.D., *Academic Senate Distinguished Teaching Award*
Jeffrey B. Remmel, Ph.D., *Associate Dean, Division of Physical Sciences*
Yosef Rinott, Ph.D., *Emeritus*
Burton Rodin, Ph.D., *Emeritus*
Helmut Rohrl, Ph.D., *Emeritus*
Murray Rosenblatt, Ph.D., *Emeritus*
Linda P. Rothschild, Ph.D.
Michael J. Sharpe, Ph.D., *Emeritus*
Lance W. Small, Ph.D., *Emeritus*
Donald R. Smith, Ph.D., *Emeritus*
Harold M. Stark, Ph.D.
Audrey A. Terras, Ph.D.
Adrian R. Wadsworth, Ph.D., *Emeritus*
Nolan R. Wallach, Ph.D.
Hans G. Wenzl, Ph.D.
Ruth J. Williams, Ph.D.
Daniel E. Wulbert, Ph.D.
Efim Zelmanov, Ph.D., *Rita L. Atkinson Professor of Mathematics*

ASSOCIATE PROFESSORS

Jozsef Balog, Ph.D.
Li-Tien Cheng, Ph.D.
Kiran Kedlaya, Ph.D.
Nitya Kitchloo, Ph.D.
Melvin Leok, Ph.D.
Bo Li, Ph.D.
Cristian Popescu, Ph.D.
Justin D. Roberts, Ph.D.
Daniel S. Rogalski, Ph.D.
Jason Schweinsberg, Ph.D.
Jacob K. Sterbenz, Ph.D.
Glenn Tesler, Ph.D.
Jacques Verstraete, Ph.D.
John J. Wavrik, Ph.D., *Emeritus*
Ben Weinkove, Ph.D.
Ronghui Xu, Ph.D.

ASSISTANT PROFESSORS

Ery Arias-Castro, Ph.D.
Alina Bucur, Ph.D.
Todd Kemp, Ph.D.
Jiawang Nie, Ph.D.
Dragos Oprea, Ph.D.

SENIOR LECTURERS WITH SECURITY OF EMPLOYMENT

John D. Eggers, Ph.D., *Academic Senate Distinguished Teaching Award*
Frank B. Thiess, Ph.D., *Emeritus*

LECTURERS WITH SECURITY OF EMPLOYMENT

Norman A. Shenk, Ph.D., *Emeritus*
Laura J. Stevens, Ph.D.

THE UNDERGRADUATE PROGRAM

The mathematics department offers a wide range of courses in pure and applied mathematics for its majors and for students in other disciplines. The department offers six majors leading to the B.S. degree: mathematics, applied mathematics, mathematics-computer science, joint major in mathematics and economics, mathematics-scientific computation, and probability and statistics, and two leading to the B.A. degree: mathematics-applied science, and mathematics-secondary education. In addition, students can minor in mathematics or mathematics education. The department also has an Honors Program for exceptional students in any of the eight majors. See the sections on major programs and the other areas mentioned above as well as the course descriptions at the end of this section for more specific information about program requirements and the courses offered by the department. You may visit our Web site, <http://math.ucsd.edu>, for more information, including course Web pages, career advising, and research interests of our faculty.

FIRST-YEAR COURSES

Entering students must take the Mathematics Placement Exam (MPE) prior to orientation unless they have an appropriate score on an AP calculus

exam, an appropriate score (600 for Math. 10A; 650 for Math. 20A) on the SAT II Math Level 2 exam, an appropriate score on the International Baccalaureate Higher Level Mathematics Exam, credit by means of a foreign exam (e.g. GCE), or transferable college credit in calculus. The purpose of the MPE is to recommend placement for entering students in Math. 3C, 4C, 10A, or 20A. For more information about the MPE (test dates, test description, sample exams, online practice tests), see the Mathematics Testing and Placement Web site, <http://mathtesting.ucsd.edu>.

Prerequisites for Math. 3C, 4C, 10A-B-C, 20A-B-C-D-E-F, and 31AH-BH-CH are enforced through [TritonLink](#). Students need to ensure that test scores and transferable college credit are submitted to the Registrar prior to enrollment through WebReg.

Math. 3C is the department's preparatory course for the Math. 10 sequence, providing a review of algebraic skills, facility in graphing, and working with exponential and logarithmic functions.

Math. 4C is the department's preparatory course for the Math. 20 sequence, providing a brief review of college algebra followed by an introduction to trigonometry and a more advanced treatment of graphing and functions.

Math. 10A-B-C is one of three calculus sequences. The students in this sequence have completed a minimum of two years of high school mathematics. This sequence is intended for majors in liberal arts and the social and life sciences. It fulfills the mathematics requirements of Revelle College and the option of the general-education requirements of Muir College. Completion of two quarters fulfills the requirement of Marshall College and the option of Warren College and Eleanor Roosevelt College.

The second first-year calculus sequence, Math. 20A-B-C, is taken mainly by students who have completed four years of high school mathematics or have taken a college level precalculus course such as Math. 4C. This sequence fulfills all college level requirements met by Math. 10A-B-C and is required of many majors, including chemistry and biochemistry, bioengineering, cognitive science, economics, mathematics, molecular biology, psychology, MAE, CSE, ECE, and physics. Students with adequate backgrounds in mathematics are strongly encouraged to take Math. 20 since it provides the foundation for Math. 20D-E-F which is required for some science and engineering majors. **Note:** As of summer 2003, Math. 21C and 21D have been renumbered to Math. 20C and 20D.

Certain transfers between the Math. 10 and Math. 20 sequences are possible, but such transfers should be carefully discussed with an advisor. Able students who begin the Math. 10 sequence and who wish to transfer to the Math. 20 sequence, may follow one of three paths:

1. Follow Math. 10A with Math. 20A, with two units of credit given for Math. 20A. This option is not available if the student has credit for Math. 10B or Math. 10C.
2. Follow Math. 10B with Math. 20B, receiving two units of credit for Math. 20B.
3. Follow Math. 10C with Math. 20B, receiving two units of credit for Math. 20B and two units of credit for Math. 20C.

Credit will not be given for courses taken simultaneously from the Math. 10 and the Math. 20 sequence.

The department also offers a three-quarter Honors Calculus sequence in Multivariable and Vector Calculus and Linear Algebra. This sequence, Math. 31AH-BH-CH, is designed for well-prepared students who have both a strong aptitude and a deep interest in mathematics and who wish to undertake a challenging series of courses. The sequence has a prerequisite of a score of 5 on the AP Calculus BC exam. These demanding, proof-based courses cover the material in Math. 20F, 20C, and 20E respectively—and entering students with a 5 on the Calculus BC exam should consider starting in the Honors sequence if their major (or minor) program requires them to take, at least, Math. 20A-B-C and 20F. Math. majors who complete the entire three-quarter honors sequence will have also satisfied the requirement of Math. 109 for their major program. They would be able to replace Math. 109 with any four-unit upper-division mathematics elective course.

MAJOR PROGRAMS

The department offers six different majors leading to the B.S. degree: (1) mathematics, (2) applied mathematics, (3) mathematics-computer science, (4) joint major in mathematics and economics, (5) mathematics-scientific computation, and (6) probability and statistics, and two leading to the B.A. degree: (1) mathematics-applied science, and (2) mathematics-secondary education. The specific emphases and course requirements for these majors are described in the following sections. All majors must obtain a minimum 2.0 grade-point average in the upper-division courses used to satisfy the major requirements. Further, the student must receive a grade of C– or better in any course to be counted toward fulfillment of the major requirements. Any mathematics course numbered 100–194 may be used as an upper-division elective. (**Note:** 195, 196, 197, 198, 199, and 199H cannot be used towards any mathematics major.) All courses used to fulfill the major must be taken for a letter grade. No more than three upper-division courses taken externally from UCSD can be counted towards any major. Special exceptions may be considered via petition.

It is strongly recommended that all mathematics majors review their programs at least annually with a departmental advisor, and that they consult with the Advising Office in AP&M 6016 before making any changes to their programs. Current course offering information for the entire academic year is maintained on the department's Web page at <http://www.math.ucsd.edu>. Special announcements are also e-mailed to all majors.

Students who plan to go on to complete a Ph.D. in mathematics should be advised that only the best and most motivated students are admitted. Many graduate schools expect that students will have completed a full sequence of abstract algebra (Math. 100A-B-C) as well as a full sequence of analysis (Math. 140A-B-C). The advanced Graduate Record Exam (GRE) often has questions that pertain to material covered in the last quarter of analysis or algebra. In addition, it is advisable that students consider Summer Research Experiences for Undergraduates.

This is a program funded by the National Science Foundation to introduce students to math research while they are still undergraduates. In their senior year or earlier, students should consider taking some graduate courses so that they are exposed to material taught at a higher level. In their junior year, students should begin to think of obtaining letters of recommendation from professors who are familiar with their abilities.

Note: Math. 20D, E, and F do not need to be taken in order. Math majors are strongly advised to take 20F as early as possible after successfully completing 20C.

EDUCATION ABROAD

Students may be able to participate in the UC Education Abroad Program (EAP) and UC San Diego's Opportunities Abroad Program (OAP) while still making progress towards the major. Students interested in this option should contact the Programs Abroad Office in the International Center and discuss their plans with the mathematics advising officer before going abroad.

The department must approve courses taken abroad. Information on EAP/OAP can be found in the "[Education Abroad Program](#)" section of the *UC San Diego General Catalog* and the Web site <http://pao.ucsd.edu>.

MAJOR IN MATHEMATICS

The upper-division curriculum provides programs for mathematics majors as well as courses for students who will use mathematics as a tool in the biological, physical and behavioral sciences, and the humanities.

Required Courses

Lower-Division

1. One of the following sequences:
 - a. Calculus: Math. 20A-B-C-D-E-F
 - b. Honors Calculus: Math. 31AH-BH-CH, Math. 20D

Upper-Division

2. Mathematical Reasoning: Math. 109 (**Note:** Students completing Math. 31CH may substitute a four-unit upper-division mathematics elective for Math. 109.)
3. One of the following sequences:
 - a. Foundations of Analysis: Math. 140A-B
 - b. Advanced Calculus: Math. 142A-B and Math. 120A (Math. 140A-B-C recommended for graduate school)
4. One of the following sequences:
 - a. Modern Algebra: Math. 100A-B
 - b. Modern Applied Algebra: Math. 103A-B and Math. 102 (Math. 100A-B-C recommended for graduate school)
5. Upper-division electives to complete thirteen four-unit courses, chosen from any mathematics course numbered between 100 and 194 (including those taken from the requirements listed above.)

As with all departmental requirements, more advanced courses on the same material may be substituted with written approval from the departmental advisor.

To be prepared for a strong major curriculum, students should complete the last three quarters of the 20 sequence and Math. 109 before the end of their sophomore year. Either Math. 140A-B or 100A-B should be taken during the junior year.

MAJOR IN APPLIED MATHEMATICS

A major in applied mathematics is also offered. The program is intended for students planning to work on the interface between mathematics and other fields.

Required Courses

Lower-Division

1. One of the following sequences:
 - a. Calculus: Math. 20A-B-C-D-E-F
 - b. Honors Calculus: Math. 31AH-BH-CH, Math. 20D
2. Programming (one of the following):
 - a. SE 8A-AL-B (Intro to Computer Sci: Java)
 - b. CSE 11 (Intro to Computer Sci: Java, Accelerated Pace)
 - c. MAE 9 (C/C++ Programming)

Upper-Division

3. Mathematical Reasoning: Math. 109 (**Note:** Students completing Math. 31CH may substitute a four-unit upper-division mathematics elective for Math. 109.)
4. Linear Algebra: Math. 102 or Math. 170A
5. Advanced Calculus: Math. 140A-B or Math. 142A-B
6. One of the following sequences:
 - a. Math. 180A-B-C-181A
 - b. Math. 180A-181A and any two from Math. 181B-C-E
 - c. (Math. 183 or Math. 180A-181A) and any three from Math. 170A-B-C-175-179
7. One additional sequence which may be chosen from the list (#6) above or the following list: Math. 110A-120A-130A, 110A-B, 120A-B, 152-184A, 154-184A, 155A-B, 171A-B, 193A-B.
8. Upper-division electives to complete at least thirteen four-unit courses, chosen from any mathematics course numbered between 100 and 194 (including those taken from the requirements listed above) except
 - a. Up to twelve units may be taken from outside the department in an approved applied mathematical area. A petition specifying the courses to be used must be approved by an applied mathematics advisor. No such units may also be used for a minor or program of concentration.
 - b. MAE 107, Econ. 120A-B-C, cannot be counted toward the thirteen required courses.

To be prepared for a strong major curriculum, students should complete the last three quarters of

the 20 sequence and Math. 109 before the end of their sophomore year.

MAJOR IN MATHEMATICS–SCIENTIFIC COMPUTATION

This major is designed for students with a substantial interest in scientific computation. The program is a specialized applied mathematics program with a concentration in computer solutions of scientific problems.

Required Courses

Lower-Division

1. One of the following sequences:
 - a. Calculus: Math. 20A-B-C-D-E-F
 - b. Honors Calculus: Math. 31AH-BH-CH, Math. 20D
2. Computer Programming: MAE 9 and [CSE 8A-AL-B or CSE 11]
3. Basic Computation: Math. 15A (or CSE 20) and Math. 15B (or CSE 21) and CSE 12

Upper-Division

4. Mathematical Reasoning: Math. 109 (**Note:** Students completing Math 31CH may substitute a four-unit upper-division mathematics elective for Math. 109.)
5. Linear Algebra: Math. 102
6. Probability and Statistics: Math. 183 or 180A-181A (Note: No credit for Math. 183 if Math. 180A or 181A taken prior or concurrently.)
7. Analysis: Math. 140A-B or 142A-B
8. Numerical Analysis: Math. 170A-B-C or Math. 170A-B/Math. 175
9. Optimization: Math. 171A-B
10. Scientific Computing: Math. 179
11. Additional elective upper-division courses to total 15 chosen from the following: Math. 107A-B, 110A-B, 120A-B, 130A-B, 131, 152, 155A-B, 170C, or 175.

At least 15 upper-division mathematics courses are required for the major, except

- a. Up to 3 upper-division courses may be taken outside the department in an approved scientific computation area in the sciences or engineering. A petition specifying the courses to be used must be approved by a mathematics-scientific computation advisor.
- b. MAE 107, Econ. 120A-B-C, Math. 195, 196, 197, 199, and 199H cannot be counted toward the 13 four-unit upper-division courses.

MAJOR IN MATHEMATICS–PROBABILITY AND STATISTICS

Effective Winter 2007

This major is designed for students with a substantial interest in probability theory and statistics. It

is useful preparation for many fields of employment as well as graduate school.

Required Courses

Lower-Division

1. One of the following sequences:
 - a. Calculus: Math. 20A-B-C-D-E-F
 - b. Honors Calculus: Math. 31AH-BH-CH, Math. 20D
2. Programming (one of the following):
 1. CSE 8A-AL-B (Java)
 2. CSE 11 (Java: Accelerated Pace)
 3. MAE 9 (C/C++)

Upper-Division

3. Mathematical Reasoning: Math. 109 (**Note:** Students completing Math. 31CH may substitute a four-unit upper-division mathematics elective for Math. 109.)
4. Linear Algebra: Math. 102 or Math. 170A
5. Analysis/Advanced Calculus: Math. 140A-B or Math. 142A-B
6. Numerical Methods: Math. 174 or Math. 170A-B
7. Probability: Math. 180A-B-C
8. Mathematical Statistics: Math. 181A-B
9. One of the following: Math. 181C, 181E, 193A, 193B, 194
10. Computational Statistics: Math. 185
11. Upper-division electives to complete 15 upper-division courses from the following list: Math. 100A-B-C, 103A-B, 110A-B, 120A-B, 130A, 131, 140C, 152, 155A-B, 170A-B-C, 171A-B, 175, 176, 179, 181C, 181E, 184A, 187, 188, 193A-B, 194.

At least 15 four-unit upper-division mathematics courses are required, except

- a. Two upper-division electives may be outside the department in an approved applied mathematical area. A petition approved by a math advisor is required.
- b. MAE 107, Econ. 120A-B-C, Math. 195-199 cannot be counted toward the upper-division requirements.

To be prepared for a strong major curriculum, students should complete the last three quarters of the 20 sequence and Math. 109 before the end of their sophomore year.

MAJOR IN MATHEMATICS–APPLIED SCIENCE

This major is designed for students with a substantial interest in mathematics and its applications to a particular field such as physics, biology, chemistry, biochemistry, cognitive science, computer science, economics, management science, or engineering.

Required Courses

Lower-Division

1. One of the following sequences:
 - a. Calculus: Math. 20A-B-C-D-E-F
 - b. Honors Calculus: Math. 31AH-BH-CH, Math. 20D
2. Programming (one of the following is required):
 - a. CSE 8A-AL-B (Intro to Computer Sci: Java)
 - b. CSE 11 (Intro to Computer Sci: Java, Accelerated Pace)
 - c. MAE 9 (C/C++ Programming)

Upper-Division Mathematics Requirements

3. Mathematical Reasoning: Math. 109 (**Note:** Students completing Math 31CH may substitute a four-unit upper-division mathematics elective for Math. 109.)
4. Linear Algebra: Math. 102 or Math. 170A
5. Analysis: Math. 140A-B or 142A-B
6. Any two-quarter, upper-division math sequence
7. Upper-division electives to complete at least seven four-unit courses, chosen from any mathematics course numbered between 100 and 194 (including those taken from the requirements listed above.)

Upper-Division Applied Science Requirements

8. Seven upper-division courses selected from one or two other departments (these cannot be from mathematics). At least three of these seven upper-division courses must require calculus as a prerequisite.

Students must submit an individual plan for approval in advance by a mathematics department advisor, and all subsequent changes to the plan must be approved by a mathematics department advisor.

MAJOR IN MATHEMATICS–COMPUTER SCIENCE

Graduates of this program will be mathematically oriented computer scientists who have specialized in the mathematical aspects and foundations of computer science or in the computer applications of mathematics.

As of fall 2000, a mathematics–computer science major is not allowed to also minor in computer science in the Computer Science and Engineering department.

The detailed curriculum is given in the list below:

MATHEMATICS–COMPUTER SCIENCE PRE-MAJOR

In October 2001, the Academic Senate approved a minimum GPA requirement of 2.5 in the lower-division mathematics courses required for the mathematics–computer science major. The 2.5 minimum GPA in the lower-division math courses

reflects minimal preparation for the upper-division courses required for the major.

Therefore, students entering UCSD as first-year students for the fall 2002 quarter and later and students entering as transfer students for the fall 2003 quarter and later will be held to this requirement. Applications from students entering UCSD on or after the effective dates above will be held until all lower-division math courses for the major are completed and the minimum GPA in those courses of 2.5 can be verified. Students meeting the 2.5 minimum GPA requirement will be accepted into the mathematics-computer science major.

Required Courses

Lower-Division

- One of the following sequences:
 - Calculus: Math. 20A-B-C-D-E-F
 - Honors Calculus: Math. 31AH-BH-CH, Math. 20D
- Intro to Computer Science—CSE 8A-AL-B
Introduction to Computer Science: Java, or
CSE 11 Introduction to Computer Science: Java (Accelerated)
- Basic Data Structures and Object-oriented Programming: CSE 12
- Computer Organization and Systems Programming: CSE 30 (Note: CSE 30 requires CSE 20 or Math. 15A as a prerequisite.)

Upper-Division:

- Mathematical Reasoning: Math. 109 (**Note:** Students completing Math. 31CH may substitute a four-unit upper-division mathematics elective for Math. 109.)
- Modern Applied Algebra: Math. 103A-B or
Modern Algebra: Math. 100A-B
- Theory of Computability: Math. 166 (or CSE 105)
- Intro to Probability: Math. 180A or 183
- Combinatorics: Math. 184A
- Computer Implementations of Data Structures: Math. 176 (or CSE 100)
- Design & Analysis of Algorithms: Math. 188 (or CSE 101)
- Eight units from: Math. 170A-B-C, 174, 175, 179 (Note duplication of credit between Math. 174 and 170A-B-C)
- Eight units from: Math. 107A-B, 152, 154, 155A-B, 168A-B, 187, CSE 120-121, 130, 131A-B, 140-140L, 141-141L, 167
- Eight additional units from: any course in list #12 or #13 above or Math. 102, 110A-B, 111A-B, 120A-B, 130A-B, 131, 140A-B, 142A-B, 150A-B, 181A-B-C

JOINT MAJOR IN MATHEMATICS AND ECONOMICS

Majors in mathematics and the natural sciences often feel the need for a more formal introduction to

issues involving business applications of science and mathematics. Extending their studies into economics provides this application and can provide a bridge to successful careers or advanced study. Majors in economics generally recognize the importance of mathematics to their discipline. Undergraduate students who plan to pursue doctoral study in economics or business need the more advanced mathematics training prescribed in this major.

This major is considered to be excellent preparation for Ph.D. study in economics and business administration, as well as for graduate studies for professional management degrees, including the MBA. The major provides a formal framework making it easier to combine study in the two fields.

Course requirements of the Joint Major in Mathematics and Economics consist principally of the required courses of the pure mathematics major and the economics/management science major.

Required Courses

Lower-Division

- One of the following sequences:
 - Calculus: Math. 20A-B-C-D-F
 - Honors Calculus: Math. 31AH-BH, Math. 20D
- Intro. to Economics: Econ. 1 and 3

Upper-Division

Fifteen upper-division courses in mathematics and economics, with a minimum of seven courses in each department, chosen from the courses listed below (prerequisites are strictly enforced):

- Mathematical Reasoning: Math. 109 (**Note:** Students completing Math. 31CH may substitute a four-unit upper-division mathematics elective for Math. 109.)
- One of the following: Applied Linear Algebra: Math. 102 Numerical Linear Algebra: Math. 170A Modern Algebra: Math. 100A-B
- One of the following: Foundations of Analysis: Math. 140A Advanced Calculus: Math. 142A
- One of the following: Ordinary Differential Equations: Math. 130A, Foundations of Analysis: Math. 140B Advanced Calculus: Math. 142B
- Microeconomics: Econ. 100A-B-C
- Econometrics: Econ. 120A-B-C or Math. 180A and Econ. 120B-C or Probability: Math. 180A, 181A and Econ. 120C
- One of the following:
 - Macroeconomics: Econ. 110A-B
 - Mathematical Programming: Numerical Optimization: Math. 171A-Bor two courses from the following:
 - Decisions Under Uncertainty: Econ. 171
 - Introduction to Operations Research: Econ. 172A-B, (Note: 172A is a prerequisite for 172B-C.)

Other courses which are strongly recommended are Math. 130B, 131, 181B, 193A-B and 194 and Econ. 109, 113, 175, and 178.

MAJOR IN MATHEMATICS—SECONDARY EDUCATION

This major offers excellent preparation for teaching mathematics in secondary schools. Students interested in earning a California teaching credential from UCSD should contact the Education Studies Program (EDS) for information regarding prerequisites and requirements. It is recommended you contact EDS as early as possible.

Lower-Division Requirements

- One of the following sequences:
 - Calculus: Math. 20A-B-C-D-E-F
 - Honors Calculus: Math. 31AH-BH-CH, Math. 20DRecommended:
- One of the following: Introduction to Computer Science: Java: CSE 8A-AL-B, C/C++ Programming: MAE 9

Upper-Division Requirements

- Mathematical Reasoning: Math. 109 (**Note:** Students completing Math. 31CH may substitute a four-unit upper-division mathematics elective for Math. 109)
- Number Theory: Math. 104A
- History of Mathematics: Math. 163
- Practicum in Learning: EDS 129A-B-C (can use EDS 136 and EDS 138 instead of EDS 129A)
- One of the following: Computer Algebra: Math. 107A, Computer Graphics: Math. 155A, Numerical Linear Algebra: Math. 170A, Intro. to Cryptography: Math. 187
- One of the following: Intro. to Probability: Math. 180A, Statistical Methods: Math. 183
- One of the following: Differential Geometry: Math. 150A, Topics in Geometry: Math 151, Geometry for Secondary Teachers: Math. 153, Intro. to Topology: Math. 190
- One of the Following: Modern Algebra: Math. 100A, Applied Linear Algebra: Math. 102, Modern Applied Algebra: Math. 103A
- One of the following: Foundations of Analysis: Math. 140A, Advanced Calculus: Math. 142A
- Upper-division courses must total thirteen courses. Upper-division courses must include at least one two-quarter sequence from the following list:
100A-B; 103A-B, 103A-102; 104A-B; 110A-B; 110A-120A; 110A-130A; 110A-131; 120A-B; 140A-B; 142A-B; 150A-B; 152-184A; 154-184A; 155A-B; 160A-B; 170A-B; 170A-175; 170A-171A; 170A-179; 171A-B; 180A-B; 180A-181A; 193A-B.

MINOR IN MATHEMATICS

The minor in mathematics consists of seven or more courses. At least four of these courses must be upper-division courses taken from the UCSD Department of Mathematics. Acceptable lower-

division courses are Math. 20D, 20E (or 31CH), and 20F (or 31AH).

Math. 195, 196, 197, 198, 199, and 199H are not acceptable courses for the mathematics minor. A grade of C– or better (or P if the Pass/Not Pass option is used) is required for all courses used to satisfy the requirements for a minor. There is no restriction on the number of classes taken with the P/NP option. Upper-division courses cannot overlap between major and minor programs.

MINOR IN MATHEMATIC EDUCATION

The education studies mathematics education minor is intended for students interested in understanding how people learn mathematics, including: students considering K-12 teaching as a career; students interested in teaching at the college level; and students who are interested in becoming better, more reflective learners. All majors are welcome, but the Calculus 10 or 20 sequence is a prerequisite for two of the upper-division courses required for the minor. For more information contact Education Studies: <http://eds.ucsd.edu/undergraduate/minors.shtml>.

MATHEMATICS HONORS PROGRAM

The Department of Mathematics offers an honors program for those students who have demonstrated excellence in the major. Successful completion of the honors program entitles the student to graduate with departmental honors (see Department Honors in the Academic Regulations section).

For Mathematics, Applied Mathematics, Mathematics–Scientific Computation, Mathematics–Applied Science, Mathematics–Secondary Education, Mathematics–Computer Science, and Probability and Statistics Majors:

Requirements for admission to the program are

1. Junior standing
2. An overall GPA of 3.0 or higher
3. A GPA in the major of 3.5 or higher
4. Completion of Math. 109 (Mathematical Reasoning) or Math. 31CH (Honors Vector Calculus) and at least one of Math. 100A, 103A, 140A, or 142A. (Completion of additional major courses is strongly recommended.)

Applications to the program should be made the spring quarter before the student is at senior standing.

Completion of the honors program requires the following:

1. At least one quarter of the student colloquium, Math. 196 (Note: Math. 196 is only offered in the fall quarter.)
2. The minimum 3.5 GPA in the major must be maintained
3. An Honors Thesis. The research and writing of the thesis will be conducted over at least two quarters of the junior/senior years under the

supervision of a faculty advisor. This research will be credited as eight to twelve units of Math. 199H. The completed thesis must be approved by the department's Honors Committee, and presented orally at the Undergraduate Research Conference or another appropriate occasion.

The department's Honors Committee will determine the level of honors to be awarded, based on the student's GPA in the major and the quality of the honors work. Applications for the mathematics department's Honors Program can be obtained at the mathematics department Undergraduate Affairs Office (AP&M 7018) or the Mathematics Advising Office (AP&M 6016). Completed applications can be returned to the Mathematics Advising Office.

For Joint Mathematics and Economics Majors:

To graduate with honors requires the following:

1. At least one quarter of the Student Colloquium, Math. 196 (Note: Math. 196 is only offered in the fall quarter.)
2. At least one Economics honors course: Econ. 100AH, 100BH, 110AH, 110BH, 120AH, 120BH, 120CH. Note: enrollment in these honors classes is by special permission; check with the undergraduate advisors in the Economics Student Services Office (SH 245).
3. An Honors Thesis. The research and writing of the thesis will be conducted over two quarters of the senior year under the supervision of a faculty advisor. The completed thesis must be approved by the Joint Mathematics and Economics Honors Committee, which comprises the Mathematics Honors Committee and the Economics Honors Committee, and presented orally at the Undergraduate Research Conference or another appropriate occasion.
 - a. If the student is a declared major in the mathematics department (MA33), this thesis will be credited as eight units of Math. 199H. Enrollment in Math. 199H is by special permission; check with the advisors in the mathematics department Undergraduate Affairs Office (AP&M 7018) or the Mathematics Advising Office (AP&M 6016).
 - b. If the student is a declared major in the economics department (EN28), the student must enroll in Econ. 191A-B. Enrollment in Econ. 191 is by special permission; check with the undergraduate advisors in the Economics Student Services Office (SH 245).
4. A minimum GPA of 3.0 overall, 3.5 in the upper-division courses required for the major and a 3.5 in the following four classes: Math. 196, Economics Honors class and either Econ. 191A-B or two quarters of Math. 199H.

The Joint Mathematics and Economics Honors Committee will determine the level of honors to be awarded, based on the student's GPA in the major and the quality of the honors work.

DUPLICATION OF CREDIT

Information on duplication of credit (both full and partial) can be found in the course descriptions. It is the student's responsibility to be aware of the credit restrictions listed.

Faculty Advisors

Advisors change yearly. Contact the undergraduate office at (858) 534-3590 for current information.

THE GRADUATE PROGRAM

The Department of Mathematics offers graduate programs leading to the M.A. (pure or applied mathematics), M.S. (statistics), and Ph.D. degrees.

The application deadline for fall admission is January 7 for Ph.D. candidates, and February 7 for M.A./M.S. candidates. Candidates should have a bachelor's or master's degree in mathematics or a related field from an accredited institution of higher education or the equivalent. A minimum scholastic average of B or better is required for course work completed in upper-division or prior graduate study. In addition, the department requires all applicants to submit scores no older than twelve months from both the GRE General Test and Advanced Subject Test in Mathematics. Completed files are judged on the candidate's mathematical background, qualifications, and goals.

Departmental support is typically in the form of teaching assistantships, research assistantships, and fellowships. These are currently only awarded to students in the Ph.D. program.

GENERAL REQUIREMENTS

All student course programs must be approved by a faculty advisor prior to registering for classes each quarter, as well as any changes throughout the quarter.

Full-time students are required to register for a minimum of twelve (12) units every quarter, eight (8) of which must be graduate-level mathematics courses taken for a letter grade only. The remaining four (4) units can be approved upper-division or graduate-level courses in mathematics-related subjects (Math. 500 may not be used to satisfy any part of this requirement). After advancing to candidacy, Ph.D. candidates may take all course work on a Satisfactory/Unsatisfactory basis. Typically, students should not enroll in Math. 299 until they have satisfactorily passed both qualifying examinations (see "[Ph.D. in Mathematics](#)") or obtained approval of their faculty advisor.

MASTER OF ARTS IN PURE MATHEMATICS

[Offered only under the Comprehensive Examination Plan.] The degree may be terminal or obtained on the way to the Ph.D. A total of forty-eight units of credit is required. Twenty-four of these units must be graduate-level mathematics courses approved in consultation with a faculty advisor.

In the selection of course work to fulfill the remaining twenty-four units, the following restrictions must be followed:

1. No more than eight units of upper-division mathematics courses.
2. No more than twelve units of graduate courses in a related field outside the department (approved by the Department of Mathematics).
3. No more than four units of Math. 295 (Special Topics) or Math. 500 (Apprentice Teaching).
4. No units of Math. 299 (Reading and Research) may be used in satisfying the requirements for the master's degree.

Comprehensive Examinations

Seven written departmental examinations are offered in three areas (refer to "[Ph.D. In Mathematics](#)," Areas 1, 2, and 3, for list of exams). A student must complete two examinations, one from Area 1 and one from Area 2, both with an M.A. pass or better.

Foreign Language Requirement

A reading knowledge of one foreign language (French, German, or Russian) is required. In exceptional cases other languages may be substituted. Testing is administered by faculty in the department who select published mathematical material in one of these languages for a student to translate.

Time Limits

Full-time students are permitted seven quarters in which to complete all degree requirements. While there are no written time limits for part-time students, the department has the right to intervene and set individual deadlines if it becomes necessary.

MASTER OF ARTS IN APPLIED MATHEMATICS

[Offered only under the Comprehensive Examination Plan] The degree may be terminal or obtained on the way to the Ph.D. Out of the total forty-eight units of required credit, two applied mathematics sequences comprising twenty-four units must be chosen from the following list (not every course is offered each year):

- 202A-B-C. (Applied Algebra)
- 210A-B-C. (Mathematical Methods in Physics and Engineering)
- 261A-B-C. (Probabilistic Combinatorics and Algorithms)
- 264A-B-C. (Combinatorics)
- 270A-B-C. (Numerical Mathematics)
- 271A-B-C. (Numerical Optimization)
- 272A-B-C. (Numerical Partial Differential Equations)
- 273A-B-C. (Advanced Techniques in Computational Math)

In certain cases, a petition may be approved to substitute one of these requirements from the following list of sequences:

- 220A-B-C. (Complex Analysis)
- 231A-B-C. (Partial Differential Equations)
- 240A-B-C. (Real Analysis)
- 280A-B-C. (Probability Theory)
- 281A-B-C. (Mathematical Statistics)
- 282A-B. (Applied Statistics)

In choosing course work to fulfill the remaining twenty-four units, the following restrictions must be followed:

1. At least eight units must be approved graduate courses in mathematics or other departments [a one-year sequence in a related area outside the department such as computer science, engineering, physics, or economics is strongly recommended];
2. A maximum of eight units can be approved upper-division courses in mathematics; and
3. A maximum of eight units can be approved upper-division courses in other departments.
4. A maximum of four units of Math. 500 (Apprentice Teaching).
5. NO UNITS of Math. 295 (Special Topics) or Math. 299 (Reading and Research) may be used.

Students are strongly encouraged to consult with a faculty advisor in their first quarter to prepare their course of study.

Comprehensive Examinations

Two written comprehensive examinations must be passed at the master's level in any of the required applied mathematics sequences listed above. The instructors of each course should be contacted for exam details.

Foreign Language Requirement

There is no foreign language requirement for the M.A. in applied mathematics.

Time Limits

Full-time M.A. students are permitted seven quarters in which to complete all requirements. While there are no written time limits for part-time students, the department has the right to intervene and set individual deadlines if it becomes necessary.

MASTER OF SCIENCE IN STATISTICS

[Offered only under the Comprehensive Examination Plan.] The M.S. in statistics is designed to provide recipients with a strong mathematical background and experience in statistical computing with various applications. Out of the forty-eight units of credit needed, required core courses comprise twenty-eight units, including

- Math. 281A-B-C. (Mathematical Statistics)
- Math. 282A-B. (Applied Statistics)

and any two topics comprising eight units chosen freely from Math. 287A-B-C and 289A-B (see course descriptions for topics).

The following guidelines should be followed when selecting courses to complete the remaining twenty units:

1. For a theoretical emphasis, Math. 280A-B-C (Probability Theory) is required.
2. For an applied orientation, Math. 270A-B-C (Numerical Mathematics) is recommended.

3. A maximum of eight units of approved upper-division applied mathematics courses (see faculty advisor) and Math. 500 (Apprentice Teaching).

Upon the approval of the faculty advisor, the rule above, limiting graduate units from other departments to eight may be relaxed in making up these twenty non-core units.

Comprehensive Examinations

Two written comprehensive examinations must be passed at the master's level in related course work (approved by a faculty advisor). Instructors of the relevant courses should be consulted for exam dates as they vary on a yearly basis.

Foreign Language Requirement

There is no foreign language requirement for the M.S. in statistics.

Time Limits

Full-time M.S. students are permitted seven quarters in which to complete all requirements. While there are no written time limits for part-time students, the department has the right to intervene and set individual deadlines if it becomes necessary.

PH.D. IN MATHEMATICS

Written Qualifying Examinations

The department offers written qualifying examinations in seven subjects. These are grouped into three areas as follows:

Area #1

Complex Analysis (Math. 220A-B-C) Real Analysis (Math. 240A-B-C)

Area #2

Algebra (Math. 200A-B-C) Applied Algebra (Math. 202A-B-C) Topology (Math. 290A-B-C)

Area #3

Numerical Analysis (Math. 270A-B-C) Statistics (Math. 281A-B-C)

1. Three qualifying exams must be passed. At least one must be passed at the Ph.D. level, and a second must be passed at either the Ph.D. or Provisional Ph.D. Level The third exam must be passed at least at the master's level.
2. Of the three qualifying exams, there must be at least one from each of Areas #1 and #2. Algebra and Applied Algebra do not count as distinct exams in Area #2.
3. Students must pass a least two exams from distinct areas with a minimum grade of Provisional Ph.D. (For example, a Ph.D. pass in Real Analysis, Provisional Ph.D. Pass in Complex Analysis, M.A. pass in Algebra would NOT satisfy this requirement, but a Ph.D. Pass in Real Analysis, M.A. pass in Complex Analysis, Provisional Ph.D. Pass in Algebra would, as would a Ph.D. Pass in Numerical Analysis, Provisional Ph.D. Pass in Applied Algebra, and M.A. pass in Real Analysis.)

- All exams must be passed by the September exam session prior to the beginning of the third year of graduate studies. (Thus, there would be no limit on the number of attempts, encouraging new students to take exams when they arrive, without penalty.)

Department policy stipulates that at least one of the exams must be completed with a Provisional Ph.D. Pass or better by September following the end of the first year. Anyone unable to comply with this schedule will lose their funding as a Ph.D. student. They will be terminated from the doctoral program and transferred to one of our master's programs.

Any master's student can submit for consideration a written request to transfer into the Ph.D. Program when the qualifying exam requirements for the Ph.D. Program have been met and a dissertation advisor is found. Approval by the Qualifying Exam and Appeals Committee (QEAC) is not automatic, however.

Exams are typically offered twice a year, one scheduled in the spring quarter and again in early September (prior to the start of fall quarter). Copies of past exams are made available for purchase in the Graduate Office.

In choosing a program with an eye to future employment, students should seek the assistance of a faculty advisor and take a broad selection of courses including applied mathematics, such as those in Area #3.

Foreign Language Requirement

A reading knowledge of one foreign language (French, German, or Russian) is required prior to advancing to candidacy. In exceptional cases other languages may be substituted. Testing is administered within the department by faculty who select published mathematical material in one of these languages for a student to translate.

Advancement to Candidacy

It is expected that by the end of the third year (nine quarters), students should have a field of research chosen and a faculty member willing to direct and guide them. A student will advance to candidacy after successfully passing the oral qualifying examination, which deals primarily with the area of research proposed but may include the project itself. This examination is conducted by the student's appointed doctoral committee. Based on their recommendation, a student advances to candidacy and is awarded the C.Phil. degree.

Dissertation and Final Defense

Submission of a written dissertation and a final examination in which the thesis is publicly defended are the last steps before the Ph.D. degree is awarded. When the dissertation is substantially completed, copies must be provided to all committee members at least four weeks in advance of the proposed defense date. Two weeks before the scheduled final defense, a copy of the dissertation must be made available in the department for public inspection.

Time Limits

The normative time for the Ph.D. in mathematics is five years. Students must have a dissertation advisor by the end of nine quarters. Students must be advanced to candidacy by the end of eleven quarters. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

A student making normal progress must meet the time limits described below. Ph.D. students who fail to meet these time limits may lose their TA funding.

- Pass Qualifying Exams requirement by the fall quarter of the beginning of the third year.
- Find Thesis advisor by the end of nine quarters.
- Advance to Candidacy by the end of eleven quarters.
- Final Defense by the end of the fifth year.

PH.D. IN MATHEMATICS WITH SPECIALIZATION IN COMPUTATIONAL SCIENCE

The Ph.D. in mathematics, with a Specialization in Computational Science is designed to allow a student to obtain standard basic training in his or her chosen field of science, mathematics, or engineering with training in computational science integrated into those graduate studies. The Specialization in Computational Science recognizes the nation's growing and continuing need for broadly trained advanced computational scientists in academic, industry, and government laboratories. Its graduates will be well-positioned to compete effectively for the best jobs in these areas.

Computational science refers to the use of computer simulation and visualization for basic scientific research, product development, and forecasting. It is an interdisciplinary field that combines mathematics (mathematical modeling, numerical analysis) and computer science (architecture, programming, networks, graphics) with one of the scientific or engineering disciplines.

The specialization draws upon the expertise of faculty from bioengineering, biological sciences, chemistry and biochemistry, computers and engineering, electrical and computer engineering, mathematics, mechanical and aerospace engineering, physics, Scripps Institution of Oceanography, structural engineering as well as research staff from the San Diego Supercomputer Center.

Admission

Prospective students must apply to the Ph.D. program of a participating home department, be admitted to that department and then be admitted to the specialization. The five participating academic departments that have a Specialization in Computational Science are chemistry and biochemistry, computer science and engineering, mathematics, mechanical and aerospace engineering, and physics. Requirements consist of those of the admitting home department (one of the five participating departments) as well as the proficiency, qualifying, and elective course requirements as outlined below. Requirements and policies relating

to the home department can be found in the *UC San Diego General Catalog* under that department's name. In the case of the mathematics department, the admission requirements for the mathematics doctoral program are those outlined above.

Specialization in Computational Science Policies

- The specialization requires that students complete all home department requirements for the Ph.D. along with satisfying the CSME proficiency, qualifying, and elective requirements. In the case of the mathematics department, the requirements and timelines for the normal mathematics Ph.D. program are as described above.
- CSME Proficiency (see below) must be satisfied by the end of the first year.
- The CSME qualifying exams must be passed by the end of the second year or, on petition, by the end of the third year.
- The CSME qualifying exams can be attempted repeatedly but no more than once per quarter per subject.
- The regular qualifying exams in the home department and the CSME qualifying exams must all be passed before the student is permitted to take the candidacy (Senate) exam.
- Two CSME electives outside the home department must be taken.
- The two CSME electives can be taken at any time before defending the thesis.
- One of the CSME electives may be taken Pass/Fail; the other must be taken for a letter grade.
- No CSME field examination requirements will be imposed beyond those of the admitting home department.
- No CSME foreign language requirements will be imposed beyond those of the admitting home department.

Proficiency Requirements: All Ph.D. students participating in the CSME doctoral program must demonstrate advanced undergraduate level proficiency in numerical analysis and in computer algorithms and data structures. Proficiency may be demonstrated by taking UCSD's courses in both subjects while enrolled in the graduate program (four units per course):

- Numerical Methods (Math. 174/274 or MAE 290A)
- Data Structures and Algorithms (CSE 100/101)

Alternatively, proficiency in the material contained in these courses may be satisfied by having previously taken these or equivalent courses at other institutions, or through other evidence of sufficient knowledge of this material. Demonstrating proficiency without taking these courses at UCSD is subject to approval by the CSME Executive Committee on an individual basis.

Qualifying Requirements: In addition to the home department qualifying exam requirements, Ph.D. students participating in the CSME doctoral program must pass the final exams in all three qualifying exam courses listed below. The three qualifying

exam courses have been selected to provide a general broad set of tools in computational science. It is expected that most students will register for and take these courses (four units per course), but the CSME Qualifying Exam Committee may allow an exceptionally well-prepared student to take the final exams without taking the courses. Students must pass the qualifying examinations by the end of the second year or, on petition, by the end of the third year.

1. Math. 275 or MAE 290B (Numerical PDEs)
2. Phys. 244 or CSE 260 (Parallel Computing)
3. Course to be selected from List A

LIST A: CSME Qualifying Exam Courses

Courses taken to satisfy the qualifying requirements cannot count toward the elective requirements.

1. Phys. 243 (Stochastic Methods)
2. Math. 270A, B, or C (Numerical Analysis; not permitted for math. students, who typically take Math. 270A-B-C as a normal mathematics qualifying course.)
3. Math. 272A, B, or C (Advanced Numerical PDEs)
4. MAE 223 (Computational Fluid Dynamics)
5. MAE 232A or B (Computational Solid Mechanics)
6. MAE 280A or B (Linear Systems Theory)
7. (To be determined by Executive Committee)

Elective Requirements: To encourage Ph.D. students specializing in computational science to both broaden themselves in an area of science or engineering as well as to obtain more specialized training in specific areas of computational science, students will be required to take and pass two elective courses from the following approved List B (four units per course), both of which must be outside of their home department, the first of which must be taken for a letter grade, and the second of which may be taken pass/fail. The CSME Executive Committee may approve the use of courses not appearing on the following list on a case-by-case basis. Courses taken to satisfy the elective requirements cannot count toward the qualifying requirements.

LIST B: Elective Graduate Courses in Mathematics, Science, and Engineering

1. Math. 270A-B-C (Numerical Analysis; not permitted for math. students, who typically take Math. 270A-B-C as a normal mathematics qualifying course.)
2. Math. 271A-B-C (Optimization)
3. Math. 272A-B-C (Advanced Numerical PDEs)
4. Math. 273A-B-C (Computational Mathematics Project)
5. Phys. 141/241 (Computational Physics I)
6. Phys. 142/242 (Computational Physics II)
7. Phys. 221 AB (Nonlinear dynamics)
8. Chem. 215 (Modeling Biological Macromolecules)

9. BGGN 260 (Neurodynamics)
10. (To be determined by Executive Committee)

Thesis/Dissertation: Students participating in the Ph.D. in mathematics with a Specialization in Computational Science must complete a dissertation that meets all requirements for the regular Ph.D. in the home department. In addition, it is expected that the Ph.D. dissertation will be interdisciplinary in nature and involve some aspect of computational science.

Final Examination: Students participating in the Ph.D. in mathematics with a Specialization in Computational Science must meet the regular final examination requirements of the home department.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

All prerequisites listed below may be replaced by an equivalent or higher-level course. The listings of quarters in which courses will be offered are only tentative. Please consult the Department of Mathematics to determine the actual course offerings each year.

LOWER-DIVISION

3C. Pre-Calculus (4)

Functions and their graphs. Linear and polynomial functions, zeroes, inverse functions, exponential and logarithmic, trigonometric functions and their inverses. Emphasis on understanding algebraic, numerical and graphical approaches making use of graphing calculators. (No credit given if taken after Math. 4C, 1A/10A, or 2A/20A.) Three or more years of high school mathematics or equivalent recommended. **Prerequisite:** Math Placement Exam qualifying score.

4C. Pre-Calculus for Science and Engineering (4)

Review of polynomials. Graphing functions and relations: graphing rational functions, effects of linear changes of coordinates. Circular functions and right triangle trigonometry. Reinforcement of function concept: exponential, logarithmic, and trigonometric functions. Vectors. Conic sections. Polar coordinates. Three lectures, one recitation. (No credit given if taken after Math. 1A/10A or 2A/20A. Two units of credit given if taken after Math. 3C.) **Prerequisite:** Math Placement Exam qualifying score or Math. 3C with a grade of C– or better.

10A. Calculus (4)

Differentiation and integration of algebraic functions. Fundamental theorem of calculus. Applications. (No credit given if taken after Math. 20A.) **Prerequisite:** Math Placement Exam qualifying score, or AP Calculus AB score of 2, or SAT II Math. Level 2 score of 600 or higher, or Math. 3C with a grade of C or better, or Math. 4C with a grade of C– or better.

10B. Calculus (4)

Further applications of the definite integral. Calculus of trigonometric, logarithmic, and exponential functions. Complex numbers. (No credit given if taken after Math. 2B/20B. Formerly numbered Math. 1B.) **Prerequisite:** AP Calculus AB score of 3, 4, or 5 (or equivalent AB subscore on BC exam), or Math. 10A with a grade of C– or better, or Math. 20A with a grade of C– or better.

10C. Calculus (4)

Vector geometry, velocity, and acceleration vectors. (No credit given if taken after Math. 2C/20C. Formerly numbered Math. 1C.) **Prerequisite:** AP Calculus BC score of 3, 4, or 5, or Math. 10B with a grade of C– or better, or Math. 20B with a grade of C– or better.

11. Elementary Probability and Statistics (4)

Events and probabilities, conditional probability, Bayes' formula. Discrete random variables: mean, variance; binomial, Poisson distributions. Continuous random variables: densities, mean, variance; normal, uniform, exponential distributions. Sample statistics, confidence intervals, hypothesis testing, regression. Applications. Intended for biology and social science majors. **Prerequisites:** AP Calculus BC score of 3, 4, or 5, or Math. 10B with a grade of C– or better, or Math. 20B with a grade of C– or better, and concurrent enrollment in Math. 11L.

11L. Elementary Probability and Statistics Laboratory (1)

Introduction to the use of software in probabilistic and statistical analysis. Emphasis on understanding connections between the theory of probability and statistics, numerical results of real data, and learning techniques of data analysis and interpretation useful for solving scientific problems. **Prerequisites:** AP Calculus BC score of 3, 4, or 5, or Math. 10B with a grade of C– or better, or Math. 20B with a grade of C– or better, and concurrent enrollment in Math. 11.

15A. Discrete Mathematics (4)

Basic discrete mathematical structures: sets, relations, functions, sequences, equivalence relations, partial orders, number systems. Methods of reasoning and proofs: propositional logic, predicate logic, induction, recursion, pigeonhole principle. Infinite sets and diagonalization. Basic counting techniques; permutations and combinations. Applications will be given to digital logic design, elementary number theory, design of programs, and proofs of program correctness. Equivalent to CSE 20. Credit not offered for both Math. 15A and CSE 20. **Prerequisites:** CSE 8A or CSE 8B or CSE 11. CSE 8B or CSE 11 may be taken concurrently with Math. 15A/CSE 20. (Not offered in 2010–11.)

15B. Mathematics for Algorithm and Systems (4)

This course introduces mathematical tools for the qualitative and quantitative analysis of algorithms and computer systems. Topics to be covered include basic enumeration and counting techniques; recurrence relations; graph theory; asymptotic notation; elementary applied discrete probability. Equivalent to CSE 21. Credit not offered for both Math. 15B and CSE 21. **Prerequisite:** Math. 15A or CSE 20 or 160A; CSE 12 is strongly recommended for CSE 21. (Not offered in 2010–11.)

20A. Calculus for Science and Engineering (4)

Foundations of differential and integral calculus of one variable. Functions, graphs, continuity, limits, derivative, tangent line. Applications with algebraic, exponential, logarithmic, and trigonometric functions. Introduction to the integral. (Two credits given if taken after Math. 1A/10A and no credit given if taken after Math. 1B/10B or Math. 1C/10C. Formerly numbered Math. 2A.) **Prerequisite:** Math Placement Exam qualifying score, or AP Calculus AB score of 2 or 3 (or equivalent AB subscore on BC exam), or SAT II Math. 2C score of 650 or higher, or Math. 4C with a grade of C– or better, or Math. 10A with a grade of C– or better.

20B. Calculus for Science and Engineering (4)

Integral calculus of one variable and its applications, with exponential, logarithmic, hyperbolic, and trigonometric functions. Methods of integration. Infinite series. Polar coordinates in the plane and complex exponentials. (Two units of credits given if taken after Math. 1B/10B or Math. 1C/10C.) **Prerequisite:** AP Calculus AB score of 4 or 5, or AP Calculus BC score of 3, or Math. 20A with a grade of C– or better, or Math. 10B with a grade of C– or better, or Math. 10C with a grade of C– or better.

20C. Calculus and Analytic Geometry for Science and Engineering (4)

Vector geometry, vector functions and their derivatives. Partial differentiation. Maxima and minima. Double integration. Two units of credit given if taken after Math. 10C. Credit not offered for both Math. 20C and 31BH. Formerly numbered Math. 21C. **Prerequisite:** AP Calculus BC score of 4 or 5, or Math. 20B with a grade of C– or better.

20D. Introduction to Differential Equations (4)

Ordinary differential equations: exact, separable, and linear; constant coefficients, undetermined coefficients, variations of parameters. Systems. Series solutions. Laplace transforms. Techniques for engineering sciences. Computing

symbolic and graphical solutions using Matlab. Formerly numbered Math. 21D. May be taken as repeat credit for Math. 21D. **Prerequisite:** Math. 20C (or Math. 21C) or Math. 31BH with a grade of C– or better.

20E. Vector Calculus (4)

Change of variable in multiple integrals, Jacobian, Line integrals, Green's theorem. Vector fields, gradient fields, divergence, curl. Spherical/cylindrical coordinates. Taylor series in several variables. Surface integrals, Stoke's theorem. Gauss' theorem. Conservative fields. Credit not offered for both Math. 20E and 31CH. **Prerequisite:** Math. 20C (or Math. 21C) or Math. 31BH with a grade of C– or better.

20F. Linear Algebra (4)

Matrix algebra, Gaussian elimination, determinants. Linear and affine subspaces, bases of Euclidean spaces. Eigenvalues and eigenvectors, quadratic forms, orthogonal matrices, diagonalization of symmetric matrices. Applications. Computing symbolic and graphical solutions using Matlab. Credit not offered for both Math. 20F and 31AH. **Prerequisite:** Math. 20C (or Math. 21C) with a grade of C– or better.

31AH. Honors Linear Algebra (4)

First quarter of three-quarter honors integrated linear algebra/multivariable calculus sequence for well-prepared students. Topics include: real/complex number systems, vector spaces, linear transformations, bases and dimension, change of basis, eigenvalues, eigenvectors, diagonalization. Credit not offered for both Math. 31AH and 20F. **Prerequisite:** AP Calculus BC score of 5 or consent of instructor.

31BH. Honors Multivariable Calculus (4)

Second quarter of three-quarter honors integrated linear algebra/multivariable calculus sequence for well-prepared students. Topics include: derivative in several variables, Jacobian matrices, extrema and constrained extrema, integration in several variables. Credit not offered for both Math. 31BH and 20C. **Prerequisite:** Math. 31AH with a grade of B– or better, or consent of instructor.

31CH. Honors Vector Calculus (4)

Third quarter of honors integrated linear algebra/multivariable calculus sequence for well-prepared students. Topics include: change of variables formula, integration of differential forms, exterior derivative, generalized Stoke's theorem, conservative vector fields, potentials. Credit not offered for both Math. 31CH and 20E. **Prerequisite:** Math. 31BH with a grade of B– or better, or consent of instructor.

87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to 15 to 20 students, with preference given to entering freshman. **Prerequisites:** none.

95. Introduction to Teaching Math (2)

(Cross-listed with EDS 30.) Revisit students' learning difficulties in mathematics in more depth to prepare students to make meaningful observations of how K–12 teachers deal with these difficulties. Explore how instruction can use students' knowledge to pose problems that stimulate students' intellectual curiosity. **Prerequisites:** none.

99R. Independent Study (1)

Independent study or research under direction of a member of the faculty. **Prerequisites:** Must be of first-year standing and a Regent's Scholar.

UPPER-DIVISION

100A. Abstract Algebra I (4)

First course in a rigorous three-quarter introduction to the methods and basic structures of higher algebra. Topics include: groups, subgroups and factor groups, homomorphisms, rings, fields. Students may not receive credit for both Math. 100A and Math. 103A. **Prerequisite:** Math. 31CH or Math. 109 or consent of instructor.

100B. Abstract Algebra II (4)

Second course in a rigorous three-quarter introduction to the methods and basic structures of higher algebra. Topics include: rings (especially polynomial rings) and ideals, unique factorization, fields; linear algebra from perspective of linear transformations on vector spaces, including inner product spaces, determinants, diagonalization. Students may not receive credit for both Math. 100B and Math. 103B. **Prerequisite:** Math. 100A or consent of instructor.

100C. Abstract Algebra III (4)

Third course in a rigorous three-quarter introduction to the methods and basic structures of higher algebra. Topics include: linear transformations, including Jordan canonical form and rational canonical form; Galois theory, including the insolubility of the quintic. **Prerequisite:** Math. 100B or consent of instructor. (F,W,S)

102. Applied Linear Algebra (4)

Second course in linear algebra from a computational yet geometric point of view. Elementary Hermitian matrices, Schur's theorem, normal matrices, and quadratic forms. Moore-Penrose generalized inverse and least square problems. Vector and matrix norms. Characteristic and singular values. Canonical forms. Determinants and multilinear algebra. **Prerequisite:** Math. 20F or Math. 31AH. (W)

103A. Modern Algebra I (4)

First course in a two-quarter introduction to abstract algebra with some applications. Emphasis on group theory. Topics include: definitions and basic properties of groups, properties of isomorphisms, subgroups. Students may not receive credit for both Math. 100A and Math. 103A. **Prerequisite:** Math. 31CH or Math. 109 or consent of instructor.

103B. Modern Algebra II (4)

Second course in a two-quarter introduction to abstract algebra with some applications. Emphasis on rings and fields. Topics include: definitions and basic properties of rings, fields, and ideals, homomorphisms, irreducibility of polynomials. Students may not receive credit for both Math. 100B and Math. 103B. **Prerequisite:** Math. 103A or Math. 100A or consent of instructor.

104A. Number Theory I (4)

Elementary number theory with applications. Topics include unique factorization, irrational numbers, residue systems, congruences, primitive roots, reciprocity laws, quadratic forms, arithmetic functions, partitions, Diophantine equations, distribution of primes. Applications include fast Fourier transform, signal processing, codes, cryptography. **Prerequisite:** Math. 109 or Math. 31CH, or consent of instructor.

104B. Number Theory II (4)

Topics in number theory such as finite fields, continued fractions, Diophantine equations, character sums, zeta and theta functions, prime number theorem, algebraic integers, quadratic and cyclotomic fields, prime ideal theory, class number, quadratic forms, units, Diophantine approximation, p -adic numbers, elliptic curves. **Prerequisite:** Math. 104A or consent of instructor.

104C. Number Theory III (4)

Topics in algebraic and analytic number theory, with an advanced treatment of material listed for Math. 104B. **Prerequisite:** Math. 104B or consent of instructor.

107A-B. Computer Algebra (4-4)

An introduction to algebraic computation. Computational aspects of groups, rings, fields, etc. Data representation and algorithms for symbolic computation. Polynomials and their arithmetic. The use of a computer algebra system as an experimental tool in mathematics. Programming using algebra systems. **Prerequisite:** prior or concurrent enrollment in the Math. 100 or 103 sequence. (Not offered in 2010–11.)

109. Mathematical Reasoning (4)

This course uses a variety of topics in mathematics to introduce the students to rigorous mathematical proof, emphasizing quantifiers, induction, negation, proof by contradiction, naive set theory, equivalence relations and epsilon-delta proofs. Required of all departmental majors. **Prerequisite:** Math. 20F or Math 31AH or consent of instructor.

110A. Introduction to Partial Differential Equations (4)

Fourier series, orthogonal expansions, and eigenvalue problems. Sturm-Liouville theory. Separation of variables for partial differential equations of mathematical physics, including topics on Bessel functions and Legendre polynomials. Formerly Math. 110. Students may not receive credit for Math. 110A and Math. 110. **Prerequisites:** Math. 20D and either 20F or Math. 31AH, or consent of instructor. (F,S)

110B. Elements of Partial Differential Equations and Integral Equations (4)

Basic concepts and classification of partial differential equations. First order equations, characteristics. Hamilton-Jacobi theory, Laplace's equation, wave equation, heat equation. Separation of variables, eigenfunction expansions, existence and uniqueness of solutions. Formerly Math. 132A. Students may not receive credit for Math. 110B and Math. 132A. **Prerequisite:** Math. 110A or consent of instructor. (W)

111A. Mathematical Modeling I (4)

An introduction to mathematical modeling in the physical and social sciences. Topics vary, but have included mathematical models for epidemics, chemical reactions, political organizations, magnets, economic mobility, and geographical distributions of species. May be repeated for credit when topics change. **Prerequisite:** Math. 20D and either Math. 20F or Math. 31AH, or consent of instructor.

111B. Mathematical Modeling II (4)

Continued study on mathematical modeling in the physical and social sciences, using advanced techniques that will expand upon the topics selected and further the mathematical theory presented in Math. 111A. May be repeated for credit when topics change. **Prerequisite:** Math. 111A or consent of instructor.

120A. Elements of Complex Analysis (4)

Complex numbers and functions. Analytic functions, harmonic functions, elementary conformal mappings. Complex integration. Power series. Cauchy's theorem. Cauchy's formula. Residue theorem. **Prerequisite:** Math. 20E or Math. 31CH, or consent of instructor. (F,W)

120B. Applied Complex Analysis (4)

Applications of the residue theorem. Conformal mapping and applications to potential theory, flows, and temperature distributions. Fourier transformations. Laplace transformations, and applications to integral and differential equations. Selected topics such as Poisson's formula, Dirichlet's problem, Neumann's problem, or special functions. **Prerequisite:** Math. 120A. (W,S)

121A. Foundations of Teaching and Learning Mathematics I (4)

(Cross-listed with EDS 121A.) Develop teachers' knowledge base (knowledge of mathematics content, pedagogy, and student learning) in the context of advanced mathematics. This course builds on the previous courses where these components of knowledge were addressed exclusively in the context of high-school mathematics. **Prerequisites:** EDS 30/Math. 95, Calculus 10C or 20C.

121B. Foundations of Teaching and Learning Math II (4)

(Cross-listed with EDS 121B.) Examine how learning theories can consolidate observations about conceptual development with the individual student as well as the development of knowledge in the history of mathematics. Examine how teaching theories explain the effect of teaching approaches addressed in the previous courses. **Prerequisite:** EDS 121A/Math. 121A.

130A. Ordinary Differential Equations I (4)

Linear and nonlinear systems of differential equations. Stability theory, perturbation theory. Applications and introduction to numerical solutions. Three lectures. **Prerequisites:** Math. 20D and either Math. 20F or Math. 31AH or consent of instructor. (F)

130B. Ordinary Differential Equations II (4)

Existence and uniqueness of solutions to differential equations. Local and global theorems of continuity and differentiability. Three lectures. **Prerequisite:** Math. 130A or consent of instructor. (W)

131. Variational Methods in Optimization (4)

Maximum-minimum problems. Normed vector spaces, functionals, Gateaux variations. Euler-Lagrange multiplier theorem for an extremum with constraint. Calculus of variations via the multiplier theorem. Applications taken from a variety of areas: applied mechanics, economics, astronautics physics, geometry, control theory. **Prerequisite:** Math. 20F or Math. 31AH, or consent of instructor. (S)

140A. Foundations of Real Analysis I (4)

First course in a rigorous three-quarter sequence on real analysis. Topics include: the real number system, basic topology, numerical sequences and series, continuity. Students may not receive credit for both Math. 140A and Math. 142A. **Prerequisite:** Math. 31CH or Math. 109, or consent of instructor.

140B. Foundations of Real Analysis II (4)

Second course in a rigorous three-quarter sequence on real analysis. Topics include: differentiation, the Riemann-Stieltjes integral, sequences and series of functions, power series, Fourier series, and special functions. Students may not receive credit for both Math. 140B and Math. 142B. **Prerequisite:** Math. 140A or consent of instructor.

140C. Foundations of Real Analysis III (4)

Third course in a rigorous three-quarter sequence on real analysis. Topics include: differentiation of functions of several real variables, the implicit and inverse function theorems, the Lebesgue integral, infinite-dimensional normed spaces. **Prerequisite:** Math. 140B or consent of instructor.

142A. Introduction to Analysis I (4)

First course in an introductory two-quarter sequence on analysis. Topics include: the real number system, numerical sequences and series, limits of functions, continuity. Students may not receive credit for both Math. 140 and Math. 142A. **Prerequisite:** Math. 31CH or Math. 109, or consent of instructor.

142B. Introduction to Analysis II (4)

Second course in an introductory two-quarter sequence on analysis. Topics include: differentiation, the Riemann integral, sequences and series of functions, uniform convergence, Taylor and Fourier series, special functions. Students may not receive credit for both Math. 140B and Math. 142B. **Prerequisites:** Math. 142A or Math. 140A, or consent of instructor.

150A. Differential Geometry (4)

Differential geometry of curves and surfaces. Gauss and mean curvatures, geodesics, parallel displacement, Gauss-Bonnet theorem. Three lectures. **Prerequisites:** Math. 20E with a grade of C- or better and Math. 20F with a grade of C- or better, or consent of instructor. (F)

150B. Calculus on Manifolds (4)

Calculus of functions of several variables, inverse function theorem. Further topics may include exterior differential forms, Stokes' theorem, manifolds, Sard's theorem, elements of differential topology, singularities of maps, catastrophes, further topics in differential geometry, topics in geometry of physics. **Prerequisite:** Math. 150A or consent of instructor. (W)

152. Applicable Mathematics and Computing (4)

This course will give students experience in applying theory to real world applications such as Internet and wireless communication problems. The course will incorporate talks by experts from industry and students will be helped to carry out independent projects. Topics include graph visualization, labelling, and embeddings, random graphs and randomized algorithms. May be taken 3 times for credit. **Prerequisites:** Math. 20D and either 20F or Math. 31AH, or consent of instructor.

153. Geometry for Secondary Teachers (4)

Two- and three-dimensional Euclidean geometry is developed from one set of axioms. Pedagogical issues will emerge from the mathematics and be addressed using current research in teaching and learning geometry. This course is designed for prospective secondary school mathematics teachers. **Prerequisite:** Math. 109 or Math. 31CH, or consent of instructor.

154. Discrete Mathematics and Graph Theory (4)

Basic concepts in graph theory. Combinatorial tools, structures in graphs (Hamiltonian cycles, perfect matching). Properties of graphs and applications in basic algorithmic problems (planarity, k-colorability, traveling salesman problem). **Prerequisites:** Math. 109 or Math. 31CH, or consent of instructor.

155A. Computer Graphics (4)

Bezier curves and control lines, de Casteljau construction for subdivision, elevation of degree, control points of Hermite curves, barycentric coordinates, rational curves. Programming knowledge recommended. Students may not receive credit for both Math. 155A and CSE 167. **Prerequisite:** Math. 20F or Math. 31AH, or consent of instructor. (F)

155B. Topics in Computer Graphics (4)

Spline curves, spline interpolation, affine and affine cross ratios, polar forms (blossoming), the Oslo algorithm for knot insertion, NURBS and geometric continuity. **Prerequisite:** Math. 155A or consent of instructor. (W)

163. History of Mathematics (4)

Topics will vary from year to year in areas of mathematics and their development. Topics may include the evolution of mathematics from the Babylonian period to the eighteenth century using original sources, a history of the foundations of mathematics and the development of modern mathematics. **Prerequisite:** Math. 20B or consent of instructor. (S)

166. Intro to the Theory of Computation (4)

Introduction to formal languages; regular languages; regular expressions, finite automata, minimization, closure properties, decision algorithms, and non-regular languages; context-free languages, context-free grammars, push-down automata, parsing theory, closure properties, and noncontext-free languages; computable languages; Turing machines, recursive functions, Church's thesis, undecidability and the halting problem. Equivalent to CSE 105. **Prerequisites:** CSE 8B or 9B or 10 or 65 or 62B AND CSE 20 or 160A or Math. 15A or 109 or 100A or 103A. (Not offered in 2010-11.)

168A. Topics in Applied Mathematics-Computer Science (4)

Topics to be chosen in areas of applied mathematics and mathematical aspects of computer science. May be repeated once for credit with different topics. **Prerequisite:** Math. 20F or Math. 31AH, or consent of instructor. (W,S)

170A. Introduction to Numerical Analysis: Linear Algebra (4)

Analysis of numerical methods for linear algebraic systems and least squares problems. Orthogonalization methods. Ill conditioned problems. Eigenvalue and singular value computations. Three lectures, one recitation. Knowledge of programming recommended. **Prerequisite:** Math. 20F. (F,S)

170B. Introduction to Numerical Analysis:

Approximation and Nonlinear Equations (4)
Rounding and discretization errors. Calculation of roots of polynomials and nonlinear equations. Interpolation. Approximation of functions. Three lectures, one recitation. Knowledge of programming recommended. **Prerequisite:** Math. 170A. (W)

170C. Numerical Ordinary Differential Equations (4)

Numerical differentiation and integration. Ordinary differential equations and their numerical solution. Basic existence and stability theory. Difference equations. Boundary value problems. Three lectures, one recitation. **Prerequisite:** Math. 170B or consent of instructor. (S)

171A. Introduction to Numerical Optimization: Linear Problems (4)

Linear optimization and applications. Linear programming, the simplex method, duality. Selected topics from integer programming, network flows, transportation problems, inventory problems, and other applications. Three lectures, one recitation. Knowledge of programming recommended. Credit not allowed for both Math. 171A and Econ. 172A. **Prerequisite:** Math. 20F.

171B. Introduction to Numerical Optimization: Nonlinear Problems (4)

Convergence of sequences in \mathbb{R}^n , multivariate Taylor series. Bisection and related methods for nonlinear equations in one variable. Newton's methods for nonlinear equations in one and many variables. Unconstrained optimization and Newton's method. Equality-constrained optimization, Kuhn-Tucker theorem. Inequality-constrained optimization. Three lectures, one recitation. Knowledge of programming recommended. Credit not allowed for both Math. 171B and Econ. 172B. **Prerequisite:** Math. 171A.

174. Numerical Methods for Physical Modeling (4)

(Conjoined with Math. 274) Floating point arithmetic, direct and iterative solution of linear equations, iterative solution of nonlinear equations, optimization, approximation theory, interpolation, quadrature, numerical methods for initial and boundary value problems in ordinary differential equations. Students may not receive credit for both Math. 174 and PHYS 105, AMES 153 or 154. Students may not receive credit for Math. 174 if Math. 170A, B, or C has already been taken. Graduate students will do an extra assignment/exam. **Prerequisites:** Math. 20D or Math. 21D, and either Math. 20F or Math 31AH, or consent of instructor.

175. Numerical Methods for Partial Differential Equations (4)

(Conjoined with Math. 275.) Mathematical background for working with partial differential equations. Survey of finite difference, finite element, and other numerical methods for the solution of elliptic, parabolic, and hyperbolic partial differential equations. Formerly Math. 172; students may not receive credit for Math. 175/275 and Math. 172. Graduate students do an extra paper, project, or presentation, per instructor. **Prerequisite:** Math. 174 or Math. 274, or consent of instructor.

176. Advanced Data Structures (4)

Descriptive and analytical presentation of data structures and algorithms. Lists, tables, priority queues, disjoint subsets, and dictionaries data types. Data structuring techniques include linked lists, arrays, hashing, and trees. Performance evaluation involving worst case, average and expected case, and amortized analysis. Credit not offered for both Math. 176 and CSE 100. Equivalent to CSE 100. **Prerequisites:** CSE 12, CSE 21, or Math. 15B, and CSE 30, or consent of instructor. Not offered in 2010-11.

179. Projects in Computational and Applied Mathematics (4)

(Conjoined with Math. 279.) Mathematical models of physical systems arising in science and engineering, good models and well-posedness, numerical and other approximation techniques, solution algorithms for linear and nonlinear approximation problems, scientific visualizations, scientific software design and engineering, project-oriented. Graduate students will do an extra paper, project, or presentation per instructor. **Prerequisite:** Math. 174 or Math. 274 or consent of instructor.

180A. Introduction to Probability (4)

Probability spaces, random variables, independence, conditional probability, distribution, expectation, variance, joint distributions, central limit theorem. (Two units of credit offered for Math. 180A if Econ. 120A previously, no credit offered if Econ. 120A concurrently.) **Prerequisite:** Math. 20C or Math. 31BH, or consent of instructor. (F)

180B. Introduction to Stochastic Processes I (4)

Random vectors, multivariate densities, covariance matrix, multivariate normal distribution. Random walk, Poisson process. Other topics if time permits. Three lectures. **Prerequisites:** Math. 20D and either Math. 20F or Math 31AH, and Math. 180A, or consent of instructor. (W)

180C. Introduction to Stochastic Processes II (4)

Markov chains in discrete and continuous time, random walk, recurrent events. If time permits, topics chosen from stationary normal processes, branching processes, queuing theory. Three lectures. **Prerequisite:** Math. 180B or consent of instructor. (S)

181A. Introduction to Mathematical Statistics I (4)

Multivariate distribution, functions of random variables, distributions related to normal. Parameter estimation, method of moments, maximum likelihood. Estimator

accuracy and confidence intervals. (Two units of credit offered for Math. 181A if Econ. 120B previously, no credit offered if Econ. 120B concurrently.) **Prerequisites:** Math. 180A or Econ. 120A, and Math. 20F or Math. 31AH, or consent of instructor. (W)

181B. Introduction to Mathematical Statistics II (4)
Hypothesis testing. Linear models, regression, and analysis of variance. Goodness of fit tests. Nonparametric statistics. **Prerequisite:** Math. 181A or consent of instructor. (S)

181C. Mathematical Statistics—Nonparametric Statistics (4)
Topics covered may include the following: classical rank test, rank correlations, permutation tests, distribution free testing, efficiency, confidence intervals, nonparametric regression and density estimation, resampling techniques (bootstrap, jackknife, etc.) and cross validations. **Prerequisite:** Math. 181B or consent of instructor.

181E. Mathematical Statistics—Time Series (4)
Analysis of trends and seasonal effects, autoregressive and moving averages models, forecasting, informal introduction to spectral analysis. **Prerequisite:** Math. 181B or consent of instructor.

183. Statistical Methods (4)
Introduction to probability. Discrete and continuous random variables—binomial, Poisson and Gaussian distributions. Central limit theorem. Data analysis and inferential statistics: graphical techniques, confidence intervals, hypothesis tests, curve fitting. (Credit not offered for Math. 183 if Econ. 120A, ECE 109, Math. 180A, Math. 181A, or Math. 186 previously or concurrently taken.) **Prerequisite:** Math. 20C (21C) with a grade of C– or better, or consent of instructor. (F,S)

184A. Combinatorics (4)
Introduction to the theory and applications of combinatorics. Enumeration of combinatorial structures. Ranking and unranking. Graph theory with applications and algorithms. Recursive algorithms. Inclusion-exclusion. Generating functions. Polya theory. **Prerequisite:** Math. 109 with a grade of C– or better, or consent of instructor. (W,S)

185. Introduction to Computational Statistics (4)
Statistical analysis of data by means of package programs. Regression, analysis of variance, discriminant analysis, principal components, Monte Carlo simulation, and graphical methods. Emphasis will be on understanding the connections between statistical theory, numerical results, and analysis of real data. **Prerequisites:** Math. 181B with a grade of C– or better, or concurrent enrollment.

186. Probability Statistics for Bioinformatics (4)
This course will cover discrete and random variables, data analysis and inferential statistics, likelihood estimators and scoring matrices with applications to biological problems. Introduction to Binomial, Poisson, and Gaussian distributions, central limit theorem, applications to sequence and functional analysis of genomes and genetic epidemiology. (Credit not offered for Math. 186 if Econ. 120A, ECE 109, Math. 180A, Math. 181A, or Math. 183 previously or concurrently.) **Prerequisites:** Math. 20C (21C) with a grade of C– or better, or consent of instructor.

187. Introduction to Cryptography (4)
An introduction to the basic concepts and techniques of modern cryptography. Classical cryptanalysis. Probabilistic models of plaintext. Monalphabetic and polyalphabetic substitution. The one-time system. Caesar-Vigenere-Playfair-Hill substitutions. The Enigma. Modern-day developments. The Data Encryption Standard. Public key systems. Security aspects of computer networks. Data protection. Electronic mail. Three lectures, one recitation. **Prerequisite:** programming experience. (S)

188. Design and Analysis of Algorithms (4)
Introduction to the design and analysis of efficient algorithms. Basic techniques for analyzing the time requirements of algorithms. Algorithms for sorting, searching, and pattern matching, algorithms for graphs and networks. NP-complete problems. Equivalent to CSE 101. **Prerequisites:** CSE 100 or Math. 176A for Math. 188; CSE 12, CSE 21, and CSE 100 for CSE 101. (Not offered in 2010–11.)

190. Introduction to Topology (4)
Topological spaces, subspaces, products, sums and quotient spaces. Compactness, connectedness, separation axioms. Selected further topics such as fundamental group, classification of surfaces, Morse theory, topological groups. May be repeated for credit once when topics vary, with consent of instructor. Three lectures. **Prerequisite:** Math. 109 or Math 31CH, or consent of instructor. (W)

191. Topics in Topology (4)
Topics to be chosen by the instructor from the fields of differential algebraic, geometric, and general topology. Three lectures. **Prerequisite:** Math. 190 or consent of instructor. (S)

192. Senior Seminar in Mathematics (1)
The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in mathematics at the upper-division level. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** department stamp and/or consent of instructor.

193A. Actuarial Mathematics I (4)
Probabilistic Foundations of Insurance. Short-term risk models. Survival distributions and life tables. Introduction to life insurance. **Prerequisite:** Math. 180A or Math. 183, or consent of instructor.

193B. Actuarial Mathematics II (4)
Life Insurance and Annuities. Analysis of premiums and premium reserves. Introduction to multiple life functions and decrement models as time permits. **Prerequisite:** Math. 193A or consent of instructor.

194. The Mathematics of Finance (4)
Introduction to the mathematics of financial models. Basic probabilistic models and associated mathematical machinery will be discussed, with emphasis on discrete time models. Concepts covered will include conditional expectation, martingales, optimal stopping, arbitrage pricing, hedging, European and American options. **Prerequisites:** Math. 20D, and either Math. 20F or Math. 31AH, and either Math. 180A or Math. 183, or consent of instructor.

195. Introduction to Teaching in Mathematics (4)
Students will be responsible for and teach a class section of a lower-division mathematics course. They will also attend a weekly meeting on teaching methods. (Does not count towards a minor or major.) Five lectures, one recitation. **Prerequisite:** consent of instructor. (F,W,S)

196. Student Colloquium (1)
A variety of topics and current research results in mathematics will be presented by guest lecturers and students under faculty direction. May be taken for P/NP grade only. **Prerequisite:** upper-division status.

197. Mathematics Internship (2 or 4)
An enrichment program which provides work experience with public/private sector employers. Subject to the availability of positions, students will work in a local company under the supervision of a faculty member and site supervisor. Units may not be applied towards major graduation requirements. **Prerequisites:** completion of 90 units, 2 upper-division mathematics courses, an overall 2.5 UCSD G.P.A., consent of mathematics faculty coordinator, and submission of written contract. Department stamp required.

199. Independent Study for Undergraduates (2 or 4)
Independent reading in advanced mathematics by individual students. Three periods. (P/NP grades only.) **Prerequisite:** permission of department. (F,W,S)

199H. Honors Thesis Research for Undergraduates (2–4)
Honors thesis research for seniors participating in the Honors Program. Research is conducted under the supervision of a mathematics faculty member. **Prerequisites:** admission to the Honors Program in mathematics, department stamp.

GRADUATE

200A-B-C. Algebra (4-4-4)
Group actions, factor groups, polynomial rings, linear algebra, rational and Jordan canonical forms, unitary and Hermitian matrices, Sylow theorems, finitely generated abelian groups, unique factorization, Galois theory, solvability by radicals, Hilbert Basis Theorem, Hilbert Nullstellensatz, Jacobson radical, semisimple Artinian rings. **Prerequisite:** consent of instructor.

201A-B. Basic Topics in Algebra (4-4)
Recommended for all students specializing in algebra. Basic topics include categorical algebra, commutative algebra, group representations, homological algebra, nonassociative algebra, ring theory. **Prerequisites:** Math. 200A-B-C or consent of instructor. (F,W,S)

202A. Applied Algebra I (4)
Introduction to algebra from a computational perspective. Groups, rings, linear algebra, rational and Jordan forms, unitary and Hermitian matrices, matrix decompositions, perturbation of eigenvalues, group representations, symmetric functions, fast Fourier transform, commutative algebra, Grobner basis, finite fields. **Prerequisite:** graduate standing or consent of instructor.

202B. Applied Algebra II (4)
Second course in algebra from a computational perspective. Groups, rings, linear algebra, rational and Jordan forms, unitary and Hermitian matrices, matrix decompositions, perturbation of eigenvalues, group representations, symmetric functions, fast Fourier transform, commutative algebra, Grobner basis, finite fields. **Prerequisite:** Math. 202A or consent of instructor.

202C. Applied Algebra III (4)
Third course in algebra from a computational perspective. Groups, rings, linear algebra, rational and Jordan forms, unitary and Hermitian matrices, matrix decompositions, perturbation of eigenvalues, group representations, symmetric functions, fast Fourier transform, commutative algebra, Grobner basis, finite fields. **Prerequisite:** Math. 202B or consent of instructor.

203A-B-C. Algebraic Geometry (4-4-4)
Places, Hilbert Nullstellensatz, varieties, product of varieties: correspondences, normal varieties. Divisors and linear systems; Riemann-Roch theorem; resolution of singularities of curves. Grothendieck schemes; cohomology, Hilbert schemes; Picard schemes. **Prerequisites:** Math. 200A-B-C. (F,W,S)

204. Topics in Number Theory (4)
Topics in analytic number theory, such as zeta functions and L-functions and the distribution of prime numbers, zeros of zeta functions and Siegel's theorem, transcendence theory, modular forms, finite and infinite symmetric spaces. **Prerequisite:** consent of instructor.

205. Topics in Algebraic Number Theory (4)
Topics in algebraic number theory, such as cyclotomic and Kummer extensions, class number, units, splitting of primes in extensions, zeta functions of number fields and the Brauer-Siegel Theorem, class field theory, elliptic curves and curves of higher genus, complex multiplication. **Prerequisite:** consent of instructor.

207A-B-C. Topics in Algebra (4-4-4)
In recent years, topics have included number theory, commutative algebra, noncommutative rings, homological algebra, and Lie groups. May be repeated for credit with consent of advisor. **Prerequisite:** consent of instructor.

208. Seminar in Algebra (1)
Various topics in algebra. **Prerequisite:** graduate standing or consent of instructor. (S/U grade only.)

209. Seminar in Number Theory (1)
Various topics in number theory. **Prerequisite:** graduate standing or consent of instructor. (S/U grade only.)

210A. Mathematical Methods in Physics and Engineering (4)
Complex variables with applications. Analytic functions, Cauchy's theorem, Taylor and Laurent series, residue theorem and contour integration techniques, analytic continuation, argument principle, conformal mapping,

potential theory, asymptotic expansions, method of steepest descent. **Prerequisites:** Math. 20DEF, 140A/142A or consent of instructor.

210B. Mathematical Methods in Physics and Engineering (4)

Linear algebra and functional analysis. Vector spaces, orthonormal bases, linear operators and matrices, eigenvalues and diagonalization, least squares approximation, infinite-dimensional spaces, completeness, integral equations, spectral theory, Green's functions, distributions, Fourier transform. **Prerequisite:** Math. 210A or consent of instructor. (W)

210C. Mathematical Methods in Physics and Engineering (4)

Calculus of variations: Euler-Lagrange equations, Noether's theorem. Fourier analysis of functions and distributions in several variables. Partial differential equations: Laplace, wave, and heat equations; fundamental solutions (Green's functions); well-posed problems. **Prerequisite:** Math. 210B or consent of instructor. (S)

212A. Introduction to the Mathematics of Systems and Control (4)

Linear and nonlinear systems, and their input-output behavior, linear continuous time and discrete-time systems, reachability and controllability for linear systems, feedback and stabilization, eigenvalue placement, nonlinear controllability, feedback linearization, disturbance rejection, nonlinear stabilization, Lyapunov and control-Lyapunov functions, linearization principle for stability. **Prerequisites:** Math. 102 or equivalent, Math. 120A or equivalent, Math. 142A or equivalent.

212B. Introduction to the Mathematics of Systems and Control (4)

Observability notions, linearization principle for observability. Realization theory for linear systems, observers and dynamic feedback, detectability, external stability for linear systems, frequency-domain considerations, dynamic programming, quadratic cost, state estimation and Kalman filtering, nonlinear stabilizing optimal controls, calculus of variations, and the Maximum Principle. **Prerequisite:** Math. 212A.

212C. Introduction to the Mathematics of Systems and Control (4)

Topics of current interest on systems theory, control, and estimation to be chosen by instructor. **Prerequisite:** Math. 212B.

216. Topics in Pure Mathematics (4)

This course brings together graduate students, postdocs, and faculty to examine a current research topic of broad interest. Previously covered topics include: noncommutative geometry, Loop groups, geometric quantization. **Prerequisite:** consent of instructor.

217A. Topics in Applied Mathematics (4)

In recent years, topics have included applied complex analysis, special functions, and asymptotic methods. May be repeated for credit with consent of advisor. **Prerequisite:** consent of instructor.

220A-B-C. Complex Analysis (4-4-4)

Complex numbers and functions. Cauchy theorem and its applications, calculus of residues, expansions of analytic functions, analytic continuation, conformal mapping and Riemann mapping theorem, harmonic functions. Dirichlet principle, Riemann surfaces. **Prerequisites:** Math. 140A-B or consent of instructor. (F,W,S)

221A-B. Topics in Several Complex Variables (4-4)

Formal and convergent power series, Weierstrass preparation theorem; Cartan-Ruckert theorem, analytic sets; mapping theorems; domains of holomorphy; proper holomorphic mappings; complex manifolds; modifications. **Prerequisites:** Math. 200A and 220A-B-C or consent of instructor.

231A-B-C. Partial Differential Equations (4-4-4)

Existence and uniqueness theorems. Cauchy-Kowalewski theorem, first order systems. Hamilton-Jacobi theory, initial value problems for hyperbolic and parabolic systems, boundary value problems for elliptic systems. Green's function, eigenvalue problems, perturbation theory.

Prerequisites: Math. 210A-B or 240A-B-C or consent of instructor.

237A-B. Topics in Differential Equations (4-4)

May be repeated for credit with consent of advisor. **Prerequisite:** consent of instructor.

240A-B-C. Real Analysis (4-4-4)

Lebesgue integral and Lebesgue measure, Fubini theorems, functions of bounded variations, Stieltjes integral, derivatives and indefinite integrals, the spaces L and C, equi-continuous families, continuous linear functionals general measures and integrations. **Prerequisites:** Math. 140A-B-C. (F,W,S)

241A-B. Functional Analysis (4-4)

Metric spaces and contraction mapping theorem; closed graph theorem; uniform boundedness principle; Hahn-Banach theorem; representation of continuous linear functionals; conjugate space, weak topologies; extreme points; Krein-Milman theorem; fixed-point theorems; Riesz convexity theorem; Banach algebras. **Prerequisites:** Math. 240A-B-C or consent of instructor.

242. Topics in Fourier Analysis (4)

A course on Fourier analysis in Euclidean spaces, groups, symmetric spaces. **Prerequisites:** Math. 240A-B-C or consent of instructor.

245A. Convex Analysis and Optimization I (4)

Convex sets and functions, convex and affine hulls, relative interior, closure, and continuity, recession and existence of optimal solutions, saddle point and min-max theory, subgradients and subdifferentials. **Prerequisites:** Math. 20F and Math. 142A, or graduate standing, or consent of instructor.

245B. Convex Analysis and Optimization II (4)

Optimality conditions, strong duality and the primal function, conjugate functions, Fenchel duality theorems, dual derivatives and subgradients, subgradient methods, cutting plane methods. **Prerequisite:** Math. 245A or consent of instructor.

245C. Convex Analysis and Optimization III (4)

Convex optimization problems, linear matrix inequalities, second-order cone programming, semidefinite programming, sum of squares of polynomials, positive polynomials, distance geometry. **Prerequisite:** Math. 245B or consent of instructor.

247A-B-C. Topics in Real Analysis (4-4-4)

In recent years, topics have included Fourier analysis, distribution theory, martingale theory, operator theory. May be repeated for credit with consent of advisor. **Prerequisite:** consent of instructor.

248. Seminar in Real Analysis (1)

Various topics in real analysis. **Prerequisite:** graduate standing or consent of instructor. (S/U grade only.)

250A-B-C. Differential Geometry (4-4-4)

Differential manifolds, Sard theorem, tensor bundles, Lie derivatives, DeRham theorem, connections, geodesics, Riemannian metrics, curvature tensor and sectional curvature, completeness, characteristic classes. Differential manifolds immersed in Euclidean space. **Prerequisite:** consent of instructor. (F,W,S)

251A-B-C. Lie Groups (4-4-4)

Lie groups, Lie algebras, exponential map, subgroup subalgebra correspondence, adjoint group, universal enveloping algebra. Structure theory of semi-simple Lie groups, global decompositions, Weyl group. Geometry and analysis on symmetric spaces. **Prerequisites:** Math. 200 and 250 or consent of instructor. (F,W,S)

256. Seminar in Lie Groups and Lie Algebras (1)

Various topics in Lie groups and Lie algebras, including structure theory, representation theory, and applications. **Prerequisite:** graduate standing or consent of instructor. (S/U grade only.) (F,W,S)

257A. Topics in Differential Geometry (4)

In recent years, topics have included Morse theory and general relativity. May be repeated for credit with consent of advisor. **Prerequisite:** consent of instructor.

257B. Topics in Differential Geometry (4)

In recent years, topics have included Morse theory and general relativity. May be repeated for credit with consent of advisor. Math. 257A must be taken before Math. 257B. **Prerequisite:** consent of instructor.

257C. Topics in Differential Geometry (4)

In recent years, topics have included Morse theory and general relativity. May be repeated for credit with consent of advisor. Math. 257B must be taken before Math. 257C. **Prerequisite:** consent of instructor.

258. Seminar in Differential Geometry (1)

Various topics in differential geometry. **Prerequisite:** graduate standing or consent of instructor. (S/U grade only.)

259A-B-C. Geometrical Physics (4-4-4)

Manifolds, differential forms, homology, deRham's theorem. Riemannian geometry, harmonic forms. Lie groups and algebras, connections in bundles, homotopy sequence of a bundle, Chern classes. Applications selected from Hamiltonian and continuum mechanics, electromagnetism, thermodynamics, special and general relativity, Yang-Mills fields. **Prerequisite:** graduate standing in mathematics, physics, or engineering, or consent of instructor.

260A. Mathematical Logic I (4)

Propositional calculus and first-order logic. Theorem proving, Model theory, soundness, completeness, and compactness, Herbrand's theorem, Skolem-Lowenheim theorems, Craig interpolation. **Prerequisite:** graduate standing or consent of instructor.

260B. Mathematical Logic II (4)

Theory of computation and recursive function theory, Church's thesis, computability and undecidability. Feasible computability and complexity. Peano arithmetic and the incompleteness theorems, nonstandard models. **Prerequisite:** Math. 260A or consent of instructor.

261A. Probabilistic Combinatorics and Algorithms (4)

Introduction to the probabilistic method. Combinatorial applications of the linearity of expectation, second moment method, Markov, Chebyshev, and Azuma inequalities, and the local limit lemma. Introduction to the theory of random graphs. **Prerequisite:** graduate standing or consent of instructor.

261B. Probabilistic Combinatorics and Algorithms II (4)

Introduction to probabilistic algorithms. Game theoretic techniques. Applications of the probabilistic method to algorithm analysis. Markov Chains and Random walks. Applications to approximation algorithms, distributed algorithms, online and parallel algorithms. Math. 261A must be taken before Math. 261B. **Prerequisite:** Math. 261A.

261C. Probabilistic Combinatorics and Algorithms III (4)

Advanced topics in the probabilistic combinatorics and probabilistic algorithms. Random graphs. Spectral Methods. Network algorithms and optimization. Statistical learning. Math. 261B must be taken before Math. 261C. **Prerequisite:** Math. 261B.

262A-B-C. Topics in Combinatorial Mathematics (4-4-4)

Development of a topic in combinatorial mathematics starting from basic principles. Problems of enumeration, existence, construction, and optimization with regard to finite sets. Some familiarity with computer programming desirable but not required. **Prerequisites:** Math. 100A-B-C.

264A-B-C. Combinatorics (4-4-4)

Topics from partially ordered sets, Möbius functions, simplicial complexes and shell ability. Enumeration, formal power series and formal languages, generating functions, partitions. Lagrange inversion, exponential structures, combinatorial species. Finite operator methods, q-analogues, Polya theory, Ramsey theory. Representation theory of the symmetric group, symmetric functions and operations with Schur functions. (F,W,S)

269. Seminar in Combinatorics (1)

Various topics in combinatorics. **Prerequisite:** graduate standing or consent of instructor. (S/U grade only.)

270A. Numerical Linear Algebra (4)

Error analysis of the numerical solution of linear equations and least squares problems for the full rank and rank deficient cases. Error analysis of numerical methods for eigenvalue problems and singular value problems. Iterative methods for large sparse systems of linear equations. **Prerequisites:** graduate standing or consent of instructor.

270B. Numerical Approximation and Nonlinear Equations (4)

Iterative methods for nonlinear systems of equations, Newton's method. Unconstrained and constrained optimization. The Weierstrass theorem, best uniform approximation, least-squares approximation, orthogonal polynomials. Polynomial interpolation, piecewise polynomial interpolation, piecewise uniform approximation. Numerical differentiation: divided differences, degree of precision. Numerical quadrature: interpolatory quadrature, Richardson extrapolation, Romberg Integration, Gaussian quadrature, singular integrals, adaptive quadrature. **Prerequisites:** Math. 270A or consent of instructor.

270C. Numerical Ordinary Differential Equations (4)

Initial value problems (IVP) and boundary value problems (BVP) in ordinary differential equations. Linear methods for IVP: one and multistep methods, local truncation error, stability, convergence, global error accumulation. Runge-Kutta (RK) Methods for IVP: RK methods, predictor-corrector methods, stiff systems, error indicators, adaptive time-stepping. Finite difference, finite volume, collocation, spectral, and finite element methods for BVP; a priori and a posteriori error analysis, stability, convergence, adaptivity. **Prerequisites:** Math. 270B or consent of instructor.

271A-B-C. Numerical Optimization (4-4-4)

Formulation and analysis of algorithms for constrained optimization. Optimality conditions; linear and quadratic programming; interior methods; penalty and barrier function methods; sequential quadratic programming methods. **Prerequisite:** consent of instructor. (F,W,S)

272A. Numerical Partial Differential Equations I (4)

Survey of discretization techniques for elliptic partial differential equations, including finite difference, finite element and finite volume methods. Lax-Milgram Theorem and LBB stability. A priori error estimates. Mixed methods. Convection-diffusion equations. Systems of elliptic PDEs. **Prerequisites:** graduate standing or consent of instructor.

272B. Numerical Partial Differential Equations II (4)

Survey of solution techniques for partial differential equations. Basic iterative methods. Preconditioned conjugate gradients. Multigrid methods. Hierarchical basis methods. Domain decomposition. Nonlinear PDEs. Sparse direct methods. **Prerequisites:** Math. 272A or consent of instructor.

272C. Numerical Partial Differential Equations III (4)

Time dependent (parabolic and hyperbolic) PDEs. Method of lines. Stiff systems of ODEs. Space-time finite element methods. Adaptive meshing algorithms. A posteriori error estimates. **Prerequisites:** Math. 272B or consent of instructor.

273A. Advanced Techniques in Computational Mathematics I (4)

Models of physical systems, calculus of variations, principle of least action. Discretization techniques for variational problems, geometric integrators, advanced techniques in numerical discretization. Project-oriented; projects designed around problems of current interest in science, mathematics, and engineering. **Prerequisite:** graduate standing or consent of instructor.

273B. Advanced Techniques in Computational Mathematics II (4)

Nonlinear functional analysis for numerical treatment of nonlinear PDE. Numerical continuation methods, pseudo-arclength continuation, gradient flow techniques, and other advanced techniques in computational nonlinear PDE. Project-oriented; projects designed around problems of current interest in science, mathematics, and engineering. **Prerequisite:** Math. 273A or consent of instructor.

273C. Advanced Techniques in Computational Mathematics III (4)

Adaptive numerical methods for capturing all scales in one model, multiscale and multiphysics modeling frameworks, and other advanced techniques in computational multiscale/multiphysics modeling. Project-oriented; projects designed around problems of current interest in science, mathematics, and engineering. **Prerequisite:** Math. 273B or consent of instructor.

274. Numerical Methods for Physical Modeling (4)

(Conjoined with Math. 174.) Floating point arithmetic, direct and iterative solution of linear equations, iterative solution of nonlinear equations, optimization, approximation theory, interpolation, quadrature, numerical methods for initial and boundary value problems in ordinary differential equations. Students may not receive credit for both Math. 174 and PHYS 105, AMES 153 or 154. Students may not receive credit for Math. 174 if Math. 170A, B, or C has already been taken. Graduate students will complete an additional assignment/exam. **Prerequisites:** Math. 20D or 21D, and either Math. 20F or Math. 31AH, or consent of instructor.

275. Numerical Methods for Partial Differential Equations (4)

(Conjoined with Math. 175.) Mathematical background for working with partial differential equations. Survey of finite difference, finite element, and other numerical methods for the solution of elliptic, parabolic, and hyperbolic partial differential equations. Formerly Math. 172; students may not receive credit for Math. 175/275 and Math. 172. Graduate students will do an extra paper, project, or presentation, per instructor. **Prerequisite:** Math. 174 or Math. 274 or consent of instructor.

276. Numerical Analysis in Multi-Scale Biology (4)

(Cross-listed with BENG 276/CHEM 276.) Introduces mathematical tools to simulate biological processes at multiple scales. Numerical methods for ordinary and partial differential equations (deterministic and stochastic), and methods for parallel computing and visualization. Hands-on use of computers emphasized, students will apply numerical methods in individual projects. **Prerequisite:** consent of instructor.

277A. Topics in Computational and Applied Mathematics (4)

Topics vary from year to year. May be repeated for credit with consent of advisor. **Prerequisite:** graduate standing or consent of instructor.

277B. Topics in Numerical Mathematics (4)

Topics vary from year to year. May be repeated for credit with consent of advisor. **Prerequisite:** consent of instructor.

278A. Seminar in Computational Mathematics (1)

Various topics in computational mathematics. **Prerequisite:** graduate standing or consent of instructor. (S/U grade only.)

278B. Seminar in Mathematical Physics/PDE (1)

Various topics in mathematical physics and partial differential equations. **Prerequisite:** graduate standing or consent of instructor. (S/U grade only.)

279. Projects in Computational and Applied Mathematics (4)

(Conjoined with Math. 179.) Mathematical models of physical systems arising in science and engineering, good models and well-posedness, numerical and other approximation techniques, solution algorithms for linear and nonlinear approximation problems, scientific visualizations, scientific software design and engineering, project-oriented. Graduate students will do an extra paper, project, or presentation per instructor. **Prerequisite:** Math. 174 or Math. 274, or consent of instructor.

280A-B-C. Probability Theory (4-4-4)

Probability measures; Borel fields; conditional probabilities, sums of independent random variables; limit theorems; zero-one laws; stochastic processes. **Prerequisites:** advanced calculus and consent of instructor. (F,W,S)

281A. Mathematical Statistics (4)

Statistical models, sufficiency, efficiency, optimal estimation, least squares and maximum likelihood, large

sample theory. **Prerequisites:** advanced calculus and basic probability theory or consent of instructor.

281B. Mathematical Statistics (4)

Hypothesis testing and confidence intervals, one-sample and two-sample problems. Bayes theory, statistical decision theory, linear models and regression. **Prerequisites:** advanced calculus and basic probability theory or consent of instructor.

281C. Mathematical Statistics (4)

Nonparametrics: tests, regression, density estimation, bootstrap and jackknife. Introduction to statistical computing using S plus. **Prerequisites:** advanced calculus and basic probability theory or consent of instructor.

282A-B. Applied Statistics (4-4)

Sequence in applied statistics. First quarter: general theory of linear models with applications to regression analysis. Second quarter: analysis of variance and covariance and experimental design. Third quarter: further topics to be selected by instructor. Emphasis throughout is on the analysis of actual data. **Prerequisite:** Math. 181B or equivalent or consent of instructor. (S/U grades permitted.)

283. Statistical Methods in Bioinformatics (4)

This course will cover material related to the analysis of modern genomic data; sequence analysis, gene expression/functional genomics analysis, and gene mapping/applied population genetics. The course will focus on statistical modeling and inference issues and not on database mining techniques. **Prerequisites:** one year of calculus, one statistics course or consent of instructor.

285. Stochastic Processes (4)

Elements of stochastic processes, Markov chains, hidden Markov models, martingales, Brownian motion, Gaussian processes. **Prerequisite:** Math. 180A (or equivalent) or consent of instructor.

286. Stochastic Differential Equations (4)

Review of continuous martingale theory. Stochastic integration for continuous semimartingales. Existence and uniqueness theory for stochastic differential equations. Strong Markov property. Selected applications. **Prerequisite:** Math. 280A-B or consent of instructor.

287A. Time Series Analysis (4)

Discussion of finite parameter schemes in the Gaussian and non-Gaussian context. Estimation for finite parameter schemes. Stationary processes and their spectral representation. Spectral estimation. **Prerequisite:** Math. 181B or equivalent or consent of instructor.

287B. Multivariate Analysis (4)

Bivariate and more general multivariate normal distribution. Study of tests based on Hotelling's T^2 . Principal components, canonical correlations, and factor analysis will be discussed as well as some competing nonparametric methods, such as cluster analysis. **Prerequisite:** Math. 181B (or equivalent) or consent of instructor.

287C. Advanced Time Series Analysis (4)

Nonparametric function (spectrum, density, regression) estimation from time series data. Nonlinear time series models (threshold AR, ARCH, GARCH, etc.). Nonparametric forms of ARMA and GARCH. Multivariate time series. **Prerequisite:** Math. 287B or consent of instructor.

287D. Statistical Learning (4)

Topics include regression methods: (penalized) linear regression and kernel smoothing; classification methods: logistic regression and support vector machines; model selection; and mathematical tools and concepts useful for theoretical results such as VC dimension, concentration of measure, and empirical processes. **Prerequisite:** Math. 287C or consent of instructor.

288. Seminar in Probability and Statistics (1)

Various topics in probability and statistics. **Prerequisite:** graduate standing or consent of instructor. (S/U grade only.)

289A-B. Topics in Probability and Statistics (4-4)

In recent years, topics have included Markov processes, martingale theory, stochastic processes, stationary and Gaussian processes, ergodic theory. May be repeated for credit with consent of advisor.

290A-B-C. Topology (4-4-4)

Point set topology, including separation axioms, compactness, connectedness. Algebraic topology, including the fundamental group, covering spaces, homology and cohomology. Homotopy or applications to manifolds as time permits. **Prerequisites:** Math. 100A-B-C and Math. 140A-B-C. (F,W,S)

291A-B-C. Topics in Topology (4-4-4)

In recent years, topics have included generalized cohomology theory, spectral sequences, K-theory, homotopy theory. **Prerequisite:** consent of instructor.

292. Seminar in Topology (1)

Various topics in topology. **Prerequisite:** graduate standing or consent of instructor. (S/U grade only.)

294. The Mathematics of Finance (4)

Introduction to the mathematics of financial models. Hedging, pricing by arbitrage. Discrete and continuous stochastic models. Martingales. Brownian motion, stochastic calculus. Black-Scholes model, adaptations to dividend paying equities, currencies and coupon-paying bonds, interest rate market, foreign exchange models. **Prerequisite:** Math. 180A (or equivalent probability course) or consent of instructor.

295. Special Topics in Mathematics (1 to 4)

A variety of topics and current research results in mathematics will be presented by staff members and students under faculty direction.

296. Student Colloquium (1 to 2)

A variety of topics and current research in mathematics will be presented by guest lecturers and students under faculty direction. **Prerequisites:** for one unit—upper-division status or consent of instructor (may only be taken P/NP), or graduate status (may only be taken S/U); for two units—consent of instructor, standard grading option allowed.

297. Mathematics Graduate Research Internship (2-4)

An enrichment program which provides work experience with public/private sector employers and researchers. Under supervision of a faculty advisor, students provide mathematical consultation services. **Prerequisites:** consent of instructor.

299. Reading and Research (1 to 12)

Independent study and research for the doctoral dissertation. One to three credits will be given for independent study (reading) and one to nine for research. **Prerequisite:** consent of instructor. (S/U grades permitted.)

TEACHING OF MATHEMATICS**500. Apprentice Teaching (1 to 4)**

Supervised teaching as part of the mathematics instructional program on campus (or, in special cases such as the CTF program, off campus). **Prerequisite:** consent of advisor. (S/U grades only.)

501. Seminar in Teaching Development (1)

A seminar designed for graduate students serving as teaching assistants in mathematics. Includes discussion of teaching theories, techniques, and materials with a focus on career development. **Prerequisite:** graduate standing or consent of instructor. (S/U grades only.)

Mathematics and Science Education

PROFESSORS

Mark I. Appelbaum, *Psychology*
Paul M. Churchland, *Philosophy*
Michael Cole, *Communication*
Guershon Harel, *Mathematics*
Barbara Jones, *Emerita, Physics*
Douglas Magde, *Chemistry and Biochemistry*
Hugh B. Mehan, *Sociology*
Jeffrey Rabin, *Mathematics*
Jeffrey Remmel, *Mathematics*
Douglas W. Smith, *Emeritus, Biological Sciences*

SENIOR LECTURERS (SOE)

Barbara A. Sawrey, *Chemistry and Biochemistry*
Randall J. Souviney, *Emeritus, Education Studies Program*
Gabriele Wienhausen, *Biological Sciences*

ASSOCIATE PROFESSORS

John Batali, *Cognitive Science*
Gail Heyman, *Psychology*
Rafael E. Nunez, *Cognitive Science*
Assistant Professor
David Barner, *Psychology*

<http://www.sci.sdsu.edu/CRMSE/msed/>

THE JOINT DOCTORAL PROGRAM

UC San Diego and San Diego State University have created this innovative program for students who already have a master's degree in biology, chemistry, mathematics, or physics. In this program, students will complement their discipline knowledge with studies of how people learn mathematics and science. The UCSD Joint Doctoral Group in Mathematics and Science Education currently consists of faculty from the Division of Biological Sciences and the Departments of Chemistry and Biochemistry, Cognitive Science, Communication, Mathematics, Philosophy, Physics, Psychology, and Sociology. The SDSU Program faculty is drawn from the Departments of Biology, Mathematical Sciences, Natural Sciences, Physics, Psychology, and the School of Education.

The program includes research, practical applications, and formal course work. Students must commit to at least four years to the program, and most students will complete the program in four to five years. An individualized course of study will be designed for each student, depending on the student's background and interests.

The graduates of this program will be able to contribute to the developing body of knowledge about human cognitive processes in mathematics and science. They will be expected to maintain a strong connection to educational practice through

teaching and application of research results on learning to instructional situations.

Information regarding admission is found in the current edition of the Bulletin of the Graduate Division of San Diego State University.

PH.D. TIME LIMIT POLICIES

All time limits for this program start when a student first registers in this program. Students must be advanced to candidacy by the end of four years. Total university support to students in this program cannot exceed five years. Total registered time in this program cannot exceed six years. The normative time in this program is five years.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

MSED 290. Issues in Science Education Research (4)
Survey of recent literature highlighting critical issues in science education research. Specific focus on research in biology education, chemistry education, and physics education. Theoretical perspectives and research methodology (both qualitative and quantitative) used to understand learning will be discussed. **Prerequisites:** admission to the Joint Doctoral Program in Mathematics and Science Education or a master's degree in biology, chemistry/biochemistry, mathematics, or physics with consent of instructor.

MSED 295. Orientation Practicum (2-6)
This course should be taken the first year. Each practicum lasts five weeks and is designed to inform students about a faculty member's research program. Assignment as a research assistant may be used as one practicum. **Prerequisite:** admission to MSED Joint Doctoral Program.

MSED 296A. Theories and Applications of Mathematics and Science Education (4)
The course is designed to cover several major themes in mathematics and science education. It will address theories and applications of cognition, teaching and learning, and curriculum, with particular emphasis on international perspectives. This is a three-quarter sequence. **Prerequisites:** admission to the Joint Doctoral Program in Mathematics and Science Education or a master's degree in biology, chemistry/biochemistry, mathematics, or physics with consent of instructor.

MSED 296B. Theories and Applications of Mathematics and Science Education (4)
The course is designed to cover several major themes in mathematics and science education. It will address theories and applications of cognition, teaching and learning, and curriculum, with particular emphasis on international perspectives. This is a three-quarter sequence. **Prerequisites:** admission to the Joint Doctoral Program in Mathematics and Science Education or a master's degree in biology, chemistry/biochemistry, mathematics, or physics with consent of instructor. MSED 296A must be taken before MSED 296B.

MSED 296C. Theories and Applications of Mathematics and Science Education (4)
The course is designed to cover several major themes in mathematics and science education. It will address theories and applications of cognition, teaching and learning, and curriculum, with particular emphasis on international perspectives. This is a three quarter sequence. **Prerequisites:** admission to the Joint Doctoral Program in Mathematics and Science Education or a master's degree in biology, chemistry/biochemistry, mathematics, or physics with consent of instructor. MSED 296B must be taken before MSED 296C.

MSED 297. Special Topics in Math and Science Education (1-4)
Study of special topics in mathematics or science education under direction of a faculty member. **Prerequisite:** consent of instructor.

MSED 298. Research Project (2-12)
Students will work on an independent research project under the supervision of MSED faculty.

MSED 299. Reading and Research (1-12)
Students will do independent study and research in preparation of their doctoral dissertation under the supervision of MSED faculty.

Middle East Studies

FACULTY

Guillermo Algaze, *Professor, Anthropology*
Eli Berman, *Associate Professor, Economics*
Suzanne Brenner, *Associate Professor, Anthropology*
David Goodblatt, *Professor, History; Endowed Chair, History*
Hasan Kayali, *Associate Professor, History*
Sanford A. Lakoff, *Professor Emeritus, Political Science*
Thomas Levy, *Professor, Anthropology*
Michael E. Meekeer, *Professor Emeritus, Anthropology*
Esra Özyürek, *Associate Professor, Anthropology*
William H. Propp, *Professor, History; Endowed Chair, History*
Michael Provence, *Program Director, Middle East Studies, Associate Professor, History*
Babak Rahimi, *Assistant Professor, Literature*
James Rauch, *Professor, Economics*
Gershon Shafir, *Professor, Sociology*
Melford E. Spiro, *Professor Emeritus, Anthropology*
Winifred Woodhull, *Associate Professor, Literature*
Oumelbanine Zhiri, *Professor, Literature*

OFFICE:

History Undergraduate Advising
Humanities and Social Sciences Building, Fifth Floor
Muir College
<http://history.ucsd.edu/programs/caesar-programs/middleeast-stud/>

THE MINOR

The minor in Middle East studies is an interdisciplinary program aimed at a comparative study of the Middle East (including North Africa).

The program consists of seven courses, of which at least five must be upper-division courses. Three courses have to deal with the Middle East since the emergence of Islam, as listed here under "[Core Courses](#)." The remaining courses may be chosen from either the Core Courses or the Supporting Courses; and they may be courses dealing with the ancient, medieval, or modern Middle East or a three-quarter sequence of a Middle Eastern language (in which case only four of the seven courses need to be upper-division). Ordinarily, all seven courses must be taken for a letter grade.

The courses that make up the minor must be approved by the student's college and by the Middle East Studies Program.

Approved courses taken at other universities or through participation in the Education Abroad Program can be included as part of the minor by petition.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

CORE COURSES

ANTH 199. Independent Study (Middle East Anthropology)
ANSC 133. Peoples and Culture of the Middle East
HINE 108. The Middle East before Islam
HINE 114. History of the Islamic Middle East
HINE 116. The Middle East in the Age of European Empires
HINE 118. The Middle East in the Twentieth Century
HINE 166. Nationalism in the Middle East
HINE 186. Special Topics in Middle Eastern History
HINE 199. Independent Study in Near Eastern History
HITO 105. Jews and Judaism in the Modern World
LTWL 141. Islam and Modernity
LTWL 160. Women in Literature: Arabic Women in Literature & Society
POLI. 121. Government and Politics of the Middle East
POLI. 138D. Special Topics/Comparative Politics: The Arab-Israeli Conflict
Soc./D 122. Jerusalem: Sacred and Profane
SOCI 158. Islam in the Modern World
SOCI 188F. Modern Jewish Societies and Israeli Society
SOCI 199. Independent Study (Middle East Sociology)
TWS 25. Third-World Literatures

SUPPORTING COURSES

ANAR 140. Foundations/Social Complex/Near East
ANAR 141. Prehistory of the Holy Land
ANTH 3. World Prehistory
JUDA 1. Beginning Hebrew
JUDA 2. Intermediate Hebrew
JUDA 3. Intermediate Hebrew Continued
JUDA 101. Introduction to Hebrew Texts
JUDA 102. Intermediate Hebrew Texts
JUDA 103. Advanced Hebrew Texts
HINE 102. The Jews in Their Homeland in Antiquity
HINE 104. The Bible and the Ancient Near East
HINE 106. The Bible and the Near East: The Writings
HINE 160. Special Topics in the Bible and the Ancient Near East
HINE 170. Special Topics in Jewish History
LIAB 1A. Beginning Arabic
LIAB 1B. Beginning Arabic
LIAB 1C. Elementary Arabic
LIAB 1D. Elementary Arabic
LIHL 116. Arabic for Arabic Speakers

Molecular Pathology

Stephen Baird, M.D., *Emeritus, Pathology (Academic Senate Distinguished Teaching Award)*

Roland C. Blantz, M.D., *Medicine*

Nigel Calcutt, Ph.D., *Pathology*

Dennis Carson, M.D., *Medicine*

Ju Chen, Ph.D., *Medicine*

David A. Cheresch, Ph.D., *Pathology*

Don W. Cleveland, Ph.D., *Medicine, Neuroscience, Cellular and Molecular Medicine (Chair)*

Lynette B. Corbeil, D.V.M., Ph.D., *Pathology*

Sara Courtneidge, Ph.D., *Burnham Institute, Tumor Microenvironment*

Jack Dixon, Ph.D., *Medicine/Pharmacology*

Daniel J. Donoghue, Ph.D., *Chemistry and Biochemistry*

Lars Eckmann, M.D., *Medicine*

Sylvia M. Evans, Ph.D., *Pharmacology*

Marilyn G. Farquhar, M.D., *Cellular and Molecular Medicine*

Gen-Sheng Feng, Ph.D., *Pathology*

James Feramisco, Ph.D., *Medicine/Pharmacology*

Joshua Fierer, M.D., *Medicine/Pathology (In-Residence)*

Xiang-Dong Fu, Ph.D., *Cellular and Molecular Medicine*

Richard Gallo, M.D., Ph.D., *Medicine (In-Residence)*

Frances D. Gillin, Ph.D., *Pathology (In-Residence)*

Mark Ginsberg, M.D., *Medicine*

Christopher Glass, M.D., Ph.D., *Cellular and Molecular Medicine*

Larry S. Goldstein, Ph.D., *Cellular and Molecular Medicine*

Steven L. Gonias, M.D., Ph.D., *Pathology*

Paul Insel, M.D., *Pharmacology*

Randall Johnson, Ph.D., *Biological Sciences*

Martin F. Kagnoff, M.D., *Medicine*

Mark P. Kamps, Ph.D., *Pathology*

Michael Karin, Ph.D., *Pharmacology*

Thomas Kipps, M.D., Ph.D., *Medicine*

Richard Klemke, Ph.D., *Pathology*

Edward Koo, M.D., *Neurosciences*

Eliezer Masliah, M.D., *Neurosciences/Pathology*

Andrew Mizisin, Ph.D., *Pathology*

Henry C. Powell, M.D., *Pathology*

Sharon Reed, M.D., *Pathology*

Douglas Richman, M.D., *Pathology/Medicine (In-Residence)*

Michael G. Rosenfeld, Ph.D., *Medicine*

Sanford Shattil, M.D., *Medicine*

Deborah H. Spector, Ph.D., *Biological Sciences*

David Tarin, M.D., Ph.D., *Pathology*

Robert A. Terkeltaub, M.D., *Medicine (In-Residence)*

Ajit P. Varki, M.D., *Medicine*

Joseph Vinetz, M.D., *Medicine*

Gernot Walter, Ph.D., *Pathology*

Tony Yaksh, Ph.D., *Anesthesiology/Pharmacology*

Dong-Er Zhang, Ph.D., *Pathology*

ASSOCIATE PROFESSORS

John Guatelli, M.D., *Medicine*

Dzung Le, Ph.D., *Pathology*

Victor Nizet, M.D., *Pediatrics*

Joe Vinetz, Ph.D., *Medicine*

ASSISTANT PROFESSORS

Jack Bui, M.D., Ph.D., *Pathology*

Seth J. Field, M.D., *Medicine*

Jonathan Lin, M.D., Ph.D., *Pathology*

Mana Parast, M.D., Ph.D., *Pathology*

Bing Ren, Ph.D., *Cellular and Molecular Medicine*

Christina Sigurdson, D.M.V., Ph.D., *Pathology*

Jing Yang, Ph.D., *Pharmacology and Pediatrics*

ADJUNCT PROFESSORS

Rolf Bodmer, Ph.D., *Burnham Institute*

Marcia Dawson, Ph.D., *Burnham Institute*

Hudson Freeze, Ph.D., *Medicine, Burnham Institute*

Minoru Fukuda, Ph.D., *Pathology, Burnham Institute*

Fred Gage, Ph.D., *Neurosciences, Salk Institute*

Martin Haas, Ph.D., *Moore's UCSD Cancer Center*

Michael Kalichman, Ph.D., *Pathology*

Stuart Lipton, Ph.D., *Neurosciences, Burnham Institute*

Mark Lepticola, Ph.D., *Pathology, Burnham Institute*

Robert Oshima, Ph.D., *Pathology, Burnham Institute*

Maurizio Pellicchia, Ph.D., *Burnham Institute*

Manuel Perucho, Ph.D., *Pathology, Burnham Institute*

James Quigley, Ph.D., *Pathology, The Scripps Research Institute*

John C. Reed, M.D., Ph.D., *Moore's UCSD Cancer Center*

Rickert, Robert, Ph.D., *Pathology, Burnham Institute*

Ze'ev Ronai, Ph.D., *Pathology, Burnham Institute*

Evan Snyder, M.D., Ph.D., *Pathology, Burnham Institute*

Diane Shelton, D.V.M., *Pathology*

Francisco Villarreal, M.D., *Medicine*

Ian Wilson, Ph.D., *Pathology, The Scripps Research Institute*

ASSOCIATE ADJUNCT PROFESSORS

Roberta Gottlieb, M.D., *Pharmacology, SDSU*

Dorit Hanein, Ph.D., *Pathology, Burnham Institute*

Fred Levine, M.D., Ph.D., *Pediatrics, Burnham Institute*

Elena Pasquale, Ph.D., *Pathology, Burnham Institute*

David W. Rose, Ph.D., *Medicine*

Guy Salvesen, Ph.D., *Pathology, Burnham Institute*

Alexey Terskikh, Ph.D., *Pathology, Burnham Institute*

Bruce E. Torbett, Ph.D., *Pathology*

OFFICE: Laurel Building, Room 107

School of Medicine

<http://medicine.ucsd.edu/molpath>

THE GRADUATE PROGRAM

The Molecular Pathology Program is closed for entrance of new students as of the 2008 academic year. The program has been integrated into the Biomedical Sciences Program as a track in the Biomedical Sciences Program.

The goal of the molecular pathology program is to produce outstanding researchers focused on the molecular basis of human disease who also understand disease at levels of histology and pathology. The molecular pathology graduate program is an interdepartmental and interinstitutional program administered by the UC San Diego Department of Pathology in affiliation with the Burnham Institute. The program provides a comprehensive knowledge of normal and abnormal biological processes, with a particular emphasis on the molecular mechanisms of human diseases. Faculty research focuses on determining how normal cellular processes are altered in human disease. Research falls within six areas: cancer

cell biology; stem cell and developmental biology; neurobiology and neurologic disease; structural biology and signal transduction; microbiology and immunology; and cardiovascular, muscle, and organ development/disease. Most program faculty reside in the Departments of Pathology, Medicine, and Pediatrics at the UCSD School of Medicine, in the Burnham Institute, and in The Scripps Research Institute.

COURSE WORK

The core science curriculum includes classes in Molecular Biology of the Cell, Methods in Cellular and Molecular Pathology, The Molecular Pathology of Cancer, and Neurologic and Muscle Disease. Learning is focused on reading and evaluating current scientific literature, with special attention to identifying the major open questions within a field and designing an effective experimental plan to answer these questions. Two elective classes (6 units total) are required. Electives taught by program faculty are offered in Microbial Pathogenesis (4 units) and Mouse Models for Human Disease (2 units). Electives may also be selected from graduate-level courses offered by other medical school programs or by other campus departments (e.g., Division of Biological Sciences, Department of Chemistry and Biochemistry, and Department of Bioengineering). This option allows students the opportunity to acquire advanced training in areas they have selected for graduate research. Popular electives are Molecular Modeling, Macromolecular Recognition, Molecular Biology of the Cardiovascular System, and graduate-level courses in Signal Transduction, Immunology, Animal Virology, Developmental Biology, Genetics, and Neurobiology. An education in histology and pathology is acquired by taking the School of Medicine course in Histology and an overview course in human pathology developed by pathology faculty for molecular pathology and pharmacy students. Students may elect to take in-depth pathology training in their particular disease(s) of interest by attending a set of comprehensive lectures (eight to twelve) taught as part of the comprehensive medical school pathology curriculum. Concurrent with their thesis research, third-year students can acquire a practical consideration of the clinical treatment of disease by attending pathology conferences: Breast Pathology Conference, Tumor Board, Pediatric Autopsy, Neuropathology "Brain-Cutting" Conference, Infectious Disease Rounds, or Hematology Conference. In such conferences, students learn how disease presents and progresses, how physicians currently treat disease, what the practical obstacles are in disease treatment, and where opportunities are for development of molecular therapeutics.

EXAMINATIONS

First Qualifying Examination (Minor Proposition)

The purpose of this examination is to test the student's ability to choose a research problem in molecular pathology and to propose an experimental approach to its solution. The problem should be unrelated to the student's thesis project. The student is expected to demonstrate knowledge in molecular

biology and basic pathology. The first qualifying examination will be taken by the end of the fall quarter of the second year.

Second Qualifying Examination (Major Proposition)

The second qualifying examination, a university requirement, consists of an oral report by the student about research accomplished and the goals to be achieved for completion of the examination, the student will advance to candidacy. The second qualifying examination should be complete by the end of the third year and must be completed by the end of the fourth year.

DEPARTMENTAL PH.D. TIME LIMIT POLICIES

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

SPPS 215. Human Disease (3)

This introduction to human disease includes etiology and mechanisms of common disease states and integrates pathology with previous core curriculum. Students will focus on an understanding of disease processes and the dynamics of changes related to drug therapy. **Prerequisites:** admission to the School of Pharmacy and Pharmaceutical Sciences, or admission to the Molecular Pathology Graduate Program, or consent of instructor.

PATH 220. Drugs and Disease: Nervous System Disease and Therapy (4)

This course will explore the molecular pathology associated with various diseases other than cancer. Emphasis will be placed on understanding the aberrant cellular processes, caused by mutation or environmental factors, that are associated with the disease state. Cardiovascular, neurological, immunological, and other diseases will be investigated.

PATH 221. Molecular Pathology of Cancer (4)

The purpose of this course is to present exciting new developments in molecular carcinogenesis, with particular emphasis on oncogene expression and functions of oncogenic proteins. The relevance of molecular mechanisms for understanding human cancer will be discussed.

PATH 222. Microbial Pathogenesis (4)

Topics covered in this course include molecular and cellular mechanisms of viral, bacterial, and protozoan pathogenesis. Host response and microbial mechanisms of host defense will also be discussed. Sessions will consist of faculty and student presentations of current literature.

PATH 223. Mouse Models of Human Disease (2)

This course provides an overview of the use of mouse models in biomedical research. Sessions will cover general mouse biology, genetics, and technologies for generating mutant mice; and will focus on model selection, methodological approaches, data interpretation, experimental design, and ethics of animal research. Student participation and discussion will be encouraged. **Prerequisite:** graduate standing or consent of instructor.

PATH 225. Molecular Pathology Research Seminars (2)

This course presents developments in cellular and molecular pathology research. Both faculty and students actively participate in the individual sessions. All students are required to give one to two formal presentations (under

faculty supervision) during the year. The relevance of molecular mechanisms for understanding human disease will be discussed. **Prerequisite:** consent of instructor.

PATH 228/PHAR 228/BIOM 228. Modern Drug Discovery Technologies (2)

Drug discovery is an emerging science available to academic investigators. This course provides an overview of these drug discovery techniques, including high throughput screening, cell-based screening, computational methods of lead compound discovery, and chemical methods of optimization. **Prerequisite:** graduate student status or consent of graduate program director.

PATH 230G. Molecular Biology of the Cell (6)

This course offers a concise overview of the biochemical basis of gene expression and of diverse signal transduction pathways, and integrates this background in the context of cellular processes such as cell division, development, cell-cell interactions, and inflammation. This course will highlight recent discoveries in cellular and molecular biology and will highlight human diseases that result from inappropriate regulation of cellular processes.

PATH 231. Modern Methods in Molecular and Cell Biology (4)

This course presents key concepts and methodologies used in cellular and molecular pathology research. Topics include protein purification, biochemical characterization, identification of post-translational modifications, DNA/protein microinjection, immunofluorescence, digital imaging, electron microscopy, stem cell culture, gene/promoter analysis, protein-protein interaction analysis using the yeast 2-hybrid system, transgenic and knockout mouse construction, analysis of bacterial virulence factors, and genomic/proteomic approaches to disease analysis.

PATH 232. Statistical Methods and Experimental Design (2)

This course will emphasize the relationships between experimental design, statistical methods, and biomedical research. The content of the course will include basic issues in experimental design and commonly used statistical methods. The assumptions behind the statistical tests, their appropriate use, and examples of misuse will be discussed.

PATH 296. Directed Reading (1–4)

Reading and laboratory study of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases.

PATH 299. Independent Study or Research (1–12)

Independent study or research.

SOM 213. Histology (2)

This course teaches the structural basis of normal and abnormal function at the cellular and tissue levels. Emphasis is based on microscopic study conducted in small laboratory groups under close faculty supervision.

SPPS 215. Human Disease (3)

This introduction to human disease includes etiology and mechanisms of common disease states and integrates pathology with previous core curriculum. The focus will be to understand disease processes and the dynamics of changes related to drug therapy. Our goal is to give the student an overview of the illnesses and disorders of human organs, systems and functions, in other words, human disease, with the hope that this background will lead the students to clinical understanding of patients and future insight into the pathogenesis of disease and new treatments. This course will include general pathology and system based pathology, taught in lecture, case discussion, and lab format.

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

OFFICE: Provost, Muir College
2126 Humanities and Social Sciences Building

THE WRITING PROGRAM

OFFICE: 2346 Humanities and Social Sciences Building, Muir College
(858) 534-2522

<http://muir.ucsd.edu/muir-writing>

The Muir College Writing Program is a sequence of courses in critical thinking and writing during which students must advance beyond the basic competency expected at entrance to understand and write discourse acceptable at the university level. Even when faced with challenging topics, students must demonstrate the ability to comprehend textual arguments at more than a superficial level; their writing must exhibit an understanding of academic arguments including focused theses, systematic methods of analysis and argumentation, awareness of audience, strong organization and development, clear presentation of ideas, appropriate syntax and diction, and—needless to say—correct grammar and usage.

To achieve these ends, the courses focus on principles of analysis and reasoned argumentation. Students will learn to identify underlying assumptions and values in arguments from such fields as the sciences, social and behavioral sciences, and the humanities. They will then write reasoned arguments of their own. Students will also write annotated bibliographies, paper proposals, and research papers as appropriate. In addition, students learn to monitor and adapt their own writing processes. Since the ability to evaluate one's own writing and carry out appropriate revision strategies is crucial to effective writing and argument, all students are required to revise their papers several times. Attention is devoted to developing skill in evaluation and revision in classes and in individual conferences with instructors. Sections of MCWP 50 vary in theme and content, giving students the opportunity to write in areas that interest them or that may be relevant to their major fields. (Descriptions of the MCWP 50 sections are available each quarter in the Muir Writing Program office during pre-enrollment.)

Students are required to take both MCWP 40 and MCWP 50 for a letter grade in their first year of residence at the college. All transfer students, upon satisfaction of Subject A, must take MCWP 40 and MCWP 50 in their first year of residence. In cases where more than one quarter of practice is needed to prepare a student for MCWP 50, an IP grade is given in MCWP 40, and the student takes MCWP 41. MCWP 41 is then followed by MCWP 50. Completion of the sequence allows students to meet the Muir College writing requirement.

IGETC and TAG certified transfer students: Please contact the Muir Writing Program Office.

199. Muir Special Project (4-16)

A course of independent work on a research or creative project to satisfy a Muir graduation requirement. (Only Muir students who have had Muir Special Project proposals approved may enroll in this course.) Students wishing to enroll must submit a written request with a description of the project. (Muir students must submit the Muir Special Project 199 form to the major advisor and to the Office of the Provost by the seventh week of the quarter prior to the quarter in which the 199 is to be undertaken. For information on other requirements, consult the provost's office.) **Prerequisites:** upper-division status, approval by project advisor and by provost. (Letter grades only.)

MCWP 40. Critical Writing (4)

First course of sequence in university reading and writing which satisfies the Muir College graduation requirement in writing. Required of all Muir College first-year students and of transfer students who have not completed a comparable course elsewhere. MCWP 40 introduces students to the basic elements of argument and analysis. Students engage in close reading of texts, weekly writing and revision, and individual conferences. Course must be taken for a letter grade. Those who need additional work to prepare for MCWP 50 will be given a grade of IP and will be required to take MCWP 41. **Prerequisite:** satisfaction of the UC Entry Level Writing requirement.

MCWP 41. Special Study in Writing (4)

An individualized writing class including both class discussion and tutorials. Students confer individually with instructors on a regular weekly basis to talk about writing problems. The course is designed for students who have taken MCWP 40 or its equivalent but need additional writing practice to prepare for MCWP 50. MCWP 41 does not satisfy the first part of the Muir Writing requirement. MCWP 41 must be taken for a letter grade and must be taken within two quarters of MCWP 40. **Prerequisite:** MCWP 40 or its equivalent.

MCWP 50. Critical Writing (4)

Second course of sequence in reading and writing which satisfies the Muir College graduation requirement in writing. Required of all Muir College first-year students and of transfer students. MCWP 50 focuses on advanced skills of argument and analysis. Students engage in close reading of texts, weekly writing and revision, and individual conferences. Course must be taken for a letter grade. **Prerequisite:** satisfaction of MCWP 40 requirement or completion of TAG or IGETC agreement.

MCWP 125. Argument and Analysis (4)

An advanced course in argumentation and analysis, with particular attention both to constructing arguments and analyzing the logic and rhetoric of others' arguments. Students will engage in close reading of texts, weekly writing and revision, and individual conferences. A course specially designed for and required of transfer students who enter Muir College under the aegis of TAG or IGETC. **Prerequisite:** departmental approval.

Music

PROFESSORS

Charles R. Curtis, M.M.
Anthony C. Davis, B.A.
Mark Dresser, M.A.
John W. Fonville, D.M.A.
Aleck Karis, M.M.
Philip C. Larson, M.M.
Philippe Manoury, Dip. Mus.
F. Richard Moore, Ph.D.
Susan Narucki, B.A.
János Négyesy, Dip. Mus.
Jann C. Pasler, Ph.D.
Miller S. Puckette, Ph.D.
Roger L. Reynolds, M.M.
Steven E. Schick, M.M.
Rand Steiger, M.F.A., Chair
Chinary Ung, Ph.D.

PROFESSORS EMERITI

Peter Farrell, M.M.
Edwin L. Harkins, Ph.D.
Cecil W. Lytle, B.A.
Wilbur L. Ogdon, Ph.D.
Carol Plantamura, M.F.A.
Harvey Sollberger, M.A.
Bertram J. Turetzky, M.A.
Joji Yuasa

ASSOCIATE PROFESSORS

Gerald J. Balzano, Ph.D.
David Borgo, Ph.D.
Shlomo Dubnov, Ph.D.
Nancy Guy, Ph.D.
Jane R. Stevens, Ph.D.

ASSISTANT PROFESSORS

Anthony Burr, D.M.A.
Lei Liang, Ph.D.
Katharina Rosenberger, D.M.A.

LECTURERS

Kenneth Anderson
David Chase, D.M.A.
Kamau Kenyatta, B.A.
Colin McAllister, D.M.A.
Kartik Seshadri, M.B.A.
Robert Zelikman, M.F.A.

MUSIC TECHNOLOGY DIRECTOR

Peter Otto, M.F.A., *Director (Lecturer)*
Tom Erbe, B.S., *Studio Director (Lecturer)*

OFFICE: Conrad Prebys Music Center
<http://music.ucsd.edu>

This department is dedicated to the development of musical intelligence and capacity, centering its quest on the music of our own time. The undergraduate programs intend to enhance the exercise and comprehension of the music-making process. The graduate programs aim to educate practitioners and

researchers who can nourish the entire domain of music as well as extend its boundaries.

RESOURCES

PERFORMANCE/PRODUCTION OPPORTUNITIES

Performing in front of an audience is an essential part of the performance program; composers too must hear their works performed. Both performance and non-performance students are encouraged to participate in ensembles, festivals, and collaborative events. Practice facilities include grand pianos, disclaviers and uprights, an electronic keyboard lab, several harpsichords, a wide array of percussion instruments, a percussion studio, and instruments for student checkout.

Each academic year, more than 150 public concerts are presented in well-equipped venues: Mandeville Center Auditorium (792 seats), Mandeville Recital Hall (150 seats), Erickson Hall (150 seats), and Studio A (100 seats). Substantial resources and staffing are dedicated to performances of faculty and student works by new music ensembles, experimental and improvisational ensembles, student performance collectives (New Music Forum, Performers' Forum, and IS Forum), and at an annual graduate Spring Festival.

Our concert calendar can be viewed at <http://music.ucsd.edu/events>.

Ensembles in Residence

- Chamber Music Advanced
- Chamber Singers
- Concert Choir
- Gospel Choir
- Ensemble Realizations of Unconventionally Notated Scores
- Improvisation Ensemble
- Jazz Ensembles
- La Jolla Symphony and Chorus
- redfishbluefish
- Wind Ensemble
- World Music (Sitar & Tabla)
- Indian classical music

Visiting Artists/Artist in Residence

Visiting artists and artists-in-residence play an integral part in research and collaborate with faculty and students in focus seminars, concerts, weeklong festivals, and colloquia, bringing an array of new creativity and ideas. Recent special events included Powering Up/Powering Down, an international festival of radical media arts, and the IS Intermedia Festival, featuring sound installation, performance, and critical theory.

Music Technology Facilities

The Department of Music maintains highly sophisticated, continuously upgraded facilities for the

support of graduate and undergraduate instruction. <http://music.ucsd.edu/facilities/>

Computer Music Instructional Laboratory (CMIL)—Established in 1987 to support undergraduate and graduate studies in computer music, CMIL is a 900-square-foot facility with recessed storage and printing areas, machine isolation, acoustical treatments, a presentation console, ergonomic workstation components, a high-resolution data projection system, CD and DVD authoring, and integrated digital audio equipment for student access to audio processing, duplicating, high-definition digital mixing and high-quality (Dynaudio) multichannel audio monitoring. The facility provides adequate space for instrumental rehearsal and interfacing experimentation, and provides several FireWire interfaces for laptop computing. Mobile desktop systems optimized for live performance applications are also maintained in CMIL.

Our server has high-speed network and wireless connections, mass storage, and archiving systems. Intel and Macintosh computer workstations run unique music software packages developed at UC San Diego. Pd is a new, real-time, interactive musical and graphics programming environment written and under continuing development by Professor Miller Puckette. Other audio and graphics editing and processing software packages are also supported, including Pro Tools HD, development compilers, and several standard music-production packages. The facility is configured and optimized to support direct connection of musical instruments to computers for prototyping of real-time interactive performance and compositional projects using MAX/MSP/Jitter and Pd computer music software. The facility is also used for advanced seminars and classes in such topics as sound spatialization, music software programming, computer music techniques, repertoire analysis, and research.

Digital Music Project Studio—This is a 900-square-foot facility, including an isolation booth, absorption and diffusion treatments, data connections, and audio tie-lines to CMIL and Erickson Hall. The studio houses Macintosh and Linux systems and many dedicated devices for music production and recording, including a Pro Tools HD digital audio production package with sixteen channels of digital I/O for precise digital recording and editing. Recent upgrades include improved microphone preamps and an array of new software packages, including Waves plug-ins and convolution reverb. The studio features a Yamaha 02R96 digital mixing console with all upgrades, 5.1 and stereo monitoring, and sound-for-picture capabilities. The studio supports MIDI for synthesis, processing, and control in music composition and performance, and includes hardware and software for CD and DVD mastering.

Open Computing Laboratory (OCL)—This facility occupies 1,950 square feet, with audio and printer connections to CMIL and the Digital Music Project Studio. Most workstations are networked, and several stations are equipped with CD and DVD burning equipment. OCL was established in 1990 to support many facets of the department curriculum, and has been upgraded incrementally every year thereafter. It now comprises seventeen computer workstations (iMacs, desktop G4s and G5s, and several Intels), most with MIDI interfaces and

Yamaha SY22/33 synthesizers. Coda Finale, Max/MSP, Soundhack, Metasynth, DVD Studio Pro, Final Cut, Pd, Pro Tools, and IRCAM Forum are some of the packages supported in the lab. Large-format music and text printing are supported. For instructional presentation, the room features a high-quality data projection and surround sound system. The presentation station also features a PC workstation, a G5 Mac with Pro Tools editing, DAT, Bias Peak editor and SpectraFoo, signal display software, and DVD-authoring software burner.

Media Networking—All instructional labs and all of the Department of Music's performance spaces and classroom spaces have been upgraded for wireless and fast Ethernet and media networking. Media networking allows advanced students and researchers to "stream" digital video and audio among diverse on-campus facilities and onto the Internet. Additionally, there is wireless connectivity at most campus locations. All UCSD music production and research facilities are designed for ease of data portability and as complementary components of a powerful, well-designed, thoroughly integrated continuum of resources serving the needs of entering students through postdoctorate students and faculty researchers.

Music Technology Equipment Checkout—The music department maintains an inventory of technology equipment available to music majors and graduate students for overnight and weekend checkout. Equipment includes laptop computers with music software installed, FireWire audio interfaces, MIDI keyboards and interfaces, microphones, cables, and other recording and production sound equipment. This equipment is provided primarily to support class-related, dissertation, thesis and ICAM senior projects.

Concert Recording and CD Releases—All faculty and most student concerts are recorded by professional staff or their assistants, and qualified students can utilize the department's extensive high-tech resources for experimental projects resulting in public performance and recordings of new works. Regularly released CDs, under advisement by faculty mentors, feature advanced graduate students who perform, compose, edit, and collaborate to produce a snapshot of musical achievement that predicts distinguished careers and new avenues of musical thought and practice.

Music Center Studios—The Department of Music has a state-of-the-art recording and faculty research complex, completely refurbished in 2004-05, with studios designed to meet the following objectives:

- Serve as an unsurpassed facility for recording and mastering classical and contemporary music.
- Serve as a reference-critical listening space for the evaluation of audio production.
- Support faculty research in psychoacoustics, computer music, and digital signal processing (DSP) for audio.

The facility incorporates two large recording studios (50 x 60 feet) with variable wall and floor surfaces for diverse acoustical configurations, a control room (20 x 30 feet), an isolated machine room, and other support spaces. Music center studios host live performances as well as six-camera video shoots, and are well suited for high-tech presentations and

concert recording. A 120-dimmer grid with a digital lighting board supports theatrical lighting for performance, and for television and video production.

The control room features highly refined acoustical qualities and new all-digital mixing and editing systems including Pyramix and Pro Tools HD. ATC monitoring systems have been upgraded for surround sound. An excellent range of microphones supports an unusual array of recording possibilities; a fine selection of pianos, percussion, and electronic instruments is also part of the holdings of the complex. Grad students may apply for staff positions and recording-project support at music center studios, and ICAM majors may apply for engineering and production internship credits. The department's instructional labs are designed to serve as networked, media-compatible satellites to the music center studios. <http://music.ucsd.edu/facilities>

Center for Research in Computing and the Arts (CRCA), and California Institute for Telecommunications and Information Technology (Calit2)

The Center for Research in Computing and the Arts (CRCA) is an organized research unit of UCSD. Historically rooted in the Center for Music Experiment (CME), CRCA now exists to foster collaborative working relationships among a wide array of artists, scientists, and technologists by identifying and promoting projects in which common research interests may be advanced through computing.

Music projects at CRCA cover a wide spectrum, from pure research to technically advanced creative endeavors. Current research includes, but is not limited to, interactive multimedia and performance, digital audio and synthesis techniques, video/image processing, spatial audio, computer music languages, virtual environments, robotics, computer composition, installation, artificial intelligence, and Web art.

CRCA offers a broad array of events in its facilities, reflecting the research and artistic expression of faculty, students, associates, and visiting scholars. Research residencies and fellowships are available for undergraduate and graduate students on an annual, competitive basis.

In fall 2005 CRCA moved into its new home in the Media Arts wing of UCSD's new Calit2 building. This impressive new structure houses offices, labs, and performance spaces on a world-class stage that places CRCA at the crossroads of artistic and technical innovation. CRCA affiliates work alongside leading researchers in the areas of wireless communications, computer imaging, signal processing, bioinformatics, chip design, immersive media, and a host of new and emerging disciplines. <http://www.crca.ucsd.edu>; <http://www.calit2.net/>

Music Library

The Music Library (located in Geisel Library) maintains extensive collections of materials in all areas of music, and is known internationally for contemporary music holdings. Ethnic music collections are aggressively being expanded. The Music Library's Services Room has fifty-two stations for playback of the recordings collection, including CD, DVD, VHS, LP, or tape formats. Ten of the remote

control stations are equipped with video monitors. The Seminar Room is equipped with audio and video equipment for group presentations. Digital Audio Reserves (DAR) provides students with 24/7 access, including off-campus access, to course listening assignments, via the UCSD network. <http://orpheus.ucsd.edu/music>

THE UNDERGRADUATE PROGRAM

Undergraduate courses offered in the Department of Music satisfy a wide range of interests for non-music majors as well as for students majoring in music.

Students wishing to acquire a musical background to support further study should take MUS 1A-B-C, which develops skills musicians use in the analysis and performance of music. Students interested in "music appreciation" should choose from the following courses, which introduce aspects of the rich heritage of music: MUS 4–15. None of the aforementioned courses have prerequisites. For students with prior musical background who wish to continue in upper-division theory courses, MUS 2A-B-C (in lieu of 1A-B-C) is essential.

MUSIC MAJOR PROGRAMS

The undergraduate program at UCSD offers a bachelor of arts degree in music and in *music humanities*. The curriculum emphasizes the development of musical listening and performance skills as applied to both contemporary and traditional music. A third degree program, interdisciplinary computing in the arts (ICAM-music), is also offered.

The *music major* is intended for students who may choose to engage in music as a profession. This major thus requires extensive development of musical skills. A student without the appropriate level of those skills upon entrance to UCSD must devote considerable time to attaining them, either in lower-division courses or independent study. Students can concentrate in composition, performance, literature, technology, or jazz and the music of the African diaspora.

The Department of Music is committed to creative music making; thus all music majors are required to enroll in ensemble performance for at least three quarters (see #8 below).

The *music/humanities major* is intended for students who wish to pursue a broad liberal arts program that includes music as a central element. This program emphasizes music history and literature, and allows the individual student to select an area of interest for the major within the broad field of the humanities.

The interdisciplinary computing in the arts major is intended for students who wish to pursue the field of music specializing in the art and technology of our time. Below is a detailed description of this major.

MUSIC MAJOR REQUIREMENTS

The lower-division prerequisites for the music major are MUS 2A-B-C, and MUS 2AK-BK-CK. Jazz emphasis students take MUS 2JK in lieu of 2CK. To continue within the major, all students must pass Music 2C or an equivalent proficiency exam. Composition emphasis students must take Music 33A-B-C, Introduction to Composition I, II, and III,

or take a proficiency exam for the three-quarter sequence course. All required music major courses must be taken for a letter grade, with the exception of MUS 143, which is taken on a Pass/Not Pass basis. All courses to be counted toward satisfying the major requirements must be passed with a grade of C or better.

To complete the music major the following courses are required. Courses that are specific to each area of emphasis are shown in parentheses.

1. One of the following sequences:

- MUS 101A-B-C (performance, composition, literature, and technology)
- MUS 101A-B and 104 (jazz)

2. One of the following sequences:

- MUS 102A-B-C (performance, composition, literature, and technology)
- MUS 137A-B-C (jazz)

3. MUS 120A-B-C

4. One quarter of MUS 133 (normally taken in the winter quarter of the junior or senior year)

5. One of the following:

- MUS 107, 110, 116, or 150 (performance, composition, literature, and technology)
- MUS 150 (jazz)

6. One of the following:

- three quarters of MUS 132 or 132V (performance)
- MUS 103A-B-C (composition)
- three courses from the series MUS 107-116, 126, 127A-B, and 150, of which at least one must be 107, 110, 116, or 150 [in addition to #5 above] (literature)
- Music 170/171/175 (technology)
- two courses from MUS 105, 126, 127A, and 127B; plus one course from MUS 107, 110, 111, 114, 115, 116, or 150 [in addition to #5 above] (jazz)

7. One additional course to be selected from

- MUS 107-116, 126, 127A-B, and 150 (performance, composition, literature, and technology)
- MUS 151-154 (jazz)

8. One of the following sequences:

- Two quarters chosen from MUS 95C, 95D, or 95K and one quarter from MUS 95B-W, 130, 131, and 134 (performance, composition, literature, and technology)
- Two quarters of MUS 95JC or 131, and one quarter of MUS 95C, 95D, 95G, or 95K (jazz)

9. MUS 143 every quarter

MUSIC/HUMANITIES MAJOR REQUIREMENTS

The prerequisite for the music/humanities major is Music 1A-B-C (or 2A-B-C, if qualified). To complete the major the following courses are required:

1. MUS 120A-B-C

2. Three courses chosen from MUS 107-116, 126, 127A-B, and 150, of which at least one must be 107, 110, 116, or 150

3. A coherent set of six upper-division courses selected from the humanities or fine arts (including

music) that focuses on a specific topic, chosen in consultation with the music/humanities academic advisor

4. Two quarters chosen from MUS 95C, 95D, or 95K, and one quarter from MUS 95B-W, 130, 131, and 134

5. MUS 143 every quarter

Students interested in this major should confer with the music/humanities faculty advisor to work out a course of study, which must be submitted at the beginning of the junior year for the advisor's written approval.

INTERDISCIPLINARY COMPUTING AND THE ARTS (ICAM) MAJOR

The Interdisciplinary Computing and the Arts major in the Departments of Music and Visual Arts draws upon and aims to bring together ideas and paradigms from computer science, art, and cultural theory. It takes for granted that the computer has become a metamedium and that artists working with computers are expected to combine different media forms in their works. All of this makes the program unique among currently existing computer art or design programs which, on the one hand, usually focus on the use of computers for a particular media (for instance, specializing in computer animation, or computer music, or computer design for print) and, on the other hand, do not enter into a serious dialogue with current research in computer science, only teaching the students off-the-shelf software.

The goals of the program are to

- prepare the next generation of artists who will be functioning in a computer-mediated culture
- give students necessary technical, theoretical, and historical backgrounds so they can contribute to the development of new aesthetics for computer media
- prepare students to mediate between the worlds of computer science and technology, the arts, and the culture at large by being equally proficient with computing and cultural concepts
- give students sufficient understanding of the trajectories of development in computing so they can anticipate and work with the emerging trends, rather than being locked in particular software currently available on the market.

Major Course Requirements

Twenty courses are required in the computing and the arts major for the attainment of the Bachelor of Arts degree. A minimum of twelve of these courses must be upper division.

All courses taken to satisfy major requirements must be taken for a letter grade, and only grades of C- or better will be accepted in the major.

MUS 4. Introduction to Western Music

VIS 1. Introduction to Art-Making

ICAM 40/VIS 40. Introduction to Computing in the Arts

Math. 20A. Calculus for Science and Engineering*

Math. 20B. Calculus for Science and Engineering*

CSE 11. Introduction to Computer Science: JAVA*

and choose *one* from

MUS 1A. Musical Literacy

MUS 2A. Basic Musicianship

MUS 5. Sound in Time

and choose *one* from

MUS 6. Electronic Music

MUS 7. Music, Science, and Computers

MUS 14. Contemporary Music

*Math. 20A and Math. 20B is an accelerated calculus course for science and engineering. Math. 10A-B-C covers similar material in a non-accelerated format, and can be substituted. CSE 11 is an accelerated course in the JAVA programming language. CSE 8A and CSE 8B, which cover the same material in a non-accelerated format, may be substituted.

Upper-Division (twelve courses required)

Survey (one course required)

ICAM 110. Computing in the Arts: Current Practice

Foundation (three courses required)

ICAM 101/VIS 140. Digital Imaging: Image and Interactivity

ICAM 102/VIS 145A. Digital Media I: Time, Movement, Sound

ICAM 103/MUS 170. Musical Acoustics

Advanced (four courses required)

Choose *one* from

MUS 172. Computer Music II

VIS 141B. Computer Programming for the Arts II

VIS 145B. Time- and Process-Based Digital Media II

VIS 147B. Electronic Technologies for Art II

Choose *three* from

ICAM 120. Virtual Environments

ICAM 130/VIS 149. Seminar in Contemporary Computer Topics

MUS 171. Computer Music I

MUS 173. Audio Production: Mixing and Editing

MUS 174A-B. Audio and MIDI Studio Techniques

MUS 175. Musical Psychoacoustics

MUS 176. Music Technology Seminar

VIS 109. Advanced Projects in Media

VIS 131. Special Projects in Media

VIS 132. Installation Production and Studio

VIS 141A. Computer Programming for the Arts I

VIS 147A. Electronic Technologies for Art I

VIS 174. Media Sketchbook

Theory and History (two courses required)

ICAM 150/VIS 159. History of Art and Technology

and choose *one* of

MUS 111. World Music Traditions

MUS 114. Music of the Twentieth Century

MUS 175. Musical Psychoacoustics

VIS 123CN. Early Print Culture: The First Media

Revolution

VIS 125E. History of Performance

VIS 150. History and Art of the Silent Cinema

VIS 151. History of the Experimental Film

VIS 152. Film in Social Context

VIS 153. The Genre Series

VIS 154. Hard Look at the Movies

VIS 155. The Director Series

VIS 156N. Special Problems in Film History and

Theory

VIS 157. Video History and Criticism

VIS 158. Histories of Photograph

VIS 194S. Fantasy in Film

Senior Project (two courses required)

ICAM 160A. Senior Project in Computer Arts I ICAM 160B. Senior Projects in Computer Arts II

All Computing and the Arts (ICAM) course descriptions are listed at the end of the lower- and upper-division sections under “Courses.” Not all courses are offered each year.

Recommendations for Transfer Students

Transfer students should attempt to complete the following lower-division courses before transferring to UCSD: CSE 11 (or CSE 8A/8AL/8B), Math. 20A-B (or Math. 10A-B-C), and MUS 4. Go to <http://www.assist.org>. ASSIST is an online student-transfer information system that shows how course credits earned at one public California college or university can be applied when transferred to another. ASSIST is the official repository of articulation for California's public colleges and universities and provides the most accurate and up-to-date information about student transfer in California.

Students should also be able to find courses equivalent to MUS 1A, 6, and 14 at some colleges. While some of these may be listed on ASSIST, transfers should be prepared to provide course descriptions, syllabi, and/or other materials that may be required to determine the content of the courses taken at other institutions.

Transfers entering with thirty-six or more quarter units by their third quarter of study at UCSD should complete their remaining lower-division courses for the major by the end of the third quarter.

HONORS

1. To be admitted into the honors program a student must have the following:
 - Excellence in a specific subject matter (performance, composition, literature, technology, jazz and music of the African diaspora, or music/humanities) and faculty support.
 - Performers must have previously performed at Undergraduate Performers Forum and enrolled in Chamber Music, MUS 130. (Vocalists can seek an exception.) Other students must have completed all Music 95 requirements prior to entering the honors program. Jazz and music of the African diaspora students must have performed, or had their compositions performed, at the Undergraduate Performers Forum.
 - A GPA in the Department of Music of 3.6; an overall GPA of 3.0
 - All of the requirements below must be completed before the last day of instruction in the spring quarter prior to the academic year in which the student proposes to pursue an honors curriculum.
 - Performance students must present a piece before the performance faculty that demonstrates their technical and musical abilities. In addition, students must provide a proposed program for an honors recital.
 - Composition students must have a composition performed on the New Music Forum

series. Either the student's principal instructor must attend this performance or a tape of this performance must be provided for faculty review. In addition, students must provide a proposed portfolio of original scores for an honors recital.

- Literature students who have (1) presented historically or musicologically oriented research papers at campus venues featuring undergraduate research, or (2) been involved in the faculty mentor program, or (3) participated in the presentation of the winter opera with the accompanying symposium, may submit a portfolio of papers to the Integrative Studies faculty. In addition, students must propose a fifty minute lecture for the Department Seminar (MUS 143).
 - Music science and technology students must present a portfolio of projects to the music technology faculty and propose a fifty-minute lecture/demonstration for the Department Seminar (MUS 143).
 - Jazz and music of the African diaspora students must perform a piece before the faculty that demonstrates their compositional and improvisational abilities. In addition, students must provide for evaluation a portfolio of three original recordings and a proposed program for an honors recital.
2. Once admitted to the honors program
 - Students must be supervised by a faculty advisor throughout the honors program.
 - Composition students admitted to the honors program will enroll in twelve units of the Composition Honors course (MUS 103D-E-F). Performance students will enroll in twelve units of MUS 132R (after at least three quarters of MUS 132). Technology students will enroll in twelve units of MUS 176 or 199; Music literature and music humanities students will enroll in twelve units of MUS 199, 150, or 107. Jazz and music of the African diaspora students will enroll in twelve units of 137D, 137E, and 137F (Honors Seminar in Jazz Studies I, II, III).
 3. To receive honors
 - A student must publicly demonstrate an appropriate level of excellence, an acceptable GPA, and suitable participation in department presentations and seminars, as determined by the student's honors committee.
 - Jazz and music of the African diaspora students will have a recital in the spring quarter of their senior year. The recital will include a program of a minimum of 50 percent of original compositions.

Please note: Being admitted to the honors curriculum does not guarantee that a student will receive honors.

For further information on the Department of Music Honors Program and to obtain an application form, students should make an appointment with the undergraduate staff advisor.

TRANSFER STUDENTS

Students who plan to transfer into the music major should have strong skills in basic musicianship. For those planning to emphasize performance, solid

proficiency on the instrument is required. A general course in the history of music is recommended. All transfer students must pass a proficiency examination in MUS 2C (Basic Musicianship) and MUS 2CK (Basic Keyboard) or take the two sequence courses. To verify the acceptability of transfer music courses, students must make an appointment with the undergraduate staff advisor.

MINOR PROGRAMS

Please obtain a Department of Music brochure of approved minors from the undergraduate office. Students must seek advice and obtain approval from the undergraduate advisor prior to embarking upon a minor program.

- The music minor for students entering UCSD in and after winter quarter 1998 consists of
- two lower-division music courses except performance ensembles (Music 95B– Music 95W) and lessons (Music 32)
 - five upper-division music courses
 - Students who entered UCSD before winter 1998 may select either the new minor or one of the music minors offered at the time of their entry into the university.

A minor with an emphasis in ICAM consists of seven specific courses, of which at least five must be upper division. Prospective minors should consult with the respective departmental advisor for a complete list of appropriate classes acceptable for the minor.

ADVISING OFFICE

Undergraduate Staff advisor:
Eileen Voreades
Room 195, Conrad Prebys Music Center
(858) 534-8226
evoreades@ucsd.edu

OFFICE: Conrad Prebys Music Center
<http://music.ucsd.edu>

THE GRADUATE PROGRAM

UC San Diego offers the master of arts and doctor of philosophy in music as well as a doctor of musical arts. Areas of emphasis for the M.A. include Composition, Computer Music, Integrative Studies, and Performance. For the Ph.D., areas of emphasis offered are Composition, Computer Music, and Integrative Studies. The doctor of musical arts has an emphasis in Contemporary Music Performance.

COMPOSITION

<http://music.ucsd.edu/grad/composition.php>
The Composition Program is committed to nourishing the individual gifts and capacities of student composers in a diverse and active environment, with an emphasis on intensive personal interaction between faculty and student. The faculty mentor considers a student's particular goals and then attempts to strengthen his or her technical capacity to meet them. The diversity and liveliness of our program itself often challenges students to reevaluate their goals.

An incoming member in the M.A. or Ph.D. program begins with a year-long seminar (taught by a different faculty composer each quarter) and

continues with individual studies thereafter. At the close of the first year fall quarter and again after the following spring quarter, the entire composition community gathers for a day-long "jury." Each seminar member is allotted a block of time during which the composition that has just been completed is performed and recorded in a carefully rehearsed presentation. There is a detailed discussion of each work by the faculty composers, and the student has opportunity to comment, explain, and pose questions. Following the performance and discussions of this day, the composition faculty meets to assess the students' work collectively and to offer any guidance deemed necessary. This process is at the root of the uniqueness of the UC San Diego program, and manifests the range, seriousness, and vitality with which compositional issues are explored here.

After completing three quarters of seminar and two juries, students come to know something about the ideas and perspectives of each faculty composer; the faculty, in turn, is aware of each student's objectives and needs. At this point, an individual mentor is agreed upon and this relationship becomes the center of the student's continuing work as the degree is completed. A Third Year Forum presents, under departmental auspices, a work composed by each third-year Ph.D. composer in the four quarters since his or her second jury. As a part of preparation for this forum, each student composer is expected to have a faculty performer on his or her Ph.D. committee (as a regular member, or as an additional sixth member). The faculty performer is the student's performance mentor and guide in interfacing with the performance community. There is also a biweekly Focus on Composition Seminar at which faculty, students and selected visitors present work of interest (compositional, analytical, technological, and even whimsical).

The seminars serve to foster mutual awareness within the student composer group. Collegial relationships develop which lead not only to friendships but also to further creative outlets in cooperative projects, including the student-run Composers' Forums, performance collectives, and recital projects. UCSD performers—faculty and student—are all committed to the playing of new music, and frequent composer/performer collaborations are a vital aspect of life in the Department of Music.

COMPUTER MUSIC

http://music.ucsd.edu/grad/comp_music.php

The Computer Music Program emphasizes research in new techniques for electronic music composition and performance, catalyzed through an active concert program of new works by students, faculty, and visitors. Areas of research include

- new audio synthesis techniques
- audio signal processing
- music cognition
- live improvisation with and by computers
- integrating audio and video
- electronic spatialization of sounds
- techniques for live electronic music performance
- computer music software and HCL design

- audio analysis and feature detection

The Computer Music Program encourages work which overlaps with the other programs of study: Composition, Performance, and Integrative Studies. Analyzing and performing electronic music repertoire as well as writing new music involving electronics are encouraged.

The first-year computer music curriculum is centered on a yearlong "backbone" course covering the essentials of the computer music field. This material divides naturally into three portions (audio signal processing, compositional algorithms, and musical cognition).

In their second year, students work individually with faculty members to deepen their mastery of their subject areas of concentration. For example, a student wishing to focus on signal processing aspects might study techniques for digital audio analysis and resynthesis, drawing on the current research literature.

Also during these first two years, students take seminars on music analysis, composition, and performance practice. After having taken a critical mass of such subjects, Ph.D. students enter a qualifying examination preparation period, and, once successful, they start their dissertation research.

UCSD's Center for Research in Computing and the Arts (<http://crca.ucsd.edu>) offers an ideal research environment for graduate students in this area. The Department of Music also provides extensive laboratory and computing support for computer music.

INTEGRATIVE STUDIES

(formerly Critical Studies/Experimental Practices)

<http://music.ucsd.edu/grad/is.php>

The graduate program in Integrative Studies (IS) promotes an engagement with contemporary music activity and discourse that integrates diverse methodologies, experiences, learning styles, and resources. IS respects multiple ways of knowing and seeks to explore connections among ideas and processes in the arts, humanities, and sciences. Students are encouraged to combine their artistic and academic pursuits; to think systematically, critically, and reflectively; and to focus on the articulations and points of overlap between specialized and generalized knowledge. Drawing on diverse fields, including cultural theory, new media studies, ethnomusicology, improvisation, cognitive science, and systems theory, among others, the IS program combines an exploration of contemporary Western and non-Western music making with an examination of ideas and concepts that are relevant to its nature, creation, production, and reception.

This integrative and interactive environment encourages cross-fertilization and hybridity between diverse musical forms and the theoretical and critical discourses that surround them, often drawing in those who may not fit categories of "composer" or "performer," or those whose work is not constrained by traditional disciplinary boundaries. Core seminars explore multiple ways of thinking about music—including critical, cognitive, and intercultural approaches—in tandem with creative practices that frequently incorporate new technologies and integrate diverse media and forms. Student-generated projects and collaborations are encouraged and

promoted with formal juries conducted by the faculty.

The program comprises four interconnected specialties: critical studies, ethnomusicology, systems inquiry, and creative practice. IS graduate students initially enroll in introductory courses taught by core faculty members designed to present an overview of each specialty and to generate possibilities for future independent and collaborative research. In subsequent quarters students choose between a variety of focused and revolving topic seminars in each of the four primary specialties. By the end of their first year in residency, students declare a primary and secondary specialty within the program. Seminars offered in other departments—for instance in visual arts, literature, theatre and dance, anthropology, communication, ethnic studies, cognitive science, psychology, or computer science—are encouraged and may fulfill degree requirements, if approved by a student's faculty advisor.

Exposure to a range of disciplines and interdisciplinary methods prepares students to pursue innovative artistic/academic projects and careers. The program teaches students to situate and contextualize knowledge and practices on a broad intellectual and artistic continuum and to recognize the responsibilities and opportunities associated with living in an increasingly interconnected and interdependent world.

PERFORMANCE

<http://music.ucsd.edu/grad/performance.php>

Fostering the creative, intelligent, and passionate performance of contemporary music is the mission of the Performance Program of the Department of Music. As once stated by founding faculty composer Robert Erickson, we at UCSD are a "community of musicians."

Performers act and interact in a communal environment by means of collaboration with faculty and student composers, research in the areas of new performance modalities, music technology, and improvisation, among many other pursuits. The performance of contemporary music is viewed as a creative act that balances expertise and exploration.

Graduate performance students pursue either a master of arts or a doctor of musical arts degree in contemporary music performance. The course of study for both programs involves the completion of required graduate seminars and intensive study with a mentoring faculty member. Students are encouraged to adopt a vigorous, exploratory orientation in their private study. Final degree requirements include a recital, or in the case of the DMA, two recitals and the presentation of personal performance research.

The work of graduate performance students forms an integral component of a rich musical environment, which produces an astonishing quantity and variety of performances. Students may perform in collaborative performances with fellow students and faculty. Ensembles include groups specializing in the interpretation of unconventionally notated scores, the percussion group red fish blue fish and other ensembles. The Performance Forum, a student-initiated concert series, provides an opportunity for students to present a wide variety of repertoire which may include improvised music, world music,

and music with technology. A strong, collaborative spirit among the curricular areas of the department (Performance, Composition, Music Technology, and Integrative Studies) also yields many new projects each year. Works by graduate student composers are performed on the annual Spring Festival and other concert series. The sense of musical community engendered by diverse interactions permeates the atmosphere and makes the Department of Music at UCSD a uniquely rewarding place to create the newest of music. Graduate Admissions

Students are admitted to begin in fall quarter only. The deadline for submission of ALL application materials is January 10. Failure to meet this deadline jeopardizes admission and financial support.

Step 1 Preliminary Application

The application process begins at the Department of Music Web site (<http://music.ucsd.edu>) with a preliminary online application. We encourage all applicants to apply as early as September.

Step 2 Portfolio

Music applicants must submit a portfolio consisting of the following by January 10 to: UCSD, Department of Music, MC 0099, La Jolla, CA 92093. Please include your most recent works as well as twentieth-century pieces, when possible.

- For *all* applicants, a repertory list of works (solo and chamber) performed or composed during the past few years and a sample of printed concert programs in which you have participated, either as performer, composer, or collaborator.
- For *all* applicants, a minimum of two papers illustrating writing ability in any of the following areas: musical analysis, criticism, aesthetics, music theory, or music technology.
- In addition,
- For *composition* applicants only, a minimum of three scores of instrumental works with taped examples of the works being performed. (These may include, but should not be exclusively, electroacoustic works.)
- For *computer music* and *IS* applicants only, representative documentation (e.g., papers, performances, intermedia works, computer programs, etc.) of prior work.
- For *performance* applicants only, tapes or CD demonstrating the level of vocal and/or instrumental performance. In person auditions are desirable when possible, but not required.

Step 3 UCSD Application for Graduate Admission

All sections of the official online UCSD Application for Graduate Admission with the \$70 nonrefundable fee, or \$90 for international students, must be submitted by January 10. Applications must include all supporting documents:

- statement of purpose
- three letters of recommendation
- official transcripts

- Graduate Record Examination (GRE) required for *all* applicants.
- TOEFL (Test of English as a Foreign Language) or International English Language Testing System (IELTS) required for all applicants whose country of citizenship does not have English as its primary language. Minimum TOEFL score is 550 for the paper-based test, 213 for the computer-based test, or 80 for the Internet-based test. The minimum IELTS score is 7.

ADVISORY EXAMINATIONS

After completion of an advisory examination during Welcome Week, each new student will meet with the departmental M.A. or Ph.D. advisor. Students found to be deficient in any areas covered on the advisory examination (dictation, sight reading, keyboard proficiency, history, and literature) will be advised to remedy deficiencies during their first year.

CORE GRADUATE CURRICULUM

All graduate students are required to take Music 201 (Projects in New Music Performance) as outlined under each area, Music 210 (Musical Analysis), Music 228 (Conducting), and Music 291 (Problems and Methods of Music Research and Performance). Students who completed Music 210, 228, and 291 during their master's degree program at UCSD, do not need to retake those courses for their doctoral curriculum.

To assure that all requirements are being adequately met, all graduate students must make an appointment with the graduate staff advisor for a degree check no later than the winter quarter of the second year.

MASTER'S DEGREE PROGRAM

The master of arts in music degree includes areas of emphasis in *Composition*, *Computer Music*, *Integrative Studies*, and *Performance*. The degree requires completion of at least thirty-six quarter units of graduate courses (courses numbered 201–299), including six units of Music 500 (Apprentice Teaching in Music) and six units of Music 299 (Advanced Research Projects and Independent Study) bearing directly on completion of the master's thesis. Master's students are expected to complete all requirements for the degree in six quarters of residence.

COURSE REQUIREMENTS

In addition to the core graduate curriculum, all master's degree students are required to complete requirements in their area of emphasis:

Composition

- MUS 201 (A, B, C, D, E, or F)—must take at least two times.
- MUS 203A-B-C—successful completion of the jury process is necessary to get a passing grade in the corresponding seminar.
- MUS 203D—after successful completion of 203C, students must enroll in Music 203D (with their committee chair) every quarter until graduation.
- MUS 204—every quarter until graduation.

- MUS 206 and/or 207—a combination of any two courses.

Computer Music

- MUS 201 (A, B, C, D, E, or F)—must take at least two times.
- MUS 270A-B-C—must take within the first year of the program.
- MUS 270D—required every quarter of the second year.
- MUS 206, 207, and/or 267—a combination of any two courses.
- Integrative Studies
- MUS 201 (A, B, C, D, E, or F)—must take at least one time.
- MUS 205—every quarter until graduation.
- MUS 206 or 207—at least three courses; two approved for a student's primary specialty and one approved for his or her secondary specialty.
- MUS 211, 212, 213, and 214—must complete the series of four courses within the first year of the program.
- MUS 251, 252, 253, or 254—at least once course corresponding to the student's primary specialty. Additional courses from this series may also be taken for corresponding 206 or 207 credit if approved by the student's faculty advisor.

It is the student's responsibility to check if a given course will count towards his or her primary or secondary specialty prior to enrolling.

Performance

- MUS 201(A, B, C, D, E, or F)—every quarter until graduation.
- MUS 206 or 207—a combination of any two courses.
- MUS 232—every quarter until graduation.
- MUS 245—every quarter in residence.

MASTER'S DEGREE COMPLETION REQUIREMENTS

A folio of *three research papers* in professional format (normally to be written in connection with the courses the student will be taking) must be accepted by the student's committee prior to approval of the thesis.

MA candidates will present a *thesis* consisting of the following under the supervision of the student's committee chair in MUS 299:

- Candidates emphasizing *Composition* will prepare a folio of three chamber compositions together with tape recordings of at least two of them.
- Candidates emphasizing *Computer Music* will write a research paper (thesis) and present a lecture-performance in which the scientific, technological, and musical aspects of an original computer music composition are documented, played, and discussed.

- Candidates emphasizing *Integrative Studies* with a primary specialty in critical studies, ethnomusicology, or systems inquiry must complete a master's thesis of roughly sixty pages.
- Candidates emphasizing *Performance* will present a recital supported by lecture-quality notes. The program must be approved by the student's committee chair.

All of the above master's requirements must have final approval from the student's individual committee upon completion.

DOCTORAL DEGREE PROGRAM

Students of superior musical competence may pursue a program with emphasis in *Composition*, *Computer Music*, or *Integrative Studies* leading to the Ph.D. or doctor of musical arts (D.M.A.) degree in *Contemporary Music Performance*.

All doctoral students within the Department of Music must complete the Core Graduate Curriculum (outlined in the section above the Master's Degree Program) plus additional core requirements for the Ph.D. or D.M.A. program. These additional core requirements are

- Successful completion of an M.A. degree, including requirements equivalent to those described above for the M.A. in music. UCSD M.A. students who apply to the Ph.D./D.M.A. program must complete all departmental requirements, obtain OGS approval, and file the M.A. degree at Geisel Library *before* enrolling in any Ph.D./D.M.A. level courses.
- The Department of Music strongly recommends that entering students have acquired a reading ability in at least one of the standard reference foreign languages (French, German, Italian, or Spanish) in addition to their native language.
- All Ph.D./D.M.A. students are required to complete six units of credit in Music 500 (Apprentice Teaching) unless the student has completed this requirement in UCSD's master's degree program.
- After completing the qualifying examination, all students must remain in residence for at least three quarters, during which time they must enroll in twelve units of Music 299 (Advanced Research Projects and Independent Study) with their committee chair or members every quarter.

COURSE REQUIREMENTS

In addition to the core graduate and Ph.D./D.M.A. curriculum, doctoral students (according to their area of emphasis) must complete the following courses prior to the qualifying examination:

Composition

- MUS 201 (A, B, C, D, E, or F)—must take at least two times.
- MUS 203A-B-C—successful completion of the jury process is necessary to get a passing grade in the corresponding seminar. Continuing students from the UCSD Composition M.A. program may be excused from MUS 203B-C by successfully completing MUS 203A at the Ph.D. level.
- MUS 203D—after successful completion of 203C,

students must enroll in MUS 203D (with their committee chair) every quarter in residence.

- MUS 204—every quarter in residence.
- MUS 206 and/or 207—a combination of any three courses.
- MUS 209—must be taken at least three times.
- MUS 298—must complete at least six units.

Computer Music

- MUS 201 (A, B, C, D, E, or F)—must take at least two times.
- MUS 270A-B-C—must be taken within the first year of the program unless previously taken as a UCSD M.A. student.
- MUS 270D—after successful completion of 270C, students must enroll in MUS 270D (with their committee chair) every quarter in residence.
- MUS 206, 207, 209, and/or 267—a combination of any six courses.
- MUS 298—must complete at least six units.

Integrative Studies

- MUS 201 (A, B, C, D, E, or F)—must take at least two times.
- MUS 205—every quarter until advanced to candidacy.
- MUS 206 or 207—at least five courses with three approved for a student's primary specialty and two approved for his or her secondary specialty.
- MUS 211, 212, 213, and 214—entire series must be taken within the first year of the program unless previously taken as a UCSD M.A. student.
- MUS 251, 252, 253, or 254—must take two courses, one to correspond with student's primary specialty and one to correspond with the student's secondary specialty; additional courses from this series may also be taken for corresponding 206 or 207 credit if approved by the student's faculty advisor.
- MUS 298—must complete at least six units.

Those students declaring creative practice as their primary specialty for the Ph.D. are required to pass a jury at the end of their first year of doctoral study. Each student is allotted a block of time to present and/or perform his or her work in front of a panel comprising area and affiliated faculty. Each presentation is followed by a detailed discussion of the student's work at which students have the opportunity to comment, explain, and pose further questions. After the completion of the jury process, the faculty meets in order to further assess each student's work and to offer additional guidance.

It is the student's responsibility to check if a given course will count towards his or her primary or secondary specialty prior to enrolling.

Performance

- MUS 201 (A, B, C, D, E, or F)—every quarter until completion of qualifying examination.

- MUS 206/207/209—as approved by D.M.A. advisor, a combination of any six seminars related to the primary and secondary area of specialization. Music 296 may be substituted for up to four seminars with permission of D.M.A. advisor.
- MUS 232—every quarter until completion of qualifying examination.
- MUS 245—every quarter in residence.
- MUS 250—must be taken at least three times.
- MUS 298—must complete at least six units.

QUALIFYING EXAMINATION/ ADVANCEMENT TO CANDIDACY

Requirements prior to taking the qualifying examination:

- Completion of all Ph.D./D.M.A. required course work.
- Formation of the Doctoral Committee. Students must choose the chair of their Doctoral Committee no later than their last quarter of course work. They must choose two more internal members of the Doctoral Committee by the end of the fall quarter of their third year. In consultation with the chair of the Doctoral Committee, two faculty members from outside the department should be added to the committee by the end of the spring quarter of the third year. All internal members of the committee must be faculty of the Department of Music. The final composition of the committee is approved by the Office of Graduate Studies.
- For Ph.D. students, one research paper judged to be of publishable quality must be completed prior to qualifying examinations. The subject of the publishable paper will be developed during the student's first two years and must be approved by the student's Ph.D. committee chair.
- For Composition students, in addition to the publishable paper, a folio of not fewer than three compositions (not previously accepted for an M.A. degree) must be completed prior to qualifying examinations. A Third Year Forum presents, under departmental auspices, a work composed by each third-year Ph.D. composer in the four quarters since his or her second jury. As a part of preparation for this forum, each student composer is expected to have a faculty performer on his or her Ph.D. committee (as a regular member, or as an additional sixth member). The faculty performer is the student's performance mentor and guide in interfacing with the performance community.
- For D.M.A. students, one major recital; plus either (a) an abstract of the thesis or research project which will be given to the Doctoral Committee at the qualifying examination; or (b) a substantial portion of the works from the student's first two "major recitals" will be presented at the qualifying examination.
- For Integrative Studies students, a dissertation prospectus must be submitted to the student's committee no later than three weeks prior to the oral portion of the qualifying examination. The

dissertation prospectus is a document that presents the research topic of the dissertation, places it in the context of the relevant literature or in the context of recent artistic developments, discusses its significance, specifies and justifies the research methods, theoretical orientation, and/or artistic approach, and indicates the anticipated steps leading to completion.

The qualifying examination for all doctoral students will consist of the following:

A written and oral defense of three questions provided by the Doctoral Committee pertaining to appropriate areas of specialization. For Integrative Studies students, one question will involve a defense of the student's dissertation prospectus and the remaining two questions will pertain to the student's primary and secondary specialties.

Successful completion of the qualifying exam marks the student's advancement to doctoral candidacy, which must take place no later than the end of the spring quarter of the fourth year.

PH.D./D.M.A. DEGREE COMPLETION REQUIREMENTS

- For *Composition* students, completion of a major composition project.
- For *Computer Music* students, completion of an acceptable dissertation.
- For *Integrative Studies* students with a primary specialty in ethnomusicology, systems inquiry, or critical studies, completion of a book-length dissertation demonstrating original research and critical insight. For Integrative Studies students with a primary specialty in creative practice, a major creative work and a written defense of that work. Prior to the dissertation defense, the student's work must be reviewed by a faculty jury and performed publicly (see the description of the jury process given above for more details).
- For D.M.A. students, completion of a second major recital plus one of the following: (a) thesis or research project; (b) a concert that is innovative in design and/or content and which is supported by a document containing extensive stylistic or analytical discussion of the program; (c) a lecture/concert pertaining to innovative and/or original material, with appropriate documentation as determined by the committee; or (d) two approved chamber music concerts, with appropriate documentation as determined by the committee.
- For all doctoral students, a final public defense of the composition/dissertation/recitals.
- A full copy of the student's dissertation/research project must be in the hands of each of the student's Doctoral Committee members four weeks before the dissertation defense.
- It is understood that the edition of the dissertation given to committee members will not be the final form, and that the committee members may suggest changes in the text at the defense. Revisions may be indicated and, in extreme cases, may require this examination to be taken more than once.

- Acceptance of the dissertation by the university librarian represents the final step in completion of all requirements for the Ph.D.

Materials previously submitted for other degrees are not acceptable for submission for the Ph.D./D.M.A. degree.

TIME LIMIT POLICY FOR THE DOCTORAL DEGREE

Normative Time Limits

4 years: Students entering the Ph.D./D.M.A. program with a master's degree from another institution.

6 years: Students continuing into the Ph.D./D.M.A. program with a master's degree from UCSD. Time limit is calculated from the beginning of the M.A. program (i.e., two years for M.A. program plus four years normative time for Ph.D./D.M.A.).

Support Time Limits

6 years: Students entering the Ph.D./D.M.A. program with a master's degree from another institution.

7 years: Students continuing into the Ph.D./D.M.A. program with a master's degree from UCSD. Time limit is calculated from the beginning of the M.A. program.

Total Registered Time Limits

6 years: Students entering the Ph.D./D.M.A. program with a master's degree from another institution.

8 years: Students continuing into the Ph.D./D.M.A. program with a master's degree from UCSD. Time limit is calculated from the beginning of the M.A. program.

Students who have not completed all Ph.D. requirements within the maximum total registered time will no longer be permitted to register for classes.

ADVISING OFFICE

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COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Note: The following course offerings outline the general scope of our program. Not all courses are offered every year. It is essential that students work closely with departmental advisors when planning their degree programs.

LOWER-DIVISION

1A. Fundamentals of Music A (4)

This course, first in a three-quarter sequence, is primarily intended for students without previous musical experience. It introduces music notation and basic music theory topics

such as intervals, scales, keys, and chords, as well as basic rhythm skills. **Prerequisites:** none.

1B. Fundamentals of Music B (4)

This course, second in a three-quarter sequence, focuses on understanding music theory and in developing musical ability through rhythm, ear training, and sight singing exercises. Topics include major and minor scales, seventh-chords, transportation, compound meter and rudiments of musical form. **Prerequisite:** Music 1A.

1C. Fundamentals of Music C (4)

This course, third in a three-quarter sequence, offers solid foundation in musical literacy through exercises such as harmonic and melodic dictation, sight singing exercises and rhythm in various meters. Topics include complex rhythm, harmony, and basic keyboard skills. **Prerequisite:** Music 1B.

2A-B-C. Basic Musicianship (4-4-4)

Primarily intended for music majors. Development of basic skills: perception and notation of pitch and temporal relationships. Introduction to functional harmony. Studies in melodic writing. Drills in sight singing, rhythmic reading, and dictation. **Prerequisites:** passing score on placement exam. Must be taken in sequence. Music majors must be concurrently enrolled in Music 2AK, 2BK, and 2CK (Basic Keyboard).

2AK-BK-CK. Basic Keyboard (2-2-2)

Scales, chords, harmonic progressions, transposition, and simple pieces. **Prerequisites:** concurrent enrollment in Music 2A, B, C.

2JK. Jazz Keyboard (2)

This course will introduce basic voicings and voice leading, stylistically appropriate accompaniment, and basic chord substitution. For majors with a Jazz and the Music of the African Diaspora emphasis to be taken concurrently with Music 2C. **Prerequisites:** Music 2AK and 2BK or passing proficiency exam, or consent of instructor. Concurrent enrollment in Music 2C. Majors only.

4. Introduction to Western Music (4)

A brief survey of the history of Western Music from the Middle Ages to the present. Much attention will be paid to the direct experience of listening to music and attendance of concerts. Class consists of lectures, listening labs, and live performances. **Prerequisite:** none.

5. Sound in Time (4)

An examination and exploration of the art and science of music making. Topics include acoustics, improvisation, composition, and electronic and popular forms. There will be required listening, reading, and creative assignments. No previous musical background required. **Prerequisite:** none.

6. Electronic Music (4)

Lectures and listening sessions devoted to the most significant works of music realized through the use of computers and other electronic devices from the middle of this century through the present. **Prerequisite:** none.

7. Music, Science, and Computers (4)

Exploration of the interactions among music, science, and technology, including the history and current development of science and technology from the perspective of music. **Prerequisite:** none.

8. American Music (4)

A course designed to study the development of music in America. The focus will be on both the vernacular traditions including hymn singing, country music, jazz, big band, rock, etc., as well as the cultivated traditions of various composers from William Billings to John Cage. **Prerequisite:** none. (Offered in selected years.)

9. Symphony (4)

The symphonic masterworks course will consist of lectures and listening sessions devoted to a detailed discussion of a small number of recognized masterworks (e.g., Mozart, Beethoven, Berlioz, Stravinsky, Ligeti, etc.). **Prerequisite:** none. (Offered in selected years.)

10. Chamber Music (4)

Chamber Music will consist of lectures and listening sessions devoted to a detailed discussion of recognized

chamber masterworks (e.g., Haydn, Mozart, Beethoven, Bartok, etc.). **Prerequisite:** none. (Offered in selected years.)

11. Folk Music (4)

A course on folk musics of the world, covered through lectures, films, and listening sessions devoted to detailed discussion of music indigenous to varying countries/areas of the world. Topics vary from year to year. May be repeated once for credit. **Prerequisite:** none.

12. Opera (4)

A study of opera masterworks that often coincide with operas presented in the San Diego Opera season. Class consists of lectures, listening labs, live performances, and opera on video. **Prerequisite:** none.

13AF. World Music/Africa (4)

A course that focuses on the music of Africa and on African ways of music making in the Diaspora to the Caribbean and South America. No prior technical knowledge of music is necessary. **Prerequisite:** none.

13AM. World Music/Multicultural America (4)

A study of music cultures in the United States, particularly Native American, Hispanic American, European American, Asian American, and Pacific Islanders from the perspective of ethnicity, origin, interaction, and the contribution of various ethnic groups to American musical life. No prior technical knowledge of music is necessary. **Prerequisite:** none.

13AS. World Music/Asia and Oceania (4)

Introduction to selected performance traditions of Asia and Oceania with links to local and visiting musicians from these cultures. No prior technical knowledge of music is necessary. **Prerequisite:** none.

14. Contemporary Music (4)

This course offers opportunities to prepare oneself for experiences with new music (through preview lectures), hear performances (by visiting or faculty artists), to discuss each event informally with a faculty panel: an effort to foster informed listening to the new in music. **Prerequisite:** none.

15. Popular Music (4)

A course on popular music from different time periods, covered through lectures, films, and listening sessions. Topics vary from year to year. May be repeated once for credit. **Prerequisite:** none.

32. Instrumental/Vocal Instruction (2)

Individual instruction on intermediate level in instrumental technique and repertory. For declared music majors and minors. Students must be simultaneously enrolled in a performance ensemble or non-performance music course. May be taken six times for credit. **Prerequisites:** audition and department stamp.

32G. Group Instrumental Instruction (2)

Group instruction in instrumental or vocal technique and repertory. Intermediate level. Intended for students who make an important contribution to Department of Music ensembles. **Prerequisites:** Written recommendation of ensemble director and audition for performance faculty on first day of classes required. Department stamp required. May be taken for credit six times. (Offered in selected years.)

32V. Vocal Instruction (1)

Individual instruction on intermediate level in vocal technique and repertory. For declared music majors and minors. Students must be simultaneously enrolled in a performance ensemble or non-performance music course and in Music 32VM. May be taken six times for credit. **Prerequisites:** audition and department stamp.

32VM. Vocal Masterclass (1)

All students enrolled in voice lessons (32V, 132V, or 132C) perform for one another and their instructors. Students critique in-class performances, with emphasis on presentation, diction, dramatic effect, vocal quality, and musicality. **Prerequisite:** concurrent enrollment in Music 32V, 132V, or 132C.

33A. Introduction to Composition I (4)

First course in a sequence for music majors and non-majors pursuing an emphasis in composition. The course examines "sound" itself and various ways of building sounds into musical structures, and develops skills in music

notation. Students compose solo pieces in shorter forms. Students may not receive credit for both Music 33 and 33A. **Prerequisite:** Music 2C or consent of instructor.

33B. Introduction to Composition II (4)

Second part of course sequence for students pursuing a composition emphasis. Course continues the building of skills with the organization of basic compositional elements: pitch, rhythm, and timbre. It explores issues of musical texture, expression, and structure in traditional and contemporary repertoire. Writing for two instruments in more extended forms. **Prerequisite:** Music 33A.

33C. Introduction to Composition III (4)

Third part of course sequence for students pursuing a composition emphasis. Course continues the development of skills in instrumentation and analysis. It includes a survey of advanced techniques in contemporary composition, with additional focus on notation, part-preparation, and the art of writing for small groups of instruments. **Prerequisite:** Music 33B.

87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to 15 to 20 students, with preference given to entering freshmen.

95. Ensemble Performance (2)

Performance in an ensemble appropriate to student abilities and interests. Normally each section requires student participation for the whole academic year, with credit for participation each quarter. Sections of Music 95W have included: African drumming, Korean percussion, Indian sitar and tabla, koto, and Indonesian flute. Not all sections will be offered every year. May be repeated for credit. Grading on participation level, individual testing, comparative papers on repertoire covered, etc. **Prerequisites:** audition and consent of instructor for each section. Materials fee required.

Note: Students in the Music 95 series courses may enroll with a letter grade option a total of twelve units for registered music majors and a total of six units for all other students; after which students may continue to enroll in Music 95 courses, but only with a P/NP grade option. There is one exception to the above grading policy. Music 95G, Gospel Choir, can only be taken for a P/NP grading option.

Section B. Instrument Choir

Section C. Concert Choir

Section D. Symphonic Chorus

Section E. Chamber Orchestra

Section G. Gospel Choir

Section H. Chamber Opera (Not offered every year.)

Section JC. Jazz Chamber Ensembles

Section JL. Large Jazz Ensemble

Section K. Chamber Singers

Section L. Wind Ensemble

Section W. World Music Ensembles

ICAM 40. Introduction to Computing in the Arts (4)

(Cross-listed with VIS 40.) An introduction to conceptual uses and historical precedents for use of computers in art making. Introduces students to the program's computer facilities and teaches them basic computer skills. **Prerequisite:** Visual Arts and ICAM majors and minors only. **Note:** Materials fee required.

UPPER-DIVISION

101A. Music Theory and Practice I (4)

Study of modal counterpart in the style of the sixteenth century. Two-voice species counterpoint studies. Analysis of music of the period. Musicianship studies: sight-singing,

dictation, and keyboard skills. **Prerequisites:** Music 2C and 2CK.

101B. Music Theory and Practice II (4)

Study of tonal harmony and counterpoint. Analysis of Bach chorales and other music from the Baroque period. Musicianship studies: sight-singing, dictation, and keyboard skills. **Prerequisite:** Music 101A.

101C. Music Theory and Practice III (4)

Tonal harmony and counterpoint. Analysis of larger classical forms: Sonata, Variation, Minuet and Trio, Rondo. Musicianship studies: sight-singing, dictation, and keyboard skills. **Prerequisite:** Music 101B.

102A. Music Theory and Practice IV (4)

Advanced study of the materials and structures of music (Beethoven to Wagner) emphasizing the evolution of music through chromatic harmony and voice leading. Development of aural discrimination and in-depth analysis. **Prerequisite:** Music 101C.

102B. Music Theory and Practice V (4)

Advanced study of the materials and structures of music (Schoenberg, Stravinsky, Webern, etc.—1900–1940) emphasizing the evolution of music through extended harmony post tonality and neoclassicism. Development of aural discrimination and in-depth analysis. **Prerequisite:** Music 102A.

102C. Music Theory and Practice VI (4)

Advanced study of the materials and structures of music (1945–2006) emphasizing the evolution of music through the many compositional trends of the late twentieth century. Development of aural discrimination and in-depth analysis. **Prerequisite:** Music 102B.

103A. Seminar in Composition I (4)

First part in composition course sequence. Individual projects will be reviewed in seminar. Techniques of instrumentation will be developed through examination of scores and creative application. Assignments will include short exercises and analysis, and final project for standard ensemble. **Prerequisite:** Music 33C.

103B. Seminar in Composition II (4)

Second part in composition course sequence. Intensive work in free composition by drafting a composition for presentation at the end of Music 103C. Written analysis of contemporary repertoire is introduced. Instruction about calligraphic conventions including computer engraving programs. **Prerequisite:** Music 103A.

103C. Seminar in Composition III (4)

Third part in composition course sequence. A mixture of individual lessons as well as group meetings, with discussion of topics germane to the development of composers, including musical aesthetics and contemporary orchestration techniques. Final performance of students' works will take place at the end of the quarter. **Prerequisite:** Music 103B.

103D-E-F. Honors Seminar in Composition (4-4-4)

Advanced individual projects for senior music majors pursuing honors in composition. Projects will be critically reviewed in seminar with fellow students and faculty composers. **Prerequisites:** Music 103A-B-C and admission into the Department of Music Honors Program in composition. Department stamp required.

104. Jazz Transcription and Analysis (4)

An introduction to the practice of transcribing and analyzing improvised music. Discussion of music technique, style, aesthetics, and the ideology of transcription. **Prerequisites:** Music 101A and 101B.

105. Jazz Composition (4)

This course will explore a range of compositional possibilities from song forms to modal and more extended forms. May be repeated once for credit. **Prerequisite:** Music 104 or consent of instructor.

107. Critical Studies Seminar (4)

This seminar explores the history of music in relation to critical issues, such as race, gender, sexuality, the environment, and politics. Readings include recent literature in cultural studies, musicology, and sociology. Topics vary. May be taken three times for credit. **Prerequisite:** Music 120C.

110. Introduction to Ethnomusicology Seminar (4)

This seminar introduces the central theories, methods, and approaches used to study the musics of contemporary cultures, in their local contexts. In addition to surveying key writings, students will document music from their local environment. **Prerequisite:** upper-division standing or consent of instructor.

111. Topics/World Music Traditions (4)

A study of particular regional musics in their repertory, cultural context, and interaction with other traditions. Topics vary. **Prerequisite:** none.

112. Topics in European Music Before 1750 (4)

This course will address topics in medieval, Renaissance, and Baroque music; topics will vary from year to year. May be repeated five times for credit. **Prerequisites:** knowledge of music notation or consent of instructor; Music 4, 8–10, or 120 recommended.

113. Topics in Classic, Romantic, and Modern Music (4)

This course will focus on Western music between 1750 and the early 20th century; topics will vary from year to year. May be repeated five times for credit. **Prerequisites:** knowledge of music notation or consent of instructor; Music 4, 8–10, or 120 recommended.

114. Music of the Twentieth Century (4)

An exploration of materials and methods used in the music of our time. There will be an extra discussion group for music majors. May be repeated once for credit. **Prerequisites:** none.

115. Women in Music (4)

A survey of the biographical, historical, sociological, and political issues affecting woman musicians, their creativity, their opportunities, and their perception by others. It compares and contrasts the work of women composers, performers, patrons, teachers, and writers on music from the Middle Ages through the present. **Prerequisite:** consent of instructor.

116. Popular Music Studies Seminar (4)

This course examines special topics in popular music from various sociopolitical, aesthetic, and performance perspectives. Readings include recent literature in cultural studies, musicology, and/or performance practice. Topics vary. May be taken three times for credit. **Prerequisites:** upper-division standing or consent of instructor.

120A. History of Music in Western Culture I (4)

First part of intensive historical, analytical, and cultural-aesthetic examination of music in Western culture from the ninth through the twenty-first centuries. Considers both sacred and secular repertoires, from Gregorian chant through early opera, c. 800–1600. **Prerequisites:** Music 1C or 2C or passing grade on proficiency exam. Music majors should be enrolled concurrently in Music 101A. Department stamp required for non-majors.

120B. History of Music in Western Culture II (4)

Second part of intensive historical, analytical, and cultural-aesthetic examination of music in Western culture from the ninth through the twenty-first centuries. Considers both instrumental and vocal repertoires, from the Baroque to the Romantic, c. 1600–1830. **Prerequisites:** Music 120A. Music majors should be enrolled concurrently in Music 101B. Department stamp required for non-majors.

120C. History of Music in Western Culture III (4)

Third part of intensive historical, analytical, and cultural-aesthetic examination of music in Western culture from the ninth through the twenty-first centuries. Considers both established traditions and new trends, from Romanticism through Modernism and Post-Modernism, c. 1890–present. **Prerequisites:** Music 120B. Music majors should be enrolled concurrently in Music 101C. Department stamp required for non-majors.

126. Blues: An Oral Tradition (4)

This course will examine the development of the Blues from its roots in work-songs and the minstrel show to its flowering in the Mississippi Delta to the development of Urban Blues and the close relationship of the Blues with Jazz, Rhythm and Blues, and Rock and Roll. (Cross-listed with Ethnic Studies 178.) **Prerequisite:** none.

127A. Jazz Roots and Early Development (1900–1943) (4)

This course will trace the early development of Jazz and the diverse traditions which helped create this uniquely American art form. We will witness the emergence of Louis Armstrong in New Orleans and examine the composer's role in Jazz with Jelly Roll Morton and Duke Ellington. (Cross-listed with Ethnic Studies 179A.) **Prerequisite:** none.

127B. Jazz Since 1946: Freedom and Form (4)

This course will examine the evolution of Jazz from 1943 to the present. The course will survey the contrasting and competing styles in Jazz from BEBOP to COOL to the avant garde and fusion. (Cross-listed with Ethnic Studies 179B.) **Prerequisite:** none.

128. Principles and Practice of Conducting (4)

The theory and practice of instrumental and/or choral conducting as they have to do with basic baton techniques, score reading, interpretation, orchestration, program building, and functional analysis. Members of the class will be expected to demonstrate their knowledge in the conducting of a small ensemble performing literature from the eighteenth, nineteenth, and twentieth centuries. **Prerequisites:** Music 2A-B-C and 101A-B-C. Department stamp required.

129. Orchestration (4)

This course will give practical experience in orchestration. Students will study works from various eras of instrumental music and will demonstrate their knowledge by orchestrating works in the styles of these various eras, learning the capabilities, timbre, and articulation of all the instruments in the orchestra. **Prerequisite:** Music 101B.

130. Chamber Music Performance (2–4/0)

Instruction in the preparation of small group performances of representative instrumental and vocal chamber music literature. May be taken for credit six times, after which students must enroll for zero units. **Prerequisite:** consent of instructor through audition.

131. Advanced Improvisation Performance (4/0)

Master class instruction in advanced improvisation performance for declared majors and minors only or consent of instructor. Audition required at first class meeting. May be repeated six times for credit. **Prerequisites:** consent of instructor through audition. Department stamp required.

132. Pro-Seminar in Music Performance (4)

Individual or master class instruction in advanced instrumental performance. For declared music majors and minors. Students must be simultaneously enrolled in a performance ensemble or non-performance music course. May be taken six times for credit. **Prerequisites:** audition and department stamp.

132C. Vocal Coaching (4)

Individual instruction in advanced vocal coaching. Emphasis placed on diction and musical issues. For declared music majors and minors. Students must be simultaneously enrolled in the Vocal Masterclass, Music 32VM. May be taken six times for credit. **Prerequisites:** at least one quarter of Music 132V and consent of instructor. Department stamp required.

132R. Recital Preparation (4)

Advanced instrumental/vocal preparation for senior music majors pursuing honors in performance. Repertoire for a solo recital will be developed under the direction of the appropriate instrumental/vocal faculty member. Special audition required during Welcome Week preceding fall quarter. **Prerequisites:** by audition only; Music 132. Department stamp required.

132V. Pro-Seminar in Vocal Instruction (3)

Individual instruction in advanced vocal performance. For declared music majors and minors. Students must be simultaneously enrolled in a performance ensemble or non-performance music course and in the Vocal Masterclass, Music 32VM. May be taken six times for credit. **Prerequisites:** audition and department stamp.

133. Projects in New Music Performance (4)

Performance of new music of the twentieth century. Normally offered winter quarter only. Required a minimum of one time for all music majors. May be taken two times

for credit. **Prerequisite:** consent of instructor through audition.

134. Symphonic Orchestra (4)

Repertoire is drawn from the classic symphonic literature of the eighteenth, nineteenth, and twentieth centuries with a strong emphasis on recently composed and new music. Distinguished soloists, as well as The La Jolla Symphony Chorus, frequently appear with the orchestra. The La Jolla Symphony Orchestra performs two full-length programs each quarter, each program being performed twice. May be repeated six times for credit. **Prerequisites:** audition and department stamp required.

137A. Jazz Theory and Improvisation (4)

Study of jazz theory and improvisation, focused on fundamental rhythmic, harmonic, melodic, and formal aspects of modern jazz style. Application of theoretical knowledge to instruments and concepts will be reinforced through listening, transcription work, and composition and improvisation exercises. First course of a year-long sequence. **Prerequisites:** MUS 2A-B-C, proficiency exam, or consent on instructor.

137B. Jazz Theory and Improvisation (4)

Study of jazz theory and improvisation, focused on fundamental rhythmic, harmonic, melodic, and formal aspects of modern jazz style. Application of theoretical knowledge to instruments and concepts will be reinforced through listening, transcription work, and composition and improvisation exercises. Second course of a year-long sequence; continuation of Music 137A. **Prerequisites:** MUS 2A-B-C and 137A, proficiency exam, or consent on instructor.

137C. Jazz Theory and Improvisation (4)

Study of jazz theory and improvisation, focused on fundamental rhythmic, harmonic, melodic, and formal aspects of modern jazz style. Application of theoretical knowledge to instruments and concepts will be reinforced through listening, transcription work, and composition and improvisation exercises. Third course of a year-long sequence; continuation of MUS 137B. **Prerequisites:** MUS 2A-B-C and 137B, proficiency exam, or consent on instructor.

137D. Seminar in Jazz Studies I (4)

Advanced individual projects for senior music majors pursuing honors in jazz and music of the African diaspora. Projects will be critically reviewed in seminar with fellow students and jazz faculty. First course of a year-long sequence. **Prerequisites:** MUS 137A-B-C and admission into the Music Department Honors Program in jazz. Department stamp required.

137E. Seminar in Jazz Studies II (4)

Advanced individual projects for senior music majors pursuing honors in jazz and music of the African diaspora. Projects will be critically reviewed in seminar with fellow students and jazz faculty. Second course of a year-long sequence; continuation of 137D. **Prerequisites:** MUS 137D and department stamp.

137F. Seminar in Jazz Studies III (4)

Advanced individual projects for senior music majors pursuing honors in jazz and music of the African diaspora. Projects will be critically reviewed in seminar with fellow students and jazz faculty. Third course of a year-long sequence; continuation of 137E. **Prerequisites:** MUS 137E and department stamp.

143. Department Seminar (1)

The department seminar serves both as a general department meeting and as a forum for the presentation of research and performances by visitors, faculty, and students. Required of all undergraduate music majors every quarter.

150. Jazz and the Music of the African Diaspora: Special Topics Seminar (4)

An in-depth writing and listening intensive investigation into a jazz or diaspora-related music history topic. Topics vary from year to year. May be repeated once for credit. **Prerequisite:** Music 126, 127A or 127B, or consent of instructor.

151. Race, Culture, and Social Change (4)

Aggrieved groups generate distinctive cultural expressions by turning negative ascription into positive affirmation and by transforming segregation into congregation. This course

examines the role of cultural expressions in struggles for social change by these communities inside and outside the U.S. (Cross-listed with Ethnic Studies 108.) **Prerequisite:** upper-division standing or consent of instructor.

152. Hip Hop: The Politics of Culture (4)

Examination of hip-hop's music, technology, lyrics, and its influence in graffiti, film, music video, fiction, advertising, gender, corporate investment, government and censorship with a critical focus on race, gender, popular culture, and the politics of creative expression. (Cross-listed with Ethnic Studies 128.) **Prerequisite:** upper-division standing or consent of instructor.

153. African Americans and the Mass Media (4)

Examination of media representations of African Americans from slavery to the present focusing on emergence and transmission of enduring stereotypes, their relationship to changing social, political, and economic frameworks, and African Americans' responses to and interpretations of these mediated images. (Cross-listed with Ethnic Studies 164.) **Prerequisite:** upper-division standing or consent of instructor.

154. Black Music/Black Texts: Communication and Cultural Expression (4)

Explores roles of music as a traditional form of communication among Africans, Afro-Americans, and West Indians: Special attention given to poetry of black music, including blues and other forms of vocal music expressive of contestatory political attitudes. (Cross-listed with Ethnic Studies 176 and Literature in English 187.) **Prerequisite:** upper-division standing or consent of instructor.

170. Musical Acoustics (4)

(Formerly Music 160A.) An introduction to the acoustics of music with particular emphasis on contemporary digital techniques for understanding and manipulating sound. **Prerequisite:** Music 1A, 2A, or 4. Cross-listed with ICAM 103.

171. Computer Music I (4)

(Formerly Music 160C.) A practical introduction to computer techniques for desktop audio, including audio editing, MIDI control, and real-time music algorithms using the MAX programming environment. **Prerequisites:** Music 170; music majors, ICAM-music and ICAM-visual arts majors and minors, or consent of instructor.

172. Computer Music II (4)

(Formerly Music 161.) Computer synthesis techniques including wavetable and additive synthesis, waveshaping, and sampling. Transformation of musical sounds using filters, modulation, and delay effects. Fourier analysis of sounds. **Prerequisites:** Music 171 (formerly Music 160C); music majors, ICAM-music and ICAM-visual arts majors and minors, or consent of instructor.

173. Audio Production: Mixing and Editing (4)

(Formerly Music 162.) Theoretical and practical aspects of recording, mixing, and editing sound for both musical and multimedia applications. Covers audio montage, equalization, effects processing, spatialization, mastering, and diffusion. **Prerequisites:** Music 170 (formerly Music 160A); music majors, ICAM-music and ICAM-visual arts majors and minors, or consent of instructor.

174A. Audio/MIDI Studio Techniques I (2)

First of three-part sequence, detailing digital studio resources and production techniques. Hardware and software techniques explored in project setting. Topics include microphones, digital recording and editing, analog and digital interfaces, workflow, analytical listening. **Prerequisites:** Music 170, music majors, ICAM-music and ICAM-visual arts majors and minors, or consent of instructor.

174B. Audio/MIDI Studio Techniques II (2)

Second of three-part sequence, detailing digital studio resources and production techniques. Hardware and software techniques explored in project setting. Topics include electronic and acoustic mixing, signal processing, MIDI, synchronization and basic sound-for-picture. **Prerequisites:** Music 170, Music 174A; music majors, ICAM-music and ICAM-visual arts majors and minors, or consent of instructor.

174C. Audio/MIDI Studio Techniques III (2)

Third of three-part sequence, detailing digital studio resources and production techniques. Hardware and software techniques explored in project setting. Topics include audio quality, compression, mastering, surround sound, large scale production management. **Prerequisites:** Music 170, Music 174B; music majors, ICAM-music and ICAM-visual arts majors and minors, or consent of instructor.

175. Musical Psychoacoustics (4)

(Formerly Music 160B.) Survey of psychoacoustical phenomena, theories of hearing, and their relation to musical perception and cognition. Techniques of psychoacoustical experimentation. **Prerequisite:** Music 170 (formerly Music 160A) recommended.

176. Music Technology Seminar (4)

(Formerly Music 163.) Selected topics in music technology and its application to composition and/or performance. Offerings vary according to faculty availability and interest. May be repeated for credit. **Prerequisites:** Music 172 (formerly Music 161) and consent of instructor.

192. Senior Seminar in Music (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in music (at the upper-division level). Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** upper-division standing; department stamp and/or consent of instructor required.

195. Instructional Assistance (2)

Assisting in the instruction of an undergraduate music class under the direct and constant supervision of a faculty member. May be taken for credit three times. **Prerequisites:** consent of instructor and departmental approval.

198. Directed Group Study (1-4)

Concentrated inquiry into various problems not covered in the usual undergraduate courses. **Prerequisites:** consent of instructor and department chair approval. Pass/Not Pass grade only.

199. Independent Study (1-4)

Independent reading, research, or creative work under the direction of a faculty member, provided no course covering the material to be studied already exists, and the study area derives from previous course work. **Prerequisites:** consent of instructor and department chair approval. Department stamp required. Pass/Not Pass grade only. May be taken for credit two times.

ICAM 101. Digital Imaging: Image and Interactivity (4)

(Cross-listed with VIS 140.) Introduction to digital image involving images, texts, and interactive display operating both within computer mediated space (i.e., Web site) and in physical space (i.e., artist book). Interactive narrative and computer programming are explored. Materials fee required. **Prerequisites:** VIS 40 or ICAM 40. Open to studio, media, and ICAM majors; computing and ICAM minors only. Two production course limitation.

ICAM 102. Digital Media I: Time, Movement, Sound (4)

(Cross-listed with VIS 145A.) Exploration of time dependent media components. Creation and manipulation of digital sound as well as moving images and their integration in multimedia work. Use of computer programming to control time is emphasized. Introduces time and process based digital media artmaking. Contemporary and historical works across time and process based media will be studied and projects produced. Topics may include software art, software and hardware interfacing, interaction, and installation in an art context. CSE 5A or equivalent program experience recommended. Materials fee required. **Prerequisites:** VIS 40 or ICAM 40 and VIS 140 or ICAM 101. Open to media, and ICAM majors; ICAM minors only. Two production course limitation.

ICAM 103. Musical Acoustics (4)

(Cross-listed with MUS 170.) An introduction to the acoustics of music with particular emphasis on contemporary

digital techniques for understanding and manipulating sound. **Prerequisites:** MUS 1A, 2A, or 4.

ICAM 110. Computing in the Arts: Current Practice (4)

Designed around the presentations by visiting artists, critics, and scientists involved with contemporary issues related to computer arts. Lectures by the instructor and contextual readings provide background material for the visitor presentations. **Prerequisites:** none. Note: Materials fee required.

ICAM 120. Virtual Environments (4)

Students create virtual reality artworks. Projects may be done individually or in groups. Exploration of theoretical issues involved will underlie acquisition of techniques utilized in the construction of virtual realities. Materials fee required. **Prerequisites:** VIS 145A or ICAM 102; CSE 11 recommended. Open to ICAM majors and minors only. Two production course limitation.

ICAM 130. Seminar in Contemporary Computer Topics (4)

(Cross-listed with VIS 149.) Topics relevant to computer-based art- and music-making, such as computer methods for making art/music, design of interactive systems, spatialization of visual/musical elements, critical studies. Topics will vary. May be repeated twice. Materials fee required. **Prerequisites:** VIS 140 or ICAM 101; VIS 145A or ICAM 102 and MUS 170 or ICAM 103 recommended. Open to media, and ICAM majors; ICAM minors only. Two production course limitation.

ICAM 150. History of Art and Technology (4)

(Cross-listed with VIS 159.) Aims to provide historical context for computer arts by examining the interaction between the arts, media technologies, and sciences in different historical periods. Topics vary(e.g., Renaissance perspective, futurism and technology, and computer art of the 1950s and 1960s. **Prerequisite:** none. Note: Materials fee required.

ICAM 160A. Senior Projects in Computer Arts I (4)

Students pursue projects of their own design over two quarters with support from faculty in a seminar environment. Project proposals are developed, informed by project development guidelines from real world examples. Collaborations are possible. Portfolio required for admissions. **Prerequisites:** VIS 141B or VIS 145B or VIS 147B or MUS 172. Open to ICAM majors only. Department stamp required. Two production course limitation.

ICAM 160B. Senior Projects in Computer Arts II (4)

Continuation of ICAM 160A. Completion and presentation of independent projects along with documentation. **Prerequisite:** ICAM 160A. Open to ICAM majors only. Department stamp required. Two production course limitation.

192. Senior Seminar in Music (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in music (at the upper-division level). Topics will vary from quarter-to-quarter. Senior seminars may be taken for credit up to four times, with a change in topics, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** upper-division standing; department stamp and/or consent of instructor.

ICAM 199. Special Studies (2/4)

Independent reading, research or creative work under direction of faculty member. **Prerequisites:** department stamp and upper-division standing required.

GRADUATE

All courses numbered 200 and above are intended for students admitted to the graduate program in music.

200. Contemporary Chamber Opera Performance (4)

Students will collaborate with faculty and guest artists in the preparation and performance of a fully staged contemporary chamber opera. The opera will be presented

in multiple public performances. Prerequisites: graduate standing in music, MU75/MU76, or consent of instructor.

201A-B-C-D-E-F. Projects in New Music

Performance (1-4, 1-4, 1-4, 1-4, 1-4)

Performance of contemporary music. Different sections represent active performance ensembles. A core requirement for music graduate students as outlined in the curriculum.

202. Advanced Projects in Performance (1-4)

Advanced performance of new music with members of the performance faculty (SONOR). Students taking this course do not need to take Music 201 that quarter. Enrollment by consent of instructor/director of SONOR. **Prerequisites:** graduate standing in music; others by written consent of instructor and department stamp.

203A. Advanced Projects in Composition (6)

Meetings and laboratory sessions devoted to the study of composition in small groups. Consent of instructor required.

203B. Advanced Projects in Composition (6)

Meetings and laboratory sessions devoted to the study of composition in small groups. Consent of instructor required.

203C. Advanced Projects in Composition (6)

Meetings and laboratory sessions devoted to the study of composition in small groups. Consent of instructor required.

203D. Advanced Projects in Composition (1-4)

Meetings on group basis with faculty composer in sessions devoted to the study of composition. **Prerequisites:** 203A-B-C and consent of instructor.

204. Focus on Composition (2)

The purpose of this seminar is to bring in the entire population of the graduate composition program (all students and faculty) for in-depth discussion of critical issues in music theory and composition. Each meeting will feature a formal presentation by either a student, faculty member, or visitor, followed by lively and challenging debate on relevant issues. **Prerequisite:** consent of instructor.

205. Focus on Integrative Studies (2)

Meets on a biweekly basis to facilitate presentations by advanced students and invited guests and to encourage in-depth discussion between students, faculty, and visitors about theoretical and artistic issues of interest. Participation is required of all enrolled IS students until advanced to candidacy. Others are welcome to participate. **Prerequisite:** graduate standing in music.

206. Experimental Studies Seminar (4)

Seminars growing out of current faculty interests. The approach tends to be speculative and includes individual projects or papers as well as assigned readings. In the past, such areas as new instrumental and vocal resources, mixed media, and compositional linguistics have been offered. **Prerequisites:** graduate standing in music; others by written consent of instructor and department stamp.

207. Theoretical Studies Seminar (4)

Seminars on subject areas relating to the established dimensions of music and in which theoreticians have produced a substantial body of work. These include studies in analysis, timbre, rhythm, notation, and psychoacoustics. Offerings vary depending on faculty availability and interest. Analytical paper required. **Prerequisites:** graduate standing in music; others by written consent of instructor and department stamp.

209. Advanced Music Theory and Practice (4)

Advanced integrated studies in music theory; composition and styles study through analysis and performance. This course is intended primarily for doctoral students and may be taken by M.A. students only with special approval of M.A. advisor and course instructor. A major research or analytical publishable paper required. **Prerequisites:** graduate standing in music; others by written consent of instructor and department stamp.

210. Musical Analysis (4)

The analysis of complex music. The course will assume that the student has a background in traditional music analysis.

The goal of the course is to investigate and develop analytical procedures that yield significant information about specific works of music, old and new. Reading, projects, and analytical papers. **Prerequisites:** graduate standing in music; others by written consent of instructor and department stamp.

211. Introduction to Ethnomusicology (2)

Introduces the field of ethnomusicology by highlighting important thinkers, concepts, and issues and by orienting students toward work of an anthropological, ethnographic, or comparative nature. Students who have taken and passed MUS 208A may not get credit for MUS 211. **Prerequisite:** graduate standing in music

212. Introduction to System Inquiry (2)

Introduces the network of concepts and approaches that comprise systems inquiry and explores the theoretical, philosophical, and methodological implications of systems thinking for musical research and practice. Students who have taken MUS 208B for credit may not take MUS 212 for credit. **Prerequisite:** graduate standing in music.

213. Introduction to Critical Studies (2)

Introduces important themes and thinkers from the fields of critical theory and cultural studies and explores how musical behaviors and phenomena relate to matters of ideology, nationality, ethnicity, social class, race, and gender. Students who have taken MUS 208C for credit may not take MUS 213 for credit. **Prerequisite:** graduate standing in music.

214. Introduction to Creative Practices (2)

Surveys the terrain of contemporary creative music and investigates the social, cultural, historical, and technological dimensions of its manifestations and practice. Students who have taken MUS 208D for credit may not take MUS 214 for credit. **Prerequisite:** graduate standing in music.

228. Conducting (4)

This course will give practical experience in conducting a variety of works from various eras of instrumental and/or vocal music. Students will study problems of instrumental or vocal techniques, formal and expressive analysis of the music, and manners of rehearsal. Required of all graduate students. **Prerequisites:** graduate standing in music; others by written consent of instructor and department stamp. (Offered in selected years.)

229. Seminar in Orchestration (4)

A seminar to give practical experience in orchestration. Students will study works from various eras of instrumental music and will demonstrate their knowledge by orchestrating works in the styles of these various eras, learning the capabilities, timbre, and articulation of all the instruments in the orchestra. **Prerequisite:** graduate standing. (Offered in selected years.)

230. Chamber Music Performance (4)

Performance of representative chamber music literature, instrumental and/or vocal, through coached rehearsal and seminar studies. Course may be repeated for credit since the literature studied varies from quarter to quarter. **Prerequisite:** consent of instructor.

232. Pro-Seminar in Music Performance (1-4)

Individual or master class instruction in advanced instrumental/vocal performance. **Prerequisite:** consent of instructor through audition.

234. Symphonic Orchestra (4)

Repertoire is drawn from the classic symphonic literature of the eighteenth, nineteenth, and twentieth centuries with a strong emphasis on recently composed and new music. Distinguished soloists, as well as The La Jolla Symphony Chorus, frequently appear with the orchestra. The La Jolla Symphony Orchestra performs two full-length programs each quarter, each program being performed twice. May be repeated six times for credit. **Prerequisites:** audition required.

245. Focus on Performance (2)

The purpose of this seminar is to bring together performance students, faculty, and guests for discussion, presentation of student and faculty projects, performances by guest artists, and master classes with different members

of the performance faculty. **Prerequisite:** consent of instructor. (S/U grade option only.)

250. Special Projects (1-12)

An umbrella course offered to music graduate students in lieu of normal seminar offerings. Topics will be generated by faculty and graduate students and submitted in December each year for review by faculty. Students may register for up to four units of a specialized research topic with given faculty. May be taken for up to twelve units a quarter. (S/U grade option only.)

251. Integrative Studies Seminar in Ethnomusicology (4)

Provides an in-depth look at the shifting definitions, methods, and scope of ethnomusicology and explores contemporary writings and issues that are shaping the field today. **Prerequisite:** graduate standing in music.

252. Integrative Studies Seminar in Systems Inquiry (4)

Traces the development of systems thinking and encourages work of a transdisciplinary nature, integrating models, strategies, methods, and tools from natural, human, social, and technological realms. **Prerequisite:** graduate standing in music.

253. Integrative Studies Seminar in Critical Studies (4)

Develops critical thinking and self-reflexive inquiry through in-depth study of a diverse range of critical and scholarly traditions as they relate to music. Students are encouraged to investigate their own sense of identity and voice, as embodied in their creative and/or scholarly work. **Prerequisite:** graduate standing in music.

254. Integrative Studies Seminar in Creative Practice (4)

Students will explore a variety of approaches to collaborative work and will be challenged to develop a personal aesthetic in experimental art and new media and design original work for presentation at faculty juries. **Prerequisite:** graduate standing in music.

267. Advanced Music Technology Seminar (4)

Advanced topics in music technology and its application to composition and/or performance. Offerings vary according to faculty availability and interest. May be repeated for credit. **Prerequisites:** Music 173 or equivalent and consent of instructor.

270A. Digital Audio Processing (4)

Digital techniques for analysis, synthesis, and processing of musical sounds. Sampling theory. Software synthesis techniques. Digital filter design. The short-time Fourier transform. Numerical accuracy considerations. **Prerequisite:** consent of instructor.

270B. Musical Cognitive Science (4)

Theoretical bases for analyzing musical sound. Approaches to perception and cognition, including psychoacoustics and information processing, both ecological and computational. Models of audition including Helmholtz's consonance/dissonance theory and Bregman's streaming model. Musical cognition theories of Lerdahl and Narmour. Neural network models of music perception and cognition. Models of rhythm. The problem of timbre and timbre perception. **Prerequisite:** consent of instructor.

270C. Compositional Algorithms (4)

Transformations in musical composition; series and intervallic structures; serial approaches to rhythm and dynamic. The stochastic music of Xenakis and Cage. Hiller's automatic composition. Improvisational models. Computer analysis of musical style. Neurally inspired and other quasiparallel algorithms. **Prerequisite:** consent of instructor.

270D. Advanced Projects in Computer Music (4)

Meetings on group basis with computer music faculty in support of individual student research projects. **Prerequisites:** consent of instructor and completion of Music 270A-B-C.

271A. Survey of Electronic Music Techniques I (4)

A hands-on encounter with several important works from the classic electronic repertory, showing a representative subset of the electronic techniques available to musicians.

Students who have taken MUS 271 for credit may not take MUS 271A for credit. **Prerequisite:** graduate standing in music.

271B. Survey of Electronic Music Techniques II (4)

A continuation of 271A, with emphasis on live interactive techniques (e.g., audio processing; analysis/resynthesis; score following). **Prerequisites:** Music 271A and graduate standing in music.

271C. Survey of Electronic Music Techniques III (4)

A continuation of 271A and B, with emphasis on compositional techniques (e.g., computer-aided composition; production; spatialization). **Prerequisites:** Music 271B and graduate standing in music.

272. Seminar in Live Computer Music (4)

Group projects to create new pieces of live electronic music involving research in electronic music and/or instrumental techniques. May be repeated for credit. **Prerequisites:** Music 271A-B-C or consent of instructor and graduate standing in music.

291. Problems and Methods of Music Research and Performance (2)

The course will give practical experience in historical research, including use of important source materials, evaluation of editions, and examination of performance practice problems. (S/U grade option only.)

296. Directed Group Research in Performance (4)

This group research seminar involves the investigation and exploration of new and experimental performance concerns. Areas could include: improvisation, graphic notation, performance electronics, and working with combined media (such as dance, poetry, and theater). **Prerequisite:** graduate standing. (S/U grade option only.)

298. Directed Research (1-4)

Individual research. (S/U grades permitted.) May be repeated for credit. Enrollment by consent of instructor only.

299. Advanced Research Projects and Independent Study (1-12)

Individual research projects relevant to the student's selected area of graduate interest conducted in continuing relationship with a faculty advisor in preparation of the master's thesis or doctoral dissertation. **Prerequisites:** graduate standing in music; others by written consent of instructor and department stamp. (S/U grades permitted.)

500. Apprentice Teaching (1-4)

Participation in the undergraduate teaching program is required of all graduate students at the equivalent of 25 percent time for three quarters (six units is required for all graduate students). **Prerequisites:** graduate standing in music; others by written consent of instructor and department stamp. (S/U grade option only.)

501. Apprentice Teaching—Nondepartmental (4)

Consideration and development of pedagogical methods appropriate to undergraduate teaching. **Prerequisites:** graduate standing and consent of instructor. (S/U grade option only.)

Neurosciences

DIRECTOR, NEUROSCIENCES GRADUATE PROGRAM

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Samuel Pfaff, Ph.D., *Adjunct/Neurobiology*
John Polich, Ph.D., *Adjunct/Neuropharmacology*
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Morton Printz, Ph.D., *Pharmacology*
Vilayanur S. Ramachandran, M.D., *Psychology*
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Massimo Scanziani, Ph.D., *Neurobiology*
Nicholas Schork, Ph.D., *Adjunct/Psychiatry*
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Terrence J. Sejnowski, Ph.D., *Biology-Neurobiology Section and Adjunct/Neurosciences, Cognitive Science, Computer Science and Engineering, and Physics*
Linda Sorkin, Ph.D., *Anesthesiology*
Nicholas C. Spitzer, Ph.D., *Biology-Neurobiology Section*
Larry R. Squire, Ph.D., *Psychiatry, Psychology, Neurosciences*
Charles Stevens, M.D., Ph.D., *Adjunct/Pharmacology*
Neal Swerdlow, M.D., Ph.D., *Psychiatry*
Palmer W. Taylor, Ph.D., *Pharmacology*
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Anthony Wynshaw-Boris, M.D., Ph.D., *Pediatrics and Medicine*
Tony Yaksh, Ph.D., *Anesthesiology and Pharmacology*
Justin Zivin, M.D., Ph.D., *Neurosciences*

Charles Zuker, Ph.D., *Biology-Neurobiology Section and Neurosciences*

ASSOCIATE PROFESSORS

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Wendy Campana, Ph.D., *Anesthesiology*
Andrea Chiba, Ph.D., *Cognitive Science*
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Donna Gruol, Ph.D., *Adjunct/Neurosciences*
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Jeffrey S. Isaacson, Ph.D., *Neurosciences*
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William R. Schafer, Ph.D., *Adjunct/Biological Sciences and Neurobiology*
Katerina Semendeferi, Ph.D., *Anthropology*
Paul A. Slesinger, Ph.D., *Adjunct/Neurosciences*
Evelyn Tecoma, M.D., Ph.D., *Clinical Neurosciences*
John Thomas, Ph.D., *Adjunct/Neurosciences and Biology*
Yimin Zou, Ph.D., *Biology*

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Adam Aron, Ph.D., *Psychology*
James B. Brewer, M.D., Ph.D., *Radiology and Neurosciences*
Virginia de Sa, Ph.D., *Cognitive Science*
Timothy Gentner, Ph.D., *Psychology*
S.V. Penelope Jones, Ph.D., *Psychiatry*
Jonathan Lin, Ph.D., *Pathology*
Jill Leutgeb Ph.D., *Biology*
Stefan Leutgeb, Ph.D., *Biology*
Mark Mayford, Ph.D., *Adjunct/Neurosciences*
Terunaga Nakagawa, M.D., Ph.D., *Chemistry and Biochemistry*
Sharon Nichols, Ph.D., *Adjunct/Neurosciences*
Ardem Patapoutian, Ph.D., *Cell Biology*
Gentry N. Patrick, Ph.D., *Biological Sciences*
Pam Reinagel, Ph.D., *Biology*
John Reynolds, Ph.D., *Adjunct/Neurosciences*
Subhojit Roy, Ph.D., *Neurosciences*
John Serences, Ph.D., *Psychology*
Tatyana Sharpee, Ph.D., *Adjunct/Physics*
Gabriel A. Silva, Ph.D., *Bioengineering*
Lisa Stefanacci, Ph.D., *Adjunct/Psychiatry*
Lisa Stowers, Ph.D., *Adjunct/Neurosciences*
Michael A. Taffe, Ph.D., *Neuropharmacology*
Jing Wang, Ph.D., *Biological Sciences*
Angela Yu, Ph.D., *Cognitive Sciences*
Binhai Zheng, Ph.D., *Neurosciences*
Eric Zorilla, Ph.D., *Adjunct/Neurosciences*

OFFICE: Building #1, School of Medicine,
Mail Code 0662

<http://neurograd.ucsd.edu>

THE GRADUATE PROGRAM

The Neurosciences Graduate Program accepts candidates for the Ph.D. degree who have undergraduate majors in such disciplines as biology, chemistry, engineering, microbiology, mathematics, physics, psychology, and zoology. A desire

and competence to understand how the nervous system functions is more important than previous background and training.

DOCTORAL DEGREE PROGRAM

Students in this program receive guidance and instruction from a campuswide group of faculty interested in nervous system mechanisms. Each student, in consultation with an advisory committee, selects courses relevant to his or her research interests and goals. The selection will include formal courses listed in this catalog and informal seminars offered by the department. A regular schedule of rotation through the laboratories of faculty members is a feature of the first year; the student is exposed in this way to the various approaches, techniques, and disciplines represented on the campus.

SPECIALIZATION IN COMPUTATIONAL NEUROSCIENCE

The Neuroscience Graduate program offers a specialization in Computational Neuroscience. Students in the Computational Neuroscience specialization are trained in the broad range of scientific and technical skills essential to understand the computational resources of neural systems. Students in this specialization will be required to fulfill all of the academic requirements of students in the Neurosciences Graduate Program. In addition to these requirements, students in the Computational Neuroscience specialization must successfully complete a set of three core computational courses, an advanced laboratory, and computational neuroscience journal clubs.

Required courses include:

Core Courses:

Neurosci. 200A-B-C
Neurosci. 225
Neurosci. 241
Neurosci. 257
Neurosci. 276

Computational Neuroscience Specialization Courses:

BGGN 246A-B
BGGN 260
BGGN 266
Cog. Sci. 260
Physics 271

COURSE WORK

By the time of the minor proposition (see below), students are expected to demonstrate competence in the basics of neuroscience by taking five quarters of mandatory course work—three quarters of Basic Neuroscience (Neurosci. 200 A-B-C), and one quarter each of Neuroanatomy Lab (Neurosci. 257) and Statistical Methods and Experimental Design (Neurosci. 225). In addition, students choose among various core elective courses, such as Molecular and Cellular Neuroendocrinology (Neurosci. 222), Neuropsychopharmacology (Neurosci. 277), Molecular and Cellular Neurobiology (Neurosci. 268), Developmental Neuroscience (Neurosci. 263) and approved courses from other graduate departments. Students are also permitted to substitute previous

courses that are similar to the Neurosciences core courses. Such a substitution would require approval of the chair of the Curriculum Committee or the director of the Graduate Program.

MINOR PROPOSITION

The purpose of this examination is to test the student's ability to choose a problem in the neurosciences and propose an experimental approach to its solution. The problem should be broad, requiring experimental approaches from more than one discipline. The problem should be outside the area of the student's anticipated dissertation research. Students will be required to demonstrate a working knowledge of the disciplines involved in the minor proposition.

Oral defense of the minor proposition will be required at the end of the winter quarter of the second year of study.

DISSERTATION

During the second year, students are expected to propose and initiate work on a dissertation problem under the guidance of a faculty preceptor. The neurosciences group at UCSD currently conducts animal research and clinical studies in the fields of neuroanatomy, neurochemistry, neuropharmacology, neurophysiology, comparative neurology, physiology of excitable membranes, synaptic transmission, neuronal integration and coding, nervous system tissue culture, neuroimmunology, brain function, sensory physiology, motor mechanism, and systems analysis as applied to neurological problems.

QUALIFYING EXAMINATION

This examination, a university requirement, focuses on the proposed research that the student will undertake for his or her dissertation. This examination is conducted by the approved doctoral committee.

DISSERTATION EXAMINATION

The required formalities listed in the Instruction for Preparation and Submission of Doctoral Dissertations issued by the Office of Graduate Studies and Research to students should be followed closely. The final examination includes both a public presentation followed by a closed defense of the dissertation with members of the Committee.

TEACHING

All students are required to perform as a teaching assistant for at least one quarter during their graduate career. To this end, opportunities to lecture and assist in laboratory exercises and demonstrations are available through a number of departments, including neurosciences, biology, and cognitive science.

PH.D. TIME LIMIT POLICIES

Students must advance to candidacy by the end of four years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

UNDERGRADUATE

199. Independent Research (2 or 4)

Laboratory research under the supervision of individual members of the faculty of the neurosciences department in one or a combination of neurosciences disciplines, e.g., neuroanatomy, neurophysiology, neurochemistry, neuropharmacology. (P/NP grades only.) (F,W,S)

GRADUATE

200A-B-C. Basic Neuroscience (4-4-4)

These courses are designed for graduate students in the neurosciences and other departments that are part of the interdisciplinary program (i.e., Biology, Cog. Sci.). These courses have been designed to cover as much basic neuroscience as possible in three quarters of study. It will combine two three-hour meetings each week with a 1.5 hour lecture and a 1.5 hour discussion of papers. These will be required courses for all first-year neurosciences graduate students. Biology will cross-list courses under Biology headings, making it a requirement of first year Biology graduate students. **Prerequisite:** graduate student or consent of instructor. (F,W,S)

210. Neurology Boot Camp (4)

For incoming doctoral students in Neurobiology, Computational Neurobiology, and Neurosciences. During the first two weeks in September, students commit to 10–15 hours per day in lectures and laboratories in electrophysiology, cellular anatomy, molecular biology, optical imaging, and computational neurobiology. Students also attend weekly seminars during fall quarter. **Prerequisites:** graduate standing only. For students in the following major codes: BI77, BI79, NE75.

221. Advanced Topics in Neurosciences (2)

Specialized advanced topic areas in neurosciences will be addressed in an interactive seminar course format. A different specific topic will be considered each quarter as announced in advance. Students will each present an aspect of the topic area and participate in discussions. **Prerequisite:** graduate student or consent of instructor. (F,W,S)

222. Molecular and Cellular Neuroendocrinology (4)

This course will examine the role of the CNS in controlling reproductive functions, stress, growth and behavior, with emphasis on the cellular and molecular mechanisms of neuroendocrine function. The lectures will be given by experts on each of the topic subjects. Lectures will include a basic introduction on the topic followed by a description of the current research in the area.

225. Statistical Methods and Experimental Design (2)

This is a practical course designed to emphasize the relationships between experimental design, statistical methods, and biomedical research. The assumptions behind the statistical tests, their appropriate use, and examples of misuse will be discussed. **Prerequisites:** registered student in SOM graduate program or approval of instructor.

232. Topics in Neurosciences at the Boundaries of Neurology and Psychiatry (4)

This course focuses on disorders affecting the nervous system, emphasizing phenomenological and mechanistic links and common biological themes across these disorders. Clinical presentations, pathology, and basic science of selected diseases will be covered in lecture and discussion format. **Prerequisite:** enrollment in UCSD graduate sciences or clinical fellowship program.

241. Ethics and Survival Skills in Academia (3)

This course will cover "ethical" issues in academia, including dishonesty, plagiarism, attribution, sexual misconduct, etc. We will also discuss "survival" issues, including job hunting, grant preparation, journal reviews, writing letters of recommendation, mentoring, etc. (W)

243. Physiological Basis of Human Information (2)

Psychological processes including attention, perception, and memory will be studied in connection with event-related potentials of the human brain. The interrelations among psychological and physiological events will be explored in order to arrive at unified concepts of human

information processing. **Prerequisites:** Neurosci. 238 or Psych. 231, and consent of instructor. (S/U grades only.) (F)

259. Workshop in Electron Microscopy (4)

This course is to introduce graduate students in the neurosciences to research methods used in electron microscopy (EM) through one hour of formal lecture, one hour of seminar, three hours of demonstration, and three hours of supervised laboratory work per week. Students will become familiar with sectioning EM, scanning EM, and freeze-fracture EM. **Prerequisites:** graduate-student standing in neurosciences doctoral program and consent of instructor. Enrollment limited. (S/U grades only.) (S)

263. Developmental Neuroscience (3)

A graduate reading course that highlights selected topics in the molecular study of neural development.

266. Development of Neural Circuits (4)

Course focuses on developmental processes during formation of neural circuits. Molecular, genetic, cellular mechanisms controlling neurogenesis, neuronal differentiation, positioning (migration), axon/dendrite patterning, and synapse formation will be discussed. Role of neural activity shaping circuit formation will be explored. **Prerequisites:** graduate standing only. For students in the following major codes: NE75, BI77, BI79, or consent of instructor.

268. Molecular and Cellular Neurobiology (4)

Molecular and cellular approaches to the study of the nervous system are advancing neurobiology at an increasingly rapid pace. This graduate-level course will address the latest molecular advances in the areas of: 1) synapse formation, neurotransmitter release, and neurotransmitter receptors; 2) nerve growth factors, their receptors, and neuronal apoptosis; 3) transcriptional regulation in the brain and peripheral nervous system; 4) cell culture, transgenic, and knock-out mouse model systems; 5) the molecular bases of genetic, psychiatric, and degenerative diseases of the nervous system; and 6) the current molecular knowledge of vision, sensory transduction, circadian rhythms, learning, memory, and behavior.

276. Neuroscience Research Rounds (1)

Neurosciences group faculty members and graduate students will present and discuss ongoing research. Attendance will be mandatory for first- and second-year graduate students. Faculty, advanced graduate students, medical students, postdoctoral trainees, and other interested parties are encouraged to attend. (F,W,S)

277. Neuropsychopharmacology (4)

An examination of the molecular and biochemical bases of drug and transmitter action. The course is devoted to receptor mechanisms, neuropharmacology, and drug action on excitable tissues. **Prerequisite:** graduate standing. (S)

285. Clinical Trails: Issues and Dilemmas in Clinical Trials (3)

This course provides a methodological perspective on clinical trials. Topics will include ethics, design of Phase I-IV trials, randomization/blinding, bias, and sample-size power. Lectures will also cover "application" with eminent UCSD trialists describing conduct, design, and statistical issues of specific studies. **Prerequisites:** medical or graduate student standing.

296. Neurosciences Research Rotation (1-12)

Independent study. (S/U grades only.) (F,W,S)

298. Neurosciences Independent Study Project (ISP) (1-12)

Prerequisite: approved ISP proposal. (F,W,S)

299. Neurosciences Research (1-12)

Independent study. (S/U grades only.) (F,W,S)

401. Neurology General Clinical Selective Clerkship (7)

Provides opportunities for practical application of neurological skills to the understanding and treatment of a variety of clinical disorders of the nervous system. **Prerequisite:** successful completion of first two years of medical school. (F,W,S)

426. Subintern Pediatric Neurology (7)

Subinterns are responsible for the primary care of hospitalized pediatric neurology patients under direct resident

and attending physician supervision. Students will perform procedures such as lumbar puncture and participate in night call, daily teaching round, neurology Grand Rounds, and Journal Clubs. **Prerequisite:** Neurology 401 or consent of instructor. (F,W,S)

427. Neurology Outpatient (7)

The student will rotate through the general and subspecialty (stroke, epilepsy, headache, nerve, and muscle) neurology clinics based at UCSD Medical Center, Perlman, VAMC, and Children's Hospital. There are lectures and clinical conferences. **Prerequisite:** Neurosciences 401 or equivalent. (F,W,S)

496. Clinical Independent Study (1-21)

Independent clinical study for medical students (S/U grades only.) (F,W,S)

500. Apprenticeship Teaching (1-4)

Participation in the department teaching program is required of all students working toward a Ph.D. degree. In general, students are not expected to teach in the first year, but are required to serve as teaching assistants or tutors for one quarter at any time during their subsequent years of training. The amount of teaching required is equivalent to the duties expected of a 50 percent assistant for one quarter. **Prerequisite:** neurosciences graduate students. (S/U grades only.) (F,W,S)

UC San Diego Opportunities Abroad Program

OFFICE: Programs Abroad Office in the International Center (corner of Gilman Drive and Library Walk)
(858) 534-1123
<http://programsabroad.ucsd.edu>

Sharon Rose, *Linguistics, Faculty Director*
Paula Levin, *Education Studies, Associate Faculty Director*
Lynn Anderson, *Dean of International Education*
Kimberly Burton, *Director of Programs Abroad*
Jim Galvin, *OAP Director*
Tonia Pizer, *OAP Advisor*
Maribeth Erlich, *OAP Advisor*
Rachel Rigoli, *OAP Advisor*
Kathleen McLaren-Hawking, *OAP Advisor*
Derek Kolb, *OAP Advisor*
Kelly O'Sullivan, *Academic Integration Officer*
Christine Trinidad, *Office Manager*

Students interested in going abroad should investigate possibilities through the Opportunities Abroad Program, which can assist with placement in a wide range of academic programs outside the UC system. These programs include study for an academic year, semester, quarter, or summer. They may be sponsored by other U.S. universities or include direct enrollment in foreign institutions. Academic credit may also be earned on a number of overseas internship programs that combine work experience and courses.

Students going abroad through the Opportunities Abroad Program earn transfer credit from the sponsoring institution. Courses taken abroad may satisfy general-education, major, or minor requirements, depending on department or college approval. Federal and state financial aid for approved plans of study abroad is available. Special study abroad scholarships are also available.

In addition to these academic programs, the Programs Abroad Office can assist students in selecting a wide range of volunteer, paid work, and educational travel programs.

RELATED PROGRAMS

For other study abroad opportunities, see UC ["Education Abroad Program \(EAP\)"](#) and ["UC San Diego Global Seminars \(GS\)."](#)

Philosophy

PROFESSORS

Georgios H. Anagnostopoulos, Ph.D.
Richard J. Arneson, Ph.D.
William Bechtel, Ph.D.
David O. Brink, Ph.D.
Craig A. Callender, Ph.D.
Nancy D. Cartwright, Ph.D.
Jonathan Cohen, Ph.D., *Graduate Advisor*
Gerald D. Doppelt, Ph.D., *Academic Senate*
Distinguished Teaching Award
Rick Grush, Ph.D.
Samuel C. Rickless, Ph.D., *Academic Senate*
Distinguished Teaching Award
Donald P. Rutherford, Ph.D., *Chair, Academic Senate*
Distinguished Teaching Award
Gila Sher, Ph.D.
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ASSISTANT PROFESSORS

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Clinton Tolley, Ph.D.
Christian Wüthrich, Ph.D.

PROFESSORS EMERITI

Henry E. Allison, Ph.D., *Research Professor (not in-residence)*
Patricia Smith Churchland, Ph.D., *Professor Emerita*
Paul M. Churchland, Ph.D., *Professor Emeritus*
Edward N. Lee, Ph.D., *Professor Emeritus*
Frederick A. Olafson, Ph.D., *Professor Emeritus*
Avrum Stroll, Ph.D., *Research Professor*

OFFICE:

7002 Humanities and Social Sciences Building
Muir College
<http://philosophy.ucsd.edu>

INTRODUCTION TO THE DEPARTMENT

Philosophy addresses some of the most basic questions humans ask about the world. Some questions are very broad, such as how can minds know about the external world, themselves, and other minds? How can we arrive at reasonable answers to ethical questions about right and wrong? What distinguishes science from other kinds of knowledge and are there limits to science? What is the role of moral choice and values in human life? Do standards of truth and logic apply in areas such as religion, art, politics, and law?

Philosophy also seeks answers to particular problems in specific areas of science, medicine, law, ethics, and technology. For example, it explores the ways that modern physics impacts our notions of space, time, causation, and nature itself. It considers the ways that neuroscience and genetics impact the

traditional ideas about free will and responsibility. It debates the limits of democratic governments in regulating individuals' conduct. It wrestles with problems about the right to die and the varied responsibilities of medical professionals. It inquires into the relation between science and religion. Related issues concern privacy, the limits of private property, and who should have access to what information.

CAREER GUIDANCE

Philosophy is a broad field with diverse subfields. Some students may want to pursue a general course of study for the major, sampling courses across several of these distinct subfields. This strategy develops a solid foundation for graduate work in philosophy and for any career that requires breadth of knowledge, intellectual flexibility, as well as communicative and analytic skills.

Other students may wish to pursue a more specialized program of studies. Below are descriptions of several areas of emphasis within philosophy. These illustrate the possibilities of developing your own coherent and focused set of courses that fulfill the requirements for the major in ways that are tailored to your specific intellectual and career interests. Philosophy is preparation for a wide range of careers—including science, law, medicine, teaching, business, and public policy.

Choosing a philosophy major is an excellent way to follow a disciplined and rigorous course of study that joins the breadth of a traditional college education with specialization in a chosen area.

UNDERGRADUATE PROGRAM—MAJOR

The Department of Philosophy offers the degree of bachelor of arts (B.A.) in philosophy for the undergraduate major. A major in philosophy requires a total of fifteen philosophy courses, at least twelve of which must be upper-division (courses numbered 100 and above). Up to two upper-division courses outside of philosophy can count among the twelve required for the major if they are drawn from a related field and contribute to the major's philosophical program; such credit must be approved by the undergraduate advisor. Honors and directed study courses (Philosophy 191–199) may not be used to satisfy the major requirement of fifteen philosophy courses. Major requirements may be met by examination.

There is no required introduction to philosophy or the major. The department offers a variety of lower-division courses and sequences (numbered 1–99), any of which could be a suitable introduction to philosophy. The only required lower-division course for majors is Philosophy 10, Introduction to Logic.

At the upper-division level, majors are encouraged to take courses in the central areas of philosophical study:

- Metaphysics and Epistemology
- Law, Ethics, and Politics
- Philosophy of Science and Logic
- History of Philosophy

Though many upper-division courses have no prerequisite, any combination of three lower-division courses would provide a good foundation for taking most upper-division courses.

CORE REQUIREMENTS FOR THE MAJOR

1. History of Philosophy. A history of philosophy core sequence 157, 158, and 159. It is strongly recommended that majors complete these courses in order.
2. Logic. Philosophy 10, and Philosophy 120 are required of all majors. Because Philosophy 120 is a prerequisite for a variety of upper-division courses, prospective majors are strongly encouraged to take Philosophy 10 and Philosophy 120 as early as possible.
3. Moral and Political Philosophy. Majors must take at least one upper-division course in moral or political philosophy from among Philosophy 160, 161, 166, or 167.
4. Metaphysics and Epistemology. Majors must take at least one upper-division course in traditional areas of analytic philosophy—metaphysics, epistemology, philosophy of language, and philosophy of mind—from among Philosophy 130, 132, 134, or 136.
5. Philosophy of Science. Majors must take at least one upper-division course in philosophy of science from among Philosophy 145, 146, 147, 149, 150, 151, or 152.

OPTIONAL AREAS OF EMPHASIS IN THE MAJOR

The Department of Philosophy offers four optional areas of emphasis within the major, as described below. Students selecting an optional area of emphasis for the major must take and pass five of the courses listed under that area. Courses taken to complete an area of emphasis are counted toward the fifteen courses required for the major. Particular courses may be applied both to the completion of the area of emphasis and in fulfillment of a core requirement for the major. Students should be aware, as they plan their course of study, that only some of the courses listed for an area of emphasis will be taught in any given year.

The department encourages students considering a philosophy major to consult with the philosophy undergraduate coordinator and the philosophy faculty undergraduate advisor to plan a program of study that is suitable to their particular interests and needs. The department Web site <http://philosophy.ucsd.edu> provides additional information about courses falling within each area of emphasis. Areas of emphasis are not noted on transcripts or diplomas. The optional areas of emphasis are

1. Law, Ethics, and Society

This area targets the nature and source of our moral rights and obligations, the authority of the state and law, the basis of value and goodness. Several courses in this area target ethical issues in medicine, the environment, technological change, economic inequality, and matters concerning race, gender, class, ethnicity, and nationality. In this area, students will learn how moral and legal reasoning can reshape the political debates

over abortion, the death penalty, privacy on the Internet, genetic testing, religious tolerance, free speech, affirmative action, and other issues.

This area is excellent preparation for law school as well as for postgraduate study and careers in public policy.

125. Games and Decisions
148. Philosophy and the Environment
152. Philosophy of Social Science
160. Ethical Theory
161. Topics in the History of Ethics
162. Contemporary Moral Issues
163. Biomedical Ethics
164. Technology and Human Values
166. Classics in Political Philosophy
167. Contemporary Political Philosophy
168. Philosophy of Law
170. Philosophy and Race

2. Science, Technology, and Medicine

This emphasis focuses on the insights and challenges presented by science. Modern science and technologies affect our view of ourselves and of nature, introducing novel promises and problems. For instance, how do we balance technical, economic, environmental, and ethical values in making decisions concerning which technologies or drugs to develop? Modern science has also changed our understanding of nature. Quantum physics, the genetic revolution, and neuroscience (to name a few) present problems and have important implications for human life. Finally, there are questions about science itself. What are the methods of modern science? Do they vary from one science to another? Can the sciences be value free?

This area will appeal especially to those students interested in pursuing careers in philosophy, science, clinical medicine, medical research, the social sciences, science journalism, and public policy.

123. Philosophy of Logic
145. Philosophy of Science
146. Philosophy of Physics
147. Philosophy of Biology
148. Philosophy and the Environment
149. Philosophy of Psychology
150. Philosophy of Cognitive Sciences
151. Philosophy of Neuroscience
152. Philosophy of Social Science
153. Philosophy of History
163. Biomedical Ethics
164. Technology and Human Values

3. Mind, Brain, and Cognitive Sciences

Traditional epistemology (the theory of how and what we know) and philosophy of mind (the theory of that-which-perceives-and-thinks) have recently been joined by several scientific disciplines in a collective search for illuminating theories. Psychology, cognitive neurobiology, computer science, and sociology have all made explosive contributions to a tradition as old as Plato and Aristotle. For example, our growing understanding of the biological brain has given new life to our traditional attempts to understand the nature of the mind. New accounts of the various mechanisms of cognition—both at the cellular and the social levels—have provided entirely new

perspectives on the nature of consciousness, the self, knowledge and free will, and on the nature of science itself.

This area is excellent preparation for careers in cognitive science, neuroscience, artificial intelligence, science journalism, and philosophy.

132. Epistemology
134. Philosophy of Language
136. Philosophy of Mind
145. Philosophy of Science
147. Philosophy of Biology
149. Philosophy of Psychology
150. Philosophy of Cognitive Sciences
151. Philosophy of Neuroscience
180. Phenomenology

4. Historical Perspectives on Philosophy, Science, and Religion

Throughout its history, philosophy has developed in a complex relationship with the natural sciences and religion. Philosophical ideas have both contributed to and challenged our understanding of nature and God, and developments in the sciences and religion have posed new challenges for philosophical thinking. The historical perspectives emphasis focuses on the fertile interplay between philosophy, science, and religion in several key periods: ancient Greece, the Scientific Revolution, and Enlightenment and post-Enlightenment Europe. The aim is not simply to document the history of philosophical ideas, but to use this history as a way of better understanding contemporary debates about the basic questions of human life.

This area prepares students for postgraduate work in philosophy, and for any career that requires breadth of knowledge, intellectual flexibility, as well as communicative and analytical skills.

100. Plato
101. Aristotle
102. Hellenistic Philosophy
104. The Rationalists
105. The Empiricists
106. Kant
107. Hegel
108. Nineteenth-Century Philosophy
109. History of Analytic Philosophy
161. Topics in the History of Ethics
166. Classics in Political Philosophy
180. Phenomenology
181. Existentialism
183. Topics in Continental Philosophy

GRADE RULES FOR MAJORS/MINORS

All courses applied toward the major or minor must be completed with a grade of C– or higher. Further, a GPA of 2.0 must be maintained in courses applied toward the major or minor. It should be noted that courses taken under the Pass/Not-Pass (P/NP) grading option cannot be applied toward the major or minor.

HONORS PROGRAM

The philosophy department offers an honors program for outstanding students in the major. Majors who have a 3.7 GPA in philosophy (3.25 overall) at the end of their junior year and who have taken at

least four upper-division philosophy courses are eligible to apply. Interested students must consult with a faculty sponsor by the last day of classes during the spring term of their junior year. Admission to the honors program requires nomination by a faculty sponsor and approval of the undergraduate advisor. Nominating Petitions can be obtained from the philosophy department.

In addition to the usual major requirements, an honors student is required to complete a senior honors thesis by the end of winter quarter. During the fall and winter quarters, the student will be registered for Philosophy 191A and 191B and will be engaged in thesis research that will be supervised and evaluated by the student's faculty sponsor. A departmental committee will read and assess the completed thesis and determine if philosophy honors are to be awarded. Honors students are expected to maintain an average of 3.7 or better for all work taken in the program. (Qualified students wishing to participate in the honors program according to a different timetable than the one described above can apply to do so by petitioning the undergraduate advisor.)

TRANSFER CREDIT

Courses taken at other institutions may be applied toward the major by petition only. Petitions should be submitted to the Department of Philosophy main office, and must be accompanied by supporting materials (transcripts, syllabi, course work, etc.). Students are required to submit one petition per transfer course.

For specific regulations regarding transfer credit for Philosophy 10 (Introduction to Logic), please see the information on the department Web site: <http://philosophy.ucsd.edu>.

It is important to note that seven of the twelve upper-division courses in the major must be taken in the Department of Philosophy at UC San Diego.

Note: All courses applied toward major must be taken for a letter grade.

UNDERGRADUATE PROGRAM—MINOR

The Department of Philosophy offers a minor in philosophy. As with the major, the minor is an attractive option for a wide range of career paths, including medicine, law, research in the natural and social sciences, journalism, education, and government. A minor requires a total of seven philosophy courses, at least five of which must be upper division. If choosing an area of emphasis, at least four upper-division courses must be from the chosen area of emphasis. All courses must be taken for a letter grade, C– or better.

ADVISING OFFICE

Students who desire additional information concerning our course offerings or program may contact individual faculty or the assistant director of the undergraduate program through the department main office at 7002 H&SS, (858) 534-3070.

OFFICE:
7002 Humanities and Social Sciences Building
Muir College
<http://philosophy.ucsd.edu>

GRADUATE PROGRAM REQUIREMENTS

The department offers programs leading to the M.A. and Ph.D. It is the intention of the graduate program to enable the student to obtain an understanding of diverse traditions and to develop as a philosopher in his or her own right. To this end, the department offers courses and seminars in the history of philosophy and in traditional and contemporary philosophical issues, from a variety of perspectives.

DOCTORAL DEGREE PROGRAM

COURSE WORK

Over the first two years, students will normally take at least three courses per quarter, of which at least two are philosophy seminars (numbered 200–285). The balance may be made up from additional graduate courses in philosophy, up to two independent studies in philosophy, upper-division courses in philosophy (those numbered 100–199), approved upper-division or graduate courses in related departments, and, if the student is a teaching assistant, Philosophy 500 Apprentice Teaching. In any case, before advancing to candidacy, students must have completed fourteen graduate seminars, twelve of which are graduate philosophy seminars.

PROSEMINAR

In fall quarter of their first year of residence, graduate students will take a proseminar designed to introduce them to philosophical methods and improve their skills at writing and analysis. Enrollment in the proseminar is limited to first-year students. The proseminar may be team-taught. The topics to be covered will address some central area or areas of philosophy and will vary from year to year. The proseminar is a regular four-unit seminar.

CORE COURSES

In the following areas, the department shall offer “core” or advanced introductory seminars: philosophy of mind, philosophy of language, philosophy of science, the history of philosophy, epistemology, metaphysics, ethics and political philosophy. The department shall offer at least three of these courses in each academic year. Students must take two of these core courses by the end of their second year of residence. Courses taken to satisfy this requirement may be applied toward the distribution requirement.

Core courses are not necessarily distinguished by the numbers under which they are offered, but by their content. A core course provides a point of entry into a field that is suitable for graduate students with no prior work in this area of philosophy as well as students with some background knowledge. A core course may be a general survey of a field, or alternatively may take up some central, relatively nonspecialized topic. (Though core courses are intended to provide students with an entry point into particular philosophical topics, students are welcome to supplement the graduate core courses with upper-division undergraduate philosophy courses (those numbered 100–199), which are often organized as surveys.) A core course may offer students the option of writing shorter papers rather

than one long seminar paper; in some cases a final examination may be offered. The decision whether to count a course as core will be made by the instructor in consultation with the graduate advisor.

DISTRIBUTION REQUIREMENTS

Before advancing to candidacy students must have completed, nine graduate seminars in philosophy (in addition to the proseminar) distributed across the subfields of philosophy listed below. Students must take three seminars in the history of philosophy, including one in ancient philosophy and one in modern philosophy), two seminars in two other areas, and at least one seminar in every area

1. History of Philosophy

2. Philosophy of Science
3. Philosophy of Mind and Philosophy of Language
4. Ethics and Political Philosophy
5. Metaphysics and Epistemology

Courses used to satisfy a requirement in one category cannot be used to satisfy a requirement in another category. The determination as to what category or categories a particular seminar taught in a given quarter may count toward is normally made by the seminar instructor.

LOGIC REQUIREMENT

In their first year of residence, all graduate students must demonstrate proficiency in basic formal logic (the predicate calculus, up to and including functions, relations, and identity) either by passing an examination in this material (normally offered each fall and often in spring) or by taking Philosophy 120 (Symbolic Logic) during their first year of study and achieving a grade of B+ or better. By the end of their second year of residence, all students must pass an advanced logic course (Philosophy 122, 123, 126, 222, or another logic class approved by the graduate advisor).

THIRD YEAR ESSAY REQUIREMENT

During the third year each student shall write an original research essay of about 7,500–9,000 words under the supervision of the student’s third-year committee, which is responsible for determining that the research essay meets the necessary standards of philosophical sophistication. The intent of the requirement is to demonstrate that the student has acquired the skills necessary for exploring a philosophical problem and addressing it in a polished essay that is more substantial and sustained than is typical in the writing of papers for graduate seminars. It is intended that the student will complete this requirement during his or her third year of residence; in any case, the student must satisfy this requirement before advancing to candidacy.

RESEARCH SKILLS REQUIREMENT

Before advancing to candidacy, students will normally be required to demonstrate competence in a skill outside philosophy but relevant to his or her dissertation research.

Which skill is appropriate will be decided by the student in consultation with his or her first- or second-year advisors and the graduate advisor.

Examples of ways in which students may satisfy the skills requirement include demonstrating competence in a foreign language relevant to their research (e.g., Classical Greek, Latin, French, or German, for students working in the history of philosophy); passing three upper-division undergraduate or graduate-level courses in biology, physics, mathematics, or linguistics (for students working in the philosophy of biology, physics, mathematics, or language); passing three upper-division undergraduate or graduate-level courses in political science, economics or sociology (for students working in political philosophy or ethics). Undergraduate courses taken must be passed with a grade of B+ or better.

Specific decisions about the satisfaction of this requirement will be made on a case-by-case basis by the graduate advisor and the student’s advisors, and will be made on grounds of the intellectual relevance of the proposed research skill and the needs of the student.

INDEPENDENT STUDY COURSES

Philosophy 290 (Directed Independent Study) is appropriate for a graduate student still in the process of fulfilling course requirements for the degree. However, this course will not normally be approved for students in the first year of the program, and will not normally count toward the satisfaction of distribution requirements.

Philosophy 295 (Research Topics) is an appropriate course for a student in the process of working towards a dissertation prospectus.

Philosophy 299 (Thesis Research) is appropriate for a student working on his or her dissertation.

TEACHING REQUIREMENTS

Participation in undergraduate teaching is one of the requirements for a Ph.D. in philosophy. Students are required to serve as a teaching assistant for (at a minimum) the equivalent of one-quarter time (ten hours per week) for three academic quarters. The duties of a teaching assistant normally entail grading papers and examinations, conducting discussion sections, and related activities, including attendance at lectures in the course for which he or she is assisting.

DISSERTATION PROSPECTUS AND ORAL CANDIDACY EXAM

Sometime after completing the distribution requirements, the student must submit a dissertation prospectus to his or her doctoral committee. The committee will then orally examine the student on the intended subject and plan of research. The examination will seek to establish that the thesis proposed is a satisfactory subject of research and that the student has the preparation and the abilities necessary to complete that research. This oral qualifying exam must be passed before the end of the fourth year of study (twelfth quarter of residence). Students who are passed and have met the other requirements will be advanced to candidacy for the Ph.D.

DOCTORAL DISSERTATION

Under the supervision of a doctoral committee, each candidate will write a dissertation demonstrating a capacity to engage in original and independent

research. The candidate will defend the thesis in an oral examination by the doctoral committee.

ACADEMIC ADVISING

First and Second Year Academic Advising

After consultation with the graduate advisor, each entering student will be assigned a faculty advisor. Students are encouraged to meet with their faculty advisors once a quarter during their first two years to plan their course of study and review their progress in the program. Students may change their faculty advisor after one has been assigned. Advising duties will shift to the third-year committee in the student's third year of study, and then to the dissertation committee once the student begins the dissertation.

Third Year Academic Advising

At the end of the student's second year of study, the department will appoint a three-member faculty committee for that student. The composition of the committee will reflect the student's preferences and the area of philosophy in which the student is inclined to do dissertation work. One of the members of the committee will be designated as the committee chair, and will serve as the student's main advisor. The committee will meet, at a minimum, once in the spring of the student's second year of study, once in the fall of the student's third year, and once in the spring of the student's third year. The responsibilities of the committee include advising the student in developing a sound dissertation project, the acquisition of professional skills (possibly through the departmental professional skills workshop), and advancing to candidacy in a timely manner. The members of this third-year committee may but need not be members of the student's dissertation committee.

Professional Skills Workshop

The department will offer each year a noncredit workshop on professional skills. Topics covered may include publication strategies, the mechanics of the job market, and how to write a cv. This workshop is open to any student in the department, and all students are encouraged to attend at least once before going on the job market.

Academic Advising after Candidacy

After advancing to candidacy, the student will select a dissertation committee that will advise him or her throughout the writing of the dissertation, supply feedback on the material of the dissertation, and conduct the oral dissertation defense. The standard committee consists of five faculty members. Three of these faculty members will be from the Department of Philosophy, and one of these (who must be tenured) will be designated as the principal director of the student's dissertation. In addition to the three philosophy faculty, the dissertation committee must include at least two faculty from outside the Department of Philosophy, at least one of whom must be a tenured UC San Diego faculty member.

MASTER'S DEGREE

The UCSD Department of Philosophy does not admit students with the intention of completing their studies at the master's level. Nonetheless, Ph.D. students in the department sometimes elect to receive the master's degree in the course of their academic progress.

To qualify for a master's degree in philosophy, a student must pass eight of the distribution requirement seminars as described above, under the subheading "[Distribution Requirements](#)." No more than four seminars from any one of the five areas may count toward the master's degree. The student must also complete a master's research paper under the direction of a faculty member or his or her choice, and have it approved by two members of the department faculty.

INTERDISCIPLINARY DEGREE PROGRAMS

The philosophy department at UCSD participates in three interdisciplinary programs, the requirements for which are outlined below.

INTERDISCIPLINARY DEGREE PROGRAM IN COGNITIVE SCIENCE

The Interdisciplinary Ph.D. Program in Cognitive Science includes faculty from a number of UCSD departments including the Departments of Anthropology, Biology and Neurobiology, Cognitive Science, Communication, Computer Science and Engineering, Linguistics, Music, Neurosciences, Philosophy, Psychiatry, Psychology, and Sociology. This group includes many outstanding figures in contemporary cognitive science.

Students wishing to pursue a Ph.D. in philosophy and cognitive science register in the philosophy program in the normal fashion, but pursue a significant portion of their studies with faculty in the several departments participating in the interdisciplinary program. Students may apply for admission to the interdisciplinary program at the same time that they apply to the Department of Philosophy, or at some point after entering UCSD. (All students wishing to transfer into any interdisciplinary program must do so prior to the end of the fifth quarter of residency.)

Students in philosophy/cognitive science are required to complete all of the requirements for the Ph.D. in philosophy with the following five amendments:

1. The student must take six quarters of Cognitive Science 200.
2. The student must take the equivalent of one year's course work (usually six courses) in one or more of the other departments affiliated with the Department of Cognitive Science. (It should be noted that a philosophy graduate student who completes this requirement is deemed thereby to have satisfied the philosophy special skills requirement by gaining an approved special competency.)
3. The distribution requirement is amended as follows. Before advancing to candidacy a philosophy/cognitive science student must have completed nine graduate seminars in philosophy distributed across the areas of (A) philosophy of

science, (B) philosophy of mind and philosophy of language, (C) ethics and political philosophy, (D), epistemology and metaphysics, and (E) history of philosophy. The student must take at least one seminar from each of these five areas and at least two seminars from any four of these areas.

4. The course work requirement is amended as follows: Over the first two years, a philosophy/cognitive student will normally take at least three courses/seminars per quarter. Besides graduate seminars in philosophy and cognitive science, these may include up to two independent studies in philosophy, upper-division courses in philosophy (those numbered 100–199), approved upper-division or graduate courses in cognitive science and affiliated departments, and, if the student is a teaching assistant, Philosophy 500 (Apprentice Teaching). (It should be noted that philosophy/cognitive students who complete all the other requirements for cognitive studies and who complete the amended distribution requirement above are thereby deemed to have completed the fourteen graduate seminars required of students prior to their advancing to candidacy.)
5. A plan detailing the course of study must be approved by the Cognitive Science Program Committee. The dissertation should be interdisciplinary, reflecting the two areas of specialization.

INTERDISCIPLINARY PROGRAM IN SCIENCE STUDIES

The Science Studies Program at UCSD is committed to interdisciplinary investigations. Understanding, interpreting, and explaining the scientific enterprise demand a systematic integration of the perspectives developed within the communication of science, history of science, sociology of science, and philosophy of science. The program offers students an opportunity to work towards such integration, while receiving a thorough training at the professional level in one of the component disciplines (communications, history, sociology, philosophy).

Students enrolled in the program choose one of the component disciplines for their major field of specialist studies (for students enrolled in the Department of Philosophy, this major field is, of course, philosophy), and are required to complete minor field requirements in the others. The core of the program, however, is a year-long seminar in science studies, led by faculty from all participating departments.

Students may apply for admission to the interdisciplinary program at the same time that they apply to the Department of Philosophy, or at some point after entering UCSD. (All students wishing to transfer into any interdisciplinary program must do so prior to the end of the fifth quarter of residency.)

Students in philosophy/science studies are required to complete all of the requirements for the Ph.D. in philosophy with the following seven amendments:

1. The student must attend the Science Studies Colloquium series for his or her entire first and second years. He or she will receive course credit (course 209C) in any two quarters of his or her

- choice (once in the first year and once in the second year, with exceptions to be considered by the director of science studies). This course is taken for an S/U grade option only.
- Before defending his or her prospectus, the student must take Introduction to Science Studies I (209A), Introduction to Science Studies II (209D), and two iterations (with changed content) of the Core Seminar in Science Studies (209B). (These courses are required in addition to the proseminar in philosophy which is required of all Ph.D. students in philosophy.)
 - The student must, prior to defending his or her prospectus, take two additional science studies courses outside philosophy drawn from a list of approved courses available each year from the Science Studies Program office. (One course in one of the sciences may be substituted for one of these courses as part of an approved program of study.)
 - The distribution requirement is amended as follows. Before advancing to candidacy, a philosophy/science studies student must have completed nine seminars in philosophy distributed across the areas of (A) philosophy of science, (B) philosophy of mind and philosophy of language, (C) ethics and political philosophy, (D) metaphysics and epistemology, and (E) history of philosophy. Students must take at least one seminar from each of these five areas and at least two seminars from any four of these areas.
 - The course work requirement is amended as follows. Over the first two years, a philosophy/science studies student will normally take at least three courses/seminars per quarter. Besides graduate seminars in philosophy and science studies, these may include up to two independent studies in philosophy, upper-division courses in philosophy (those numbered 100–199), approved upper-division or graduate courses in science studies and affiliated departments, and, if the student is a teaching assistant, Philosophy 500 (Apprentice Teaching). (It should be noted that philosophy/science studies students who complete all the other requirements for science studies and who complete the amended distribution requirements for philosophy are thereby deemed to have completed the fourteen graduate seminars required of students prior to their advancing to candidacy.)
 - The student's program of study must be approved by the Department of Philosophy faculty advisor for science studies.
 - At least two internal members and at least one external member of the student's dissertation committee should be faculty of the Science Studies Program. Exceptions to this policy require permission from the director of the Science Studies Program.

DUAL DEGREE PROGRAM WITH UNIVERSITY OF SAN DIEGO LAW SCHOOL

Students pursuing the Ph.D. in philosophy at UCSD can also pursue a degree at the University of San Diego (USD) School of Law, either the J.D.

(normally a three-year degree) or the M.S.L.S. (a one-year master's degree). Students must be admitted independently to the two programs and must complete the requirements for both programs. Once admitted to both programs, the expectation is that students would first complete their first two years of Ph.D. course work and any associated qualifying exams at UCSD. They can then take a leave from the UCSD program, freezing their clock here, to complete the appropriate course work at USD. For their M.S.L.S. degree, this will require a one-year leave, while for their J.D. degree this will require two years leave. While on leave, students would not be eligible for financial aid from UCSD. Students would then return to UCSD to complete their Ph.D., drawing on their combined training here and at USD in their thesis research, and getting advice on their research from faculty at both universities. Each program will make specific arrangements to grant some course credit toward their degrees for courses taken at the other university. The expectation is that students will pursue dual degrees serially, rather than concurrently, and that the UCSD clock will stop while students are enrolled at USD. Consequently, in the normal course of events the UCSD Department of Philosophy sees no special need for extending time limits on advancing to candidacy, years of support, or time toward the degree. However, exceptional cases can be handled by petition.

PH.D. TIME LIMIT POLICIES

Students must be advanced to candidacy by the end of four years. The department's normative time to graduation is six years. Total university support cannot exceed seven years. Total registered time at UCSD cannot exceed eight years.

APPLICATION REQUEST

For information regarding the graduate program call (858) 534-6809 or write to

University of California, San Diego
Graduate Advisor, Philosophy
9500 Gilman Dr. # 0119
La Jolla, CA 92093-0119

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

1. Introduction to Philosophy (4)

A general introduction to some of the fundamental questions, texts, and methods of philosophy. Multiple topics will be covered, and may include the existence of God, the nature of mind and body, free will, ethics and political philosophy, knowledge and skepticism.

10. Introduction to Logic (4)

Basic concepts and techniques in both informal and formal logic and reasoning, including a discussion of argument, inference, proof, and common fallacies, and an introduction to the syntax, semantics, and proof method in sentential (propositional) logic. (May be used to fulfill general-education requirements for Warren and Eleanor Roosevelt Colleges.)

12. Logic and Decision Making (4)

An introduction to the study of probability, inductive logic, scientific reasoning, and rational choice among competing hypotheses and alternative courses of action when the evidence is incomplete or uncertain. (May be used to fulfill general-education requirements for Marshall, Warren, and Eleanor Roosevelt Colleges.)

13. Introduction to Philosophy: Ethics (4)

An inquiry into the nature of morality and its role in personal or social life by way of classical and/or contemporary works in ethics. (May be used to fulfill general-education requirements for Muir and Marshall Colleges.)

14. Introduction to Philosophy: The Nature of Reality (4)

A survey of central issues and figures in the Western metaphysical tradition. Topics include the mind-body problem, freedom and determinism, personal identity, appearance and reality, and the existence of God.

15. Introduction to Philosophy: Knowledge and Its Limits (4)

A study of the grounds and scope of human knowledge, both commonsense and scientific, as portrayed in the competing traditions of Continental rationalism, British empiricism, and contemporary cognitive science.

25. Science, Philosophy, and the Big Questions (4)

An inquiry into fundamental questions at the intersection of science and philosophy. Topics can include Einstein's universe; scientific revolutions; the mind and the brain.

26. Science, Society, and Values (4)

An exploration of the interaction between scientific theory and practice on the one hand, and society and values on the other. Topics can include the relationship between science and religion, global climate change, DNA, medicine, and ethics.

27. Ethics and Society (4)

(Same as Poli. Sci. 27.) An examination of ethical principles (e.g., utilitarianism, individual rights, etc.) and their social and political applications to contemporary issues: abortion, environmental protection, and affirmative action. Ethical principles will also be applied to moral dilemmas in government, law, business, and the professions. Satisfies the Warren College ethics and society requirement. Letter grade only. **Prerequisites:** CAT 2 and 3, DOC 2 and 3, MCWP 40 and 50, Hum. 1 and 2, MMW 2 and 3, WCWP 10A-B or WCWP 11A-B.

28. Ethics and Society II (4)

(Same as Poli. Sci. 28.) An examination of a single set of major contemporary social, political, or economic issues (e.g., environmental ethics, international ethics) in light of ethical and moral principles and values. Warren College students must take course for a letter grade in order to satisfy the Warren College general-education requirement. **Prerequisite:** Phil./Poli. Sci. 27.

31. Introduction to Ancient Philosophy (4)

A survey of classical Greek philosophy with an emphasis on Socrates, Plato and Aristotle, though some consideration may be given to Presocratic and/or Hellenistic philosophers.

32. History of Philosophy: Philosophy and the Rise of Modern Science (4)

Beginning with the contrast between medieval and early modern thought, the course focuses on the relation of seventeenth-century philosophy and the emergence of modern natural science. Figures to be studied include Bacon, Galileo, Descartes, Hobbes, Leibniz, and Newton.

33. History of Philosophy: Philosophy between Reason and Despair (4)

Introduction to nineteenth-century philosophy, focusing on skepticism about the authority of reason to answer questions about the ultimate meaning and value of human life. Figures discussed may include Kant, Schopenhauer, Kierkegaard, Nietzsche, and James.

87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments

and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

90. Basic Problem in Philosophy (4)

An investigation of a selected philosophical topic through readings, discussions, and written assignments. (May be taken for credit twice, when topics vary.)

UPPER-DIVISION

100. Plato (4)

A study of Socrates and/or Plato through major dialogues of Plato. Possible topics include the virtues and happiness; weakness of the will; political authority and democracy; the theory of Forms and sensible flux; immortality; relativism, skepticism, and knowledge. May be repeated for credit with change of content and approval of instructor. **Prerequisite:** upper-division standing or consent of instructor.

101. Aristotle (4)

A study of major issues in Aristotle's works, such as the categories; form and matter; substance, essence, and accident; the soul; virtue, happiness, and politics. **Prerequisite:** upper-division standing or consent of instructor.

102. Hellenistic Philosophy (4)

A study of selected texts from the main schools of Hellenistic philosophy—Stoicism, Epicureanism, and Skepticism. **Prerequisite:** upper-division standing or consent of instructor.

104. The Rationalists (4)

The major writings of one or more of the seventeenth-century rationalists—Descartes, Spinoza, and Leibniz. Topics include the existence of God, the mind-body problem, free will, the nature of knowledge, belief, and error. May be repeated for credit with change of content and approval of instructor. **Prerequisite:** upper-division standing or consent of instructor.

105. The Empiricists (4)

The major writings of one or more of the British empiricists—Locke, Berkeley, Hume, and Reid. May be repeated for credit with change of content and approval of instructor. **Prerequisite:** upper-division standing or consent of instructor.

106. Kant (4)

A study of selected portions of the Critique of Pure Reason and other theoretical writings and/or his major works in moral theory. **Prerequisite:** Philosophy 33 or 105 or consent of instructor. May be repeated for credit with change in content and approval of the instructor.

107. Hegel (4)

A study of one or more of Hegel's major works, in particular, The Phenomenology of Spirit and The Philosophy of Right. Readings and discussion may also include other figures in the Idealist tradition—such as Fichte, Hölderlin, and Schelling—and critics of the Idealist tradition—such as Marx and Kierkegaard. **Prerequisite:** upper-division standing or consent of instructor.

108. Nineteenth-Century Philosophy (4)

A study of one or more figures in nineteenth-century philosophy, such as Schopenhauer, Nietzsche, Kierkegaard, Marx, Emerson, Thoreau, James, and Mill. The focus may be on particular figures or intellectual themes and traditions. May be repeated for credit with change of content and approval of instructor. **Prerequisite:** upper-division standing or consent of instructor.

109. History of Analytic Philosophy (4)

Central texts, figures, and traditions in analytic philosophy. Figures may include Frege, Russell, Wittgenstein, Carnap, Moore, Austin, Tarski, Quine, Davidson, Kripke, and Putnam. May be repeated for credit with change of content and approval of the instructor. **Prerequisite:** upper-division standing or consent of instructor.

115. Philosophical Methods Seminar (4)

This course provides an introduction to the techniques of philosophical inquiry through detailed study of selected philosophical texts and through extensive training in philosophical writing based on those texts. Enrollment

limited and restricted to majors; must be taken for letter grade. May not be repeated for credit. **Prerequisite:** open to philosophy majors only.

120. Symbolic Logic I (4)

The syntax, semantics, and proof-theory of first-order predicate logic with identity, emphasizing both conceptual issues and practical skills (e.g., criteria for logical truth, consistency, and validity, the application of logical methods to everyday as well as scientific reasoning). **Prerequisite:** Philosophy 10 or consent of instructor.

122. Topics in Logic (4)

A study of new, extended, or alternative logics and/or special issues in meta-logic. Topics include the nature of logic, modal logic, higher-order logic, generalized logic, free logic, the Löwenheim-Skolem theorem, the incompleteness of arithmetic, undecidability. May be repeated for credit with change in content and approval of instructor. **Prerequisite:** Philosophy 120 (and for advanced topics: Philosophy 121) or consent of instructor.

123. Philosophy of Logic (4)

Philosophical issues underlying standard and non-standard logics, the nature of logical knowledge, the relation between logic and mathematics, the revisability of logic, truth and logic, ontological commitment and ontological relativity, logical consequence, etc. May be repeated for credit with change in content and approval of instructor. **Prerequisite:** Philosophy 120 or consent of instructor.

124. Philosophy of Mathematics (4)

The character of logical and mathematical truth and knowledge; the relations between logic and mathematics; the significance of Gödel's incompleteness theorem; Platonism, logicism, and more recent approaches. **Prerequisite:** Philosophy 120 or consent of instructor.

125. Games and Decisions (4)

Formal and philosophical issues in the theory of games and the theory of rational decision. **Prerequisite:** Philosophy 12 or consent of instructor.

126. Topics in the History of Logic (4)

Problems and figures in history of logic. Subject matter varies, in some cases a single author or text (e.g., Aristotle, The Port Royal Logic, Leibniz, Kant, Frege, Tarski), in other a particular tradition or problem (e.g., Hilbert's Program, intuitionism, quantification, logicism and psychologism, modality). **Prerequisite:** Philosophy 120 or consent of instructor.

130. Metaphysics (4)

Central problems in metaphysics, such as free will and determinism, the mind-body problem, personal identity, causation, primary and secondary qualities, the nature of universals, necessity, and identity. **Prerequisite:** upper-division standing or consent of instructor.

131. Topics in Metaphysics (4)

An in-depth study of some central problem, figure, or tradition in metaphysics. May be repeated for credit with change of content and approval of instructor. **Prerequisite:** upper-division standing or consent of instructor.

132. Epistemology (4)

Central problems in epistemology such as skepticism; a priori knowledge; knowledge of other minds; self-knowledge; the problem of induction; foundationalist, coherence, and causal theories of knowledge. **Prerequisite:** upper-division standing or consent of instructor.

134. Philosophy of Language (4)

Examination of contemporary debates about meaning, reference, truth, and thought. Topics include descriptivist theories of reference, sense and reference, compositionality, truth, theories of meaning, vagueness, metaphor, and natural and formal languages. **Prerequisite:** upper-division standing or consent of instructor.

136. Philosophy of Mind (4)

Different conceptions of the nature of mind and its relation to the physical world. Topics include identity theories, functionalism, eliminative materialism, internalism and externalism, subjectivity, other minds, consciousness, self-knowledge, perception, memory, and imagination.

Prerequisite: upper-division standing or consent of instructor.

137. Philosophy of Action (4)

The nature of action and psychological explanation. Topics include action individuation, reasons as causes, psychological laws, freedom and responsibility, weakness of will, self-deception, and the emotions. **Prerequisite:** upper-division standing or consent of instructor.

145. Philosophy of Science (4)

Central problems in philosophy of science, such as the nature of confirmation and explanation, the nature of scientific revolutions and progress, the unity of science, and realism and antirealism. **Prerequisite:** upper-division standing or consent of instructor.

146. Philosophy of Physics (4)

Philosophical problems in the development of modern physics, such as the philosophy of space and time, the epistemology of geometry, the philosophical significance of Einstein's theory of relativity, the interpretation of quantum mechanics, and the significance of modern cosmology. **Prerequisite:** upper-division standing or consent of instructor.

147. Philosophy of Biology (4)

Philosophical problems in the biological sciences, such as the relation between biology and the physical sciences, the status and structure of evolutionary theory, and the role of biology in the social sciences. **Prerequisite:** upper-division standing or consent of instructor.

148. Philosophy and the Environment (4)

Investigation of ethical and epistemological questions concerning our relationship to the environment. Topics may include the value of nature, biodiversity, policy and science, and responsibility to future generations. **Prerequisite:** upper-division standing or consent of instructor.

149. Philosophy of Psychology (4)

Philosophical issues raised by psychology, including the nature of psychological explanation, the role of nature versus nurture, free will and determinism, and the unity of the person. **Prerequisite:** upper-division standing or consent of instructor.

150. Philosophy of the Cognitive Sciences (4)

Theoretical, empirical, methodological, and philosophical issues at work in the cognitive sciences (e.g., Psychology, Linguistics, Neuroscience, Artificial Intelligence, and Computer Science), concerning things such as mental representation, consciousness, rationality, explanation, and nativism. **Prerequisite:** upper-division standing or consent of instructor.

151. Philosophy of Neuroscience (4)

An introduction to elementary neuroanatomy and neurophysiology and an examination of theoretical issues in cognitive neuroscience and their implications for traditional philosophical conceptions of the relation between mind and body, perception, consciousness, understanding, emotion, and the self. **Prerequisite:** upper-division standing or consent of instructor.

152. Philosophy of Social Science (4)

Philosophical issues of method and substance in the social sciences, such as causal and interpretive models of explanation, structuralism and methodological individualism, value neutrality, and relativism. **Prerequisite:** upper-division standing or consent of instructor.

157. History of Philosophy: Ancient (4)

An examination of ancient Greek philosophy, focusing on major works of Plato and Aristotle. It is recommended that Phil. 157, Phil. 158, and Phil. 159 be taken in order. **Prerequisites:** upper-division standing and department stamp, or consent of instructor.

158. History of Philosophy: Early Modern (4)

An examination of seventeenth- and eighteenth-century philosophy, focusing on major works of Descartes, Locke, and Hume. It is recommended that Phil. 157, Phil. 158, and Phil. 159 be taken in order. **Prerequisites:** upper-division standing and department stamp, or consent of instructor.

159. History of Philosophy: Late Modern

An examination of late eighteenth-century philosophy, focusing on major works of Kant and Hegel. It is recommended that Phil. 157, Phil. 158, and Phil. 159 be taken in order. **Prerequisites:** upper-division standing and department stamp, or consent of instructor.

160. Ethical Theory (4)

Systematic and/or historical perspectives on central issues in ethical theory such as deontic, contractualist, and consequentialist conceptions of morality; rights and special obligations; the role of happiness and virtue in morality; moral conflict; ethical objectivity and relativism; and the rational authority of morality. **Prerequisite:** upper-division standing or consent of instructor.

161. Topics in the History of Ethics (4)

Central issues and texts in the history of ethics. Subject matter can vary, ranging from one philosopher (e.g., Aristotle, Hobbes, Kant, or Mill) to a historical tradition (e.g., Greek ethics or the British moralists). May be repeated for credit with change in content and approval of instructor. **Prerequisite:** upper-division standing or consent of instructor.

162. Contemporary Moral Issues (4)

An examination of contemporary moral issues, such as abortion, euthanasia, war, affirmative action, and freedom of speech. **Prerequisite:** upper-division standing or consent of instructor.

163. Biomedical Ethics (4)

Moral issues in medicine and the biological sciences, such as patient's rights and physician's responsibilities, abortion and euthanasia, the distribution of health care, experimentation, and genetic intervention. **Prerequisite:** upper-division standing or consent of instructor.

164. Technology and Human Values (4)

Philosophical issues involved in the development of modern science, the growth of technology, and control of the natural environment. The interaction of science and technology with human nature and political and moral ideals. **Prerequisite:** upper-division standing or consent of instructor.

166. Classics in Political Philosophy (4)

Central issues about the justification, proper functions, and limits of the state through classic texts in the history of political philosophy by figures such as Plato, Aristotle, Hobbes, Locke, Rousseau, Mill, and Marx. **Prerequisite:** upper-division standing or consent of instructor.

167. Contemporary Political Philosophy (4)

Different perspectives on central issues in contemporary political philosophy, such as the nature of state authority and political obligation, the limits of government and individual liberty, liberalism and its critics, equality and distributive justice. **Prerequisite:** upper-division standing or consent of instructor.

168. Philosophy of Law (4)

A study of issues in analytical jurisprudence such as the nature of law, the relation between law and morality, and the nature of legal interpretation and issues in normative jurisprudence such as the justification of punishment, paternalism and privacy, freedom of expression, and affirmative action. **Prerequisite:** upper-division standing or consent of instructor.

170. Philosophy and Race (4)

A philosophical investigation of the topics of race and racism. The role of "race" in ordinary speech. The ethics of racial discourse. Anthropological and biological conceptions of race. The social and political significance of racial categories. Post-racialist conceptions of race. **Prerequisite:** upper-division standing or consent of instructor.

175. Aesthetics (4)

Central issues in philosophical aesthetics such as the nature of art and aesthetic experience, the grounds of artistic interpretation and evaluation, artistic representation, and the role of the arts in education, culture, and politics. **Prerequisite:** upper-division standing or consent of instructor.

177. Philosophy and Literature (4)

A study of philosophical themes contained in selected fiction, drama, or poetry, and the philosophical issues that arise in the interpretation, appreciation, and criticism of literature. **Prerequisite:** upper-division standing or consent of instructor.

180. Phenomenology (4)

An examination of the phenomenological tradition through the works of its major classical and/or contemporary representatives. Authors studied will vary and may include Brentano, Husserl, Heidegger, Merleau-Ponty, Levinas, Bourdieu. **Prerequisite:** upper-division standing or consent of instructor.

181. Existentialism (4)

Classical texts and issues of existentialism. Authors studied will vary and may include Nietzsche, Kierkegaard, Sartre, and Heidegger. **Prerequisite:** upper-division standing or consent of instructor.

183. Topics in Continental Philosophy (4)

The focus will be on a leading movement in continental philosophy (e.g., the critical theory of the Frankfurt school, structuralism and deconstruction, post-modernism) or some particular issue that has figured in these traditions (e.g., freedom, subjectivity, historicity, authenticity). May be repeated for credit with change in content and approval of instructor. **Prerequisite:** upper-division standing or consent of instructor.

185. Philosophy of Religion (4)

A general introduction to the philosophy of religion through the study of classical and/or contemporary texts. Among the issues to be discussed are the existence and nature of God, the problem of evil, the existence of miracles, the relation between reason and revelation, and the nature of religious language. **Prerequisite:** upper-division standing or consent of instructor.

191A. Philosophy Honors (4)

Independent study by special arrangement with and under the supervision of a faculty member, including a proposal for the honors essay. An IP grade will be awarded at the end of this quarter; a final grade will be given for both quarters at the end of 191B. **Prerequisites:** department stamp; consent of instructor.

191B. The Honors Essay (4)

Continuation of 191A: independent study by special arrangement with and under the supervision of a faculty member, leading to the completion of the honors essay. A letter grade for both 191A and 191B will be given at the end of this quarter. **Prerequisite:** consent of instructor.

192. Senior Seminar (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in PHIL (at the upper-division level). Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** upper-division standing; department stamp and/or consent of instructor.

195. Introduction to Teaching Philosophy (4)

Under the supervision of the instructor, student will lead one discussion section of a lower-division philosophy class. The student must attend the lecture for the class and meet regularly with the instructor. Applications are available in the Department of Philosophy. **Prerequisites:** consent of instructor and department chair, G.P.A. of 3.0 or higher, over ninety units.

199. Directed Individual Study (4)

Directed individual study by special arrangement with and under the supervision of a faculty member. (P/NP grades only.) **Prerequisite:** consent of instructor.

GRADUATE COURSES**200. Proseminar (4)**

Introduction to philosophical methods of analysis through study of classic historical or contemporary texts. Writing intensive. Enrollment limited to entering graduate students.

201A. Core Course in History (4)

A study of selected texts or topics in the history of philosophy. Usually the focus will be on a single major text. May be taken for credit nine times with changed content.

202. Core Course in Ethics (4)

An introduction to some central issues in ethical theory with emphasis on classic texts or contemporary authors. May be taken for credit three times with changed content.

204A. Core Course in Philosophy of Science (4)

An introduction to one or more central problems in the philosophy of science, or in the philosophy of one of the particular sciences, such as the nature of confirmation and explanation, the nature of scientific knowledge, reductionism, the unity of science, or realism and antirealism. May be taken for credit three times with changed content.

205A. Core Course in Metaphysics (4)

An introduction to central topics in metaphysics with emphasis on classic texts or contemporary authors. May be taken for credit three times with changed content.

206A. Core Course in Epistemology (4)

An introduction to central topics in epistemology with emphasis on classic texts or contemporary authors. May be taken for credit three times with changed content.

209A. Introduction to Science Studies (4)

Study and discussion of classic work in history of science, philosophy of science, and of work that attempts to develop a unified science studies approach. Required of all students in the Science Studies Program.

209B. Seminar in Science Studies (4)

Study and discussion of selected topics in the science studies field. Required of all students in the Science Studies Program. The topic varies from year to year and students may, therefore, repeat the course for credit. May be taken for credit three times with changed content.

209C. Colloquium in Science Studies (4)

A forum for the presentation and discussion of research in progress in science studies, by graduate students, faculty, and visitors. May be taken for credit two times with changed content.

209D. Advanced Approaches to Science Studies (4)

Contemporary themes and problems in science studies. Focus on recent literature in the history, philosophy, and sociology of science, technology, and medicine.

210. Greek Philosophy (4)

A study of selected texts or topics from the history of Greek philosophy. Usually centers on works by Plato or Aristotle. May be taken for credit six times with changed content.

214. Early Modern Philosophy (4)

A study of selected texts or topics from philosophers of the sixteenth and seventeenth centuries, Descartes, Spinoza, Leibniz, or Locke. May be taken for credit six times with changed content.

215. Eighteenth-Century Philosophy (4)

A study of selected texts or topics from philosophers of the eighteenth century: for example, Kant or Hume. May be taken for credit six times with changed content.

218. Contemporary Analytical Philosophy (4)

A study of the historical development of the analytical movement, with emphasis on major texts. May be taken for credit six times with changed content.

222. Philosophy of Logic (4)

A study of selected issues in the philosophy of logic. The focus may be on contemporary texts or historical works or both. May be taken for credit six times with changed content.

230. Metaphysics (4)

Topics may include identity, personal identity, universals and particulars, modality and possible worlds, causation, reduction, supervenience, freedom and determinism, space and time, and realism versus antirealism. May be taken for credit six times with changed content.

232. Epistemology (4)

This seminar will cover issues such as rival accounts of knowledge, justification, and warrant, traditional and

contemporary perspectives on empiricism, rationalism, and pragmatism, and skepticism. May be taken for credit six times with changed content.

234. Philosophy of Language (4)

Central issues in contemporary philosophy of language, such as the nature of linguistic meaning, truth, content, reference, the syntax and semantics of various linguistic constructions, presupposition, speech acts, the epistemology of language understanding and language learning, the mental/psychological basis of linguistic understanding and use. May be taken for credit six times with changed content.

236. Philosophy of Mind (4)

Contemporary debates on the nature, function, and operation of the mental. May include questions about the mind-body relation, mental causation, perception, consciousness, and mental representation. May be taken for credit six times with changed content.

245. Philosophy of Science (4)

This seminar will cover current books and theoretical issues in the philosophy of science. May be taken for credit seven times with changed content.

246. Philosophy of Physics (4)

Systematic problems and historical and contemporary perspectives on foundational issues in physics. May include issues in the philosophy of space and time, the interpretation of relativity theory and quantum mechanics, or the foundations of statistical mechanics and probability. May be taken for credit six times with changed content.

Prerequisite: graduate standing or consent of instructor.

247. Philosophy of Biology (4)

Historical and contemporary perspectives on foundational issues about biology. May include questions about the nature of biological explanation, the relation of biology to chemistry and physics, the status of attributions of function, and the relation of biology to the social sciences. May be taken for credit six times with changed content.

250A. Philosophy of the Cognitive Sciences (4)

Contemporary debates about the study of the mind-brain as studied in one or more of the empirical cognitive sciences. May include questions about the different strategies of explanation invoked, the conceptions of representation employed, the connections between theoretical models developed. May be taken for credit six times with changed content.

260. Ethics (4)

Topics may include metaethics (e.g., the semantics, metaphysics, epistemology, and normativity of ethics), consequentialism and deontology, moral psychology (e.g., freedom, responsibility, and weaknesses of will), or substantive moral problems. The approach may be systematic, historical, or both. May be taken for credit six times with changed content.

267. Political Philosophy (4)

Topics may include the nature and limits of state authority, liberty and equality, distributive justice, liberalism and its critics (e.g., feminists, libertarians, and others), or issues in jurisprudence. The focus may be on classic texts or contemporary authors. May be taken for credit six times with changed content.

276. German Translation Workshop (1-2)

This course meets weekly to provide training in reading and translating philosophical German. Students prepare in advance written translations of assigned passages. The course helps train graduate students preparing to take the Departmental German Exam. Can be taken nine times for credit with changed content.

277. Phenomenology Reading Group (1-2)

This course meets biweekly with students reading and presenting material from the phenomenological literature. The course is designed both for students doing active research in phenomenology and for those seeking to gain some familiarity with that tradition. Can be taken nine times for credit with changed content.

278. Topics and Methods in Contemporary Philosophy (1-2)

Investigation of central issues in contemporary philosophy. Content varies but typically will center on a recent and important philosophical book. Can be taken nine times for credit with changed content.

279. Experimental Philosophy Laboratory (1-2)

A weekly forum of presentations, EPL provides a wider range of content than a traditional seminar. Content varies, but the focus is on philosophical problems of mind, representation, language and consciousness through empirical and philosophical methods. Can be taken nine times for credit with changed content.

280. Philosophy of Science Topics and Methods (1-2)

This course meets weekly to discuss recent books or articles in philosophy of science. The reading is designed both for students doing active research in the field and for those seeking to gain some familiarity with it. Can be taken nine times for credit with changed content.

281. History of Philosophy Research and Methods (1-2)

This course meets to discuss work in progress in the history of philosophy. Its aim is to introduce understanding of the methods and standards of research in the field through constructive criticism of each other's work. Can be taken nine times for credit with changed content.

282. Topics and Methods in Ethics (1-2)

Weekly or biweekly meetings to discuss recent literature in ethics, broadly construed so as to include ethical theory, normative ethics, jurisprudence, and historical traditions in these fields. The course is suitable for those specializing in ethics and for those seeking some familiarity with the field. Can be taken nine times for credit with changed content.

283. Topics and Methods in Political Philosophy (1-2)

Weekly or biweekly meetings to discuss recent literature in political philosophy and historical tradition of this field. The course is suitable for those specializing in ethics and for those seeking some familiarity with the field.

284. Philosophy of Biology Research Group (1-2)

A research group for graduate students engaged in philosophy or history of the biological sciences. The group discusses biological, historical, and philosophical articles and books and ongoing research projects. Can be taken nine times for credit with change of content. **Prerequisite:** graduate standing or consent of instructor.

285. Seminar on Special Topics (4)

Focused examination of specific problems or themes in some area of philosophy. May be taken for credit nine times with changed content.

286. Philosophy of Physics Reading Group (1-2)

A research group for graduate students engaged in philosophy or history of the physical sciences. The group discusses physical, historical, and philosophical articles and books and ongoing research projects. Can be taken nine times for credit with change of content. **Prerequisite:** graduate standing or consent of instructor.

287. Greek Reading Group (1-2)

This group provides training in reading and translating philosophical Greek by having students prepare translations of passages and lead discussions. The group helps train graduate students preparing for Departmental Greek Exam. Can be taken nine times for credit with change of content. **Prerequisite:** graduate standing or consent of instructor.

290. Directed Independent Study (4)

Supervised study of individually selected philosophical topics. S/U grades permitted.

292. Writing Workshop (1-3)

Each enrolled student produces a research essay ready for publication, presents it to students and faculty, and offers critiques of other students' presentations. Units will vary according to enrollment in course. To be taken in fall quarter of third year of philosophy graduate study.

295. Research Topics (1-12)

Advanced individual research studies under the direction of a member of the staff. Hours of outside preparation will

vary with number of units taken. May be taken for credit nine times with changed content.

299. Thesis Research (1-12)

S/U grades permitted.

500. Apprentice Teaching (1-4)

A course designed to satisfy the requirement that graduate students should serve as teaching assistants, either in the Department of Philosophy or in one of the writing programs offered by the various colleges. Each Ph.D. candidate must teach the equivalent of quarter time for three academic quarters. Students are permitted to sign up as TAs for a maximum of eighteen quarters.

Physics

PROFESSORS

Henry D. I. Abarbanel, Ph.D., *Director, Institute for Nonlinear Science*
Daniel P. Arovas, Ph.D.
Dmitri N. Bassov, Ph.D., *Vice Chair, Graduate Education*
Ami E. Berkowitz, Ph.D., *Emeritus*
James G. Branson, Ph.D.
Keith A. Brueckner, Ph.D., *Emeritus*
E. Margaret Burbidge, Ph.D., *Emeritus and Research Professor*
Leonid V. Butov, Ph.D.
Joseph C. Y. Chen, Ph.D., *Emeritus*
Patrick H. Diamond, Ph.D.
Massimiliano Di Ventra, Ph.D.
C. Fred Driscoll, Ph.D.
Daniel H. E. Dubin, Ph.D.
Robert C. Dynes, Ph.D.
George Feher, Ph.D., *Emeritus and Research Professor*
Zachary Fisk, Ph.D., *Emeritus*
Donald R. Fredkin, Ph.D., *Emeritus*
George M. Fuller, Ph.D., *Director, Center for Astrophysics and Space Sciences*
Marvin L. Goldberger, Ph.D., *Emeritus*
John M. Goodkind, Ph.D., *Emeritus and Research Professor*
Kim Griest, Ph.D., *Chancellor's Associates Faculty Award for Excellence in Undergraduate Teaching, 2002*
Benjamin Grinstein, Ph.D.
Jorge E. Hirsch, Ph.D.
Terence T-L. Hwa, Ph.D.
Kenneth A. Intriligator, Ph.D.
Elizabeth E. Jenkins, Ph.D.
Barbara Jones, Ph.D., *Emeritus*
David Kleinfeld, Ph.D.
Julius G. Kuti, Ph.D.
Herbert Levine, Ph.D.
Leonard N. Liebermann, Ph.D., *Emeritus*
Ralph H. Lovberg, Ph.D., *Emeritus*
Aneesh V. Manohar, Ph.D.
M. Brian Maple, Ph.D., *Bernd T. Matthias Endowed Chair; Director, Center for Interface and Materials Science*
Carl E. Mclwain, Ph.D., *Research Professor*
Xuong Nguyen-Huu, Ph.D., *Emeritus*
Michael L. Norman, Ph.D.
Melvin Y. Okamura, Ph.D., *Emeritus*
Thomas M. O'Neil, Ph.D.
José N. Onuchic, Ph.D., *Academic Senate Distinguished Teaching Award*
Hans P. Paar, Ph.D., *Vice Chair, Undergraduate Education*
Laurence E. Peterson, Ph.D., *Emeritus and Research Professor*
Sally K. Ride, Ph.D., *Emerita*
Ivan K. Schuller, Ph.D., *Director, Center for Advanced Nanoscience*
Sheldon Schultz, Ph.D., *Emeritus and Research Professor*
Lu J. Sham, Ph.D.
Vitali D. Shapiro, Ph.D., *Emeritus*

Vivek A. Sharma, Ph.D., *Academic Senate Distinguished Teaching Award, 2004*
Frank Shu, Ph.D., *Emeritus*
Sunil K. Sinha, Ph.D.
Harry Suhl, Ph.D., *Research Professor*
Clifford M. Surko, Ph.D.
Robert A. Swanson, Ph.D., *Emeritus*
Harold Ticho, Ph.D., *Emeritus*
David R. Tytler, Ph.D.
Wayne Vernon, Ph.D., *Emeritus and Research Professor*
Arthur M. Wolfe, Ph.D., *Chancellor's Associates Chair*
Peter S. Wolynes, Ph.D.
David Y. Wong, Ph.D., *Emeritus*
Frank Wuertwein, Ph.D.
Avraham Yagil, Ph.D.

ASSOCIATE PROFESSORS

Michael M. Fogler, Ph.D.
Alexander Groisman, Ph.D.
Brian Keating, Ph.D.
Thomas W. Murphy, Jr., Ph.D.
Paolo Padoan, Ph.D.
Douglas E. Smith, Ph.D.

ASSISTANT PROFESSORS

Adam Burgasser, Ph.D.
Alison Coil, Ph.D.
Olga Dudko, Ph.D.
Oleg Shpyrko, Ph.D.
Congjun Wu, Ph.D.

LECTURER (PSOE)

Michael G. Anderson, Ph.D.

ADJUNCT PROFESSORS

Hans Kobrak, Ph.D., *Emeritus*
Tihro Ohkawa, Ph.D.
Raj K. Pathria, Ph.D.
Ronald E. Waltz, Ph.D.

SENIOR LECTURER

Richard E. Rothschild, Ph.D., *Research Scientist, Center for Astrophysics and Space Sciences*

General Administration:
1110-113 Urey Hall Addition, Revelle College

Graduate Student Affairs:
1110-121 Urey Hall Addition

Undergraduate Student Affairs:
1110-115 Urey Hall Addition

Chair's Office:
1110-113 Urey Hall Addition

<http://physics.ucsd.edu>

The Department of Physics was established in 1960 as the first new department of the UCSD campus. Since then it has developed a strong faculty and student body with unusually diversified interests which lie primarily in the following areas:

1. Physics of elementary particles
2. Quantum liquids and superconductivity
3. Solid state and statistical physics

4. Plasma physics
5. Astrophysics and space physics
6. Atomic and molecular collision and structure
7. Biophysics
8. Geophysics
9. Nonlinear dynamics
10. Computational physics

In addition to on-campus research facilities, the high energy program uses accelerators at SLAC, CERN, and Fermi Laboratory. The astrophysics program uses facilities at Keck, Lick, and Kitt Peak Observatories.

THE UNDERGRADUATE PROGRAM

The Department of Physics offers undergraduate programs leading to the following degrees:

- B.S., Physics
- B.S., Physics with Specialization in Astrophysics
- B.S., Physics with Specialization in Biophysics
- B.S., Physics with Specialization in Computational Physics
- B.S., Physics with Specialization in Earth Sciences
- B.S., Physics with Specialization in Materials Physics
- B.A., General Physics
- B.A., General Physics/Secondary Education

A grade-point average of 2.0 or higher in the upper-division major program is required for graduation. Students must receive a grade of C- or better in any course to be counted toward fulfillment of the major requirements. In exceptional cases, students with a grade-point average in the major of 2.5 or greater may petition to have one grade of D accepted. All courses (lower- and upper-division) required for the major must be taken for a letter grade.

SHANG-KENG MA AWARD

The Department of Physics presents the Shang-keng Ma Memorial Award at commencement each year to a graduating physics student who has shown exceptional ability and promise during the UCSD undergraduate years. The award was established in 1984 to commemorate the contributions of Professor Ma to the UCSD Department of Physics and to the field of theoretical condensed matter physics.

JOHN HOLMES MALMBERG PRIZE

The John Holmes Malmberg Prize is presented annually at commencement to a graduating physics student who is recognized for potential for a career in physics and a measure of experimental inquisitiveness. This prize was established in 1993 in memory of Professor Malmberg who pioneered the use of non-neutral plasmas for sophisticated tests of plasma equilibrium, wave, and transport effects. He was an involved teacher of undergraduate and graduate students and was active in departmental and campus affairs.

PHYSICS MAJOR (B.S. DEGREE)

The physics major provides a core of basic education in several principle areas of physics, with sufficient flexibility to allow students to prepare either for graduate school or a career in industry. Since in preparing for either goal, more than the required core courses are necessary, it is important for students to meet with a physics department advisor in deciding a schedule.

In the junior year, the emphasis is on macroscopic physics; the two principal physics subjects are electromagnetism and mechanics. The mathematics and computer background required for the physics program is completed in this year.

In the senior year, a sequence of courses in quantum physics provides the student the modern view of atomic and some aspects of sub-atomic physics and the principal analytical methods appropriate in this domain. The relation of the microscopic to the macroscopic world is the subject of courses in thermodynamics and statistical physics, with illustrations drawn from gas dynamics and solid-state physics. Upper-division laboratories teach students the essentials of physical measurement and building advanced equipment, as well as other aspects of experimental science.

The following courses are required for the physics major:

Lower-Division

1. Physics 4A-B-C-D-E or Physics 2A-B-C-D1
2. Physics 2CL and 2DL
3. Chemistry 6A or 2 a programming course such as MAE 9 or MAE 10
4. Mathematics 20C-D-E-F

¹The Physics 4 series is recommended, but the Physics 2 sequence is acceptable by petition, in which case both

²Chemistry 6A and a programming course are required

Upper-Division

1. Physics 100A-B, 105A, 110A, 120A, 130A-B, 140A, and an additional laboratory course from the lab group: 120B, 121, 133, 173
2. Two courses from either the theoretical or experimental pre-grad-school sequence
Theoretical pre-grad-school sequence: Phys. 100C, 105B, 110B, 130C, 140B
Experimental pre-grad-school sequence: Phys. 100C, 110B, 120B, 130C, 140B
3. Restricted electives: Three upper-division (four-unit) or graduate courses in physics or mathematics (only one). Courses in other science disciplines may be substituted by petition.

For students wishing to prepare for graduate school it is important that all courses in either the theorist or experimentalist pre-grad-school sequence be taken. Mathematics 120A is also recommended.

Suggested Schedule (pre-graduate school)

FALL	WINTER	SPRING
JUNIOR YEAR		
Phys. 100A	Phys. 100B	Phys. 120A
Phys. 105A	Phys. elective ³	Phys. 130A
Phys. 110A	Phys. 105B2	
SENIOR YEAR		
Phys. 140A	Phys. 140B ²	Phys. lab ¹
Phys. 130B	Phys. elective ³	Phys. elective ³
WINTER		
Phys. 100B	SPRING	
Phys. elective ³	Phys. 120A	
Phys. 105B ²	Phys. 130A	
Phys. 140B ²	Phys. lab ¹	
Phys. elective ³	Phys. elective ³	

¹Any course from lab group listed above

²Any two courses from theoretical or experimental pre-grad-school sequence listed above

³Any restricted elective as described above

Suggested Schedule (career in industry)

FALL	WINTER	SPRING
JUNIOR YEAR		
Phys. 100A	Phys. 100B	[pre-grad] ⁴
Phys. 105A	Phys. elective ³	Phys. 120A
Phys. 110A	[other] ⁵	Phys. 130A
SENIOR YEAR		
Phys. 140A	[pre-grad] ⁴	Phys. elective ³
Phys. lab ²	Phys. elective ³	[other] ⁵
Phys. 130B	[other] ⁵	

²Any course from lab group listed above

³Any restricted elective as described above

⁴any course from either pre-grad-school sequence listed above

⁵any other course as approved by advisor (optional)

PHYSICS MAJOR WITH SPECIALIZATION IN ASTROPHYSICS (B.S. DEGREE)

The astrophysics specialization is appropriate for students who would like to gain an in-depth understanding of modern astronomy and astrophysics, and/or who wish to prepare for graduate school in astronomy or astrophysics. It is similar to the standard physics major with electives being chosen from astronomically oriented courses. A wide variety of technical, academic, and professional careers are possible for students who choose this specialization.

The following courses are required for the physics major with specialization in astrophysics:

Lower-Division

1. Physics 4A-B-C-D-E or Physics 2A-B-C-D¹
2. Physics 2CL and 2DL
3. Chemistry 6A or² a programming course such as MAE 9 or MAE 10
4. Mathematics 20C-D-E-F

¹The Physics 4 series is recommended, but the Physics 2 sequence is acceptable, in which case both

Chemistry 6A and a programming course are required.

Upper-Division

1. Physics 100A-B, 105A, 110A, 120A, 130A-B, 140A and an additional laboratory course from the lab group: 120B, 121, 133.

2. Two courses from either the theoretical or experimental pre-grad-school sequence.
3. It is recommended that students take the three quarter astrophysics sequence—Physics 160, 161, 162—but any three courses selected from the following list are acceptable:

Physics 160. Stellar Astrophysics

Physics 161. Compact Objects and the Milky Way

Physics 162. Galaxies and Cosmology

Physics 163. Solar System

ECE 120. Solar System Physics

Chem. 170. Cosmochemistry

SIO 130. Geodynamics of Terr. Planets

MAE 180A. Space Science and Engineering 180 A/B

Physics 223. Stellar Structure and Evolution; with consent of Instructor

Physics 224. Interstellar Medium; with consent of Instructor

Physics 226. Galaxies & Galactic Dynamics; with consent of Instructor

Physics 227. Cosmology; with consent of Instructor

Physics 228. High Energy and Compact Objects; with consent of Instructor

Theoretical pre-grad-school sequence: Phys. 100C, 105B, 110B, 130C, 140B

Experimental pre-grad-school sequence: Phys. 100C, 110B, 120B, 130C, 140B

Example Schedule

FALL	WINTER	SPRING
JUNIOR YEAR		
Phys 100A	Phys 100B	Phys 120A
Phys 105A	Phys 105B ¹	Phys 130A
Phys 110A		
SENIOR YEAR		
Phys 140A	Phys 140B	Physics Lab ²
Phys 160	Phys 161	Phys 162
Phys 130B		

¹Experimentalists may replace 105B with an additional lab.

²Any course from lab group listed above

PHYSICS MAJOR WITH SPECIALIZATION IN BIOPHYSICS (B.S. DEGREE)

The Department of Physics offers an undergraduate program that prepares students for careers in biophysics. This program leads to a degree in "B.S., Physics with Specialization in Biophysics." As a terminal degree, it is an excellent education for students who wish to work in the biotechnology industry, and provides an ideal background for students who plan to attend graduate or professional school in biological or biomedical fields.

This program is intended for students with a strong interest in bringing the concepts and technical advances from the physical sciences to bear on issues in biology. The curriculum is chosen to prepare students as rigorously trained but broad-minded generalists, so that they may attack problems in the biological, biochemical, and biomedical sciences with the tools and confidence that come from rigorous training in the physical sciences.

The curriculum for Physics Major with Specialization in Biophysics is designed to allow premedical students to complete all necessary courses for admission to medical schools.

The lower-division program for physics majors with specialization in biophysics includes basic courses in biology and chemistry as well as physics. Although the sequence Physics 4A through 4E is strongly recommended, students have the choice of petitioning the department to substitute the sequence Physics 2A through 2D.

The following courses are required for the physics major with specialization in biophysics:

Lower-Division

1. Physics 4A-B-C-D-E and 2CL-DL; or Physics 2A-B-C-D and 2CL-DL (Physics 4 sequence is strongly recommended)
2. Chemistry 6A-B-C and 6BL
3. Biology, BILD 1 and BILD 2
4. Mathematics 20A-B-C-D-E-F

The upper-division program includes advanced courses in physics, including two core lecture courses and one core laboratory course in biophysics, as well as organic chemistry.

Upper-Division

1. Physics 100A, 105A, 110A, 120A, 130A, 140A, 171, 172, 173
2. Chemistry 140A

Additional electives, to achieve a count of twelve upper-division courses in the major, may be selected from biology, chemistry and physics. Three additional upper-division courses, in any subject, are required in order to satisfy UCSD requirements.

Premedical students will need to take two additional quarters of organic chemistry (Chemistry 140B and 140C), one quarter of organic chemistry laboratory (Chemistry 143A), and one quarter of an upper level biology course. In addition, some medical schools also require a quarter of biochemistry (Biology BIBC 100 or Chemistry 114A). The premedical requirements may be used to satisfy elective requirements for upper-division courses.

As a guide to prospective students, we consider a schedule of required classes for a Muir College student.

Suggested Schedule

FALL	WINTER	SPRING
FRESHMAN YEAR		
Math. 20A	Chem. 6A Math. 20B Phys. 4A	Chem. 6B Chem. 6BL Math. 20C Phys. 4B
SOPHOMORE YEAR		
Chem. 6C Math. 20D Phys. 4C	Math. 20E Phys. 4D Phys. 2CL	Math. 20F Phys. 4E Phys. 2DL
JUNIOR YEAR		
Phys. 100A Phys. 105A Phys. 110A	BILD 1 Chem. 140A	BILD 2 Phys. 120A Phys. 130A
SENIOR YEAR		
Phys. 140A Phys. 171	Phys. 172 Elec.	Phys. 173

B.S. IN PHYSICS WITH SPECIALIZATION IN COMPUTATIONAL PHYSICS

The computational physics specialization is designed to support a broad range of career development tracks, so students may pursue (1) a terminal B.S. degree for gainful employment in information technology and high-tech industry, (2) preparation for graduate studies in computational science with an M.S. degree, and (3) graduate work in physics with strong interest in computational physics. This flexibility is afforded by a wide array of restricted electives which allows students to design much of their own program (subject to advisor's approval) while simultaneously maintaining the essential physics-based curriculum. Academic advising will be provided by physics faculty in the Computational Physics Specialization Program to assist students in designing their optimal career development track in the flexible curriculum.

The following courses are required for Physics Major with Specialization in Computational Physics:

Lower-Division

1. Physics 4A-B-C-D-E or Physics 2A-B-C-D¹, Physics 2CL-DL
2. Mathematics 20C-F
3. Chemistry 6A
4. MAE 9, or MAE 10, or CSE 11²

¹The 2A-B-C-D sequence is an allowed substitute by petition.

²Electing CSE 11, student is still required to have C or Fortran based programming skills equivalent to MAE 9, or MAE 10.

Upper-Division

1. Physics 100A-B, 105A-B, 110A, 120A, 121, 130A-B, 140A, 141, 142¹
2. Six restricted electives from following groups: Physics 100C, 110B, 120B, 130C, 140B, 173, other upper-division Physics courses, Mathematics 132A-B, 170A-C, 172, 173, 183 CSE 12, 30, 80 Substitute Upper-Division courses²

Suggested Schedule (restricted electives not shown)

FALL	WINTER	SPRING
JUNIOR YEAR		
Phys. 100A Phys. 105A Phys. 110A	Phys. 100B Phys. 105B	Phys. 120A Phys. 130A
SENIOR YEAR		
Phys. 140A Phys. 130B	Phys. 141 Phys. 121	Phys. 142

¹Students will choose two required courses from the group Phys. 121, Phys. 141, Phys. 142, and either will drop the third, or take it as one of the six restricted electives

²Substitute elective courses (upper-division science, mathematics, engineering, or other) require advisor's approval

Career Track Examples with Restricted Electives

The program of electives is intended to be flexible, and can be tailored to the student's needs and interests in consultation with the academic advisor.

Grad. School Theorist with Computational Interest Track for student with interest in theoretical physics based computational science:

Physics 100C, 110B, 130C, 140B Mathematics 132A-B

Grad. School Experimentalist with Computational Interest Track for students with interest in experimental physics based computational science:

Physics 100C, 120B, 142
Mathematics 183
CSE 80

Information Technology Track for student with interest in physics based software oriented applications:

Physics 100C, 140B
CSE 12, 30, 80
Mathematics 173

Numerical Science/Engineering Application Developer Track for students with interest in physics and engineering applications of numerical algorithms:

Physics 100C, 140B
Mathematics 170A-C, 172

High Tech Instrumentation Track for students with interest in physics based instrumentation:

Physics 100C, 120B, 140B
Mathematics 183
CSE 12, 80

PHYSICS MAJOR WITH SPECIALIZATION IN EARTH SCIENCES (B.S. DEGREE)

The upper-division program for physics majors with specialization in earth sciences is essentially the same as the standard physics major augmented by courses in earth sciences offered through the Scripps Institution of Oceanography.

Students may wish to incorporate a small portion of the major program into their lower-division studies, for example, SIO 50.

The following courses are required for the physics major with specialization in earth sciences:

Lower-Division

1. Physics 4A-B-C-D-E and 2CL-DL; or Physics 2A-B-C-D and 2CL-DL (Physics 4 sequence is strongly recommended)
2. Chemistry 6A-B and 6BL
3. Mathematics 20C-F

Upper-Division

1. Physics 100A-B, 105A, 110A-B, 120A, 130A, 140A, plus one upper-division lab*
2. SIO 50, 102, 103, 120
3. Restricted Electives: Three earth sciences courses in the SIO department (upper-division or graduate level) to be chosen with the approval of the SIO undergraduate program advisor.
4. Two courses from either the theoretical or experimental pre-grad school sequence.

*Another lab course chosen from Physics 120B, 121, 133, or 173.

Suggested Schedule

FALL	WINTER	SPRING
JUNIOR YEAR		
Phys. 100A Phys. 105A	Phys. 100B Phys. 110B	Phys. 120A Phys. 130A

Phys. 110A SIO 102
SIO 50

SENIOR YEAR

Phys. 140A SIO 120 U.D. Lab
SIO 103 Restr. Elec. Restr. Elec.
Restr. Elec.

PHYSICS MAJOR WITH SPECIALIZATION IN MATERIALS PHYSICS (B.S. DEGREE)

The materials physics specialization is designed to support a broad range of options, so students may pursue (1) a terminal B.S. Degree, or preparation for (2) graduate work in materials science, or (3) graduate work in physics. This flexibility is afforded by a wide range of restricted electives which allows students to design much of their own program while simultaneously maintaining the essential physics-based curriculum. Academic advising will be provided by the department to assist the student in navigating through the many options. The B.S. program also serves as the entry to the integrated five-year B.S./M.S. program.

Lower-Division

1. Physics 4A-B-C-D-E or Physics 2A-B-C-D, Physics 2CL-DL
2. Chemistry 6A-B*
3. Mathematics 20C-F
4. MAE 9 or MAE 10 (or equivalent programming experience)

Upper-Division

1. Physics 100A-B, 105A-B, 110A, 120A-B, 130A-B, 140A, 133, 152A-B
2. Four restricted electives, to be chosen from Chemistry 120A-B*; Mathematics 120A; ECE 103, 134, 135A-B, 136, 136L; MAE 160, 110A; or any upper division physics course

* Students who anticipate taking Chemistry 120A-B as an upper-division elective are strongly advised to take Chemistry 6C.

Suggested Schedule (restricted electives not shown)

FALL	WINTER	SPRING
JUNIOR YEAR		
Phys. 100A	Phys. 100B	Phys. 120A
Phys. 105A	Phys. 105B	Phys. 130A
Phys. 110A		
SENIOR YEAR		
Phys. 140A	Phys. 152A	Phys. 152B
Phys. 120B		Phys. 133
Phys. 130B		

Restricted Electives: Example

As examples of restricted electives, a student opting for a terminal B.S. Degree (Option 1) might choose to take MAE 160, ECE 103, 136, and Physics 121. Students preparing for graduate work in materials science (Option 2) might consider MAE 160, ECE 103, 134, and a fourth elective. Students preparing for graduate work in physics (Option 3) might consider Physics 100C, 110B, 140B, and a fourth elective. The program of electives is intended to be flexible, and can be tailored to the student's needs and interests in consultation with the academic advisor.

See entry for *Integrated Bachelor's/Master's Degree Program in Materials Physics*.

GENERAL PHYSICS MAJOR (B.A. DEGREE)

This program covers the essential topics in physics and provides a broadly based education in the natural sciences. Starting with lower-division courses in mathematics, physics, computing, biology and/or chemistry, students proceed to upper-division mechanics, electricity and magnetism, thermal physics, quantum physics, and a physical measurements laboratory course. In addition, students take sixteen units of upper-division elective courses in the natural sciences or mathematics.

While the B.A. Program is suitable for students who pursue a terminal degree in physics or use it as a preparation for other professional careers, it is not intended for those who wish to proceed to the Ph.D. in physics. The latter should enroll in the B.S. Program

The following courses are required for the general physics major:

Lower-Division

1. Physics 2A-B-C-D and 2CL-DL
2. Mathematics 20C-F
3. Three restrictive elective courses in science and engineering (a list of acceptable courses is given below)

Upper-Division

1. Physics 100A-B, 105A, 110A-B, 120A, 130A, 140A or Chemistry 127 or 131
2. Restricted Electives: Sixteen units of upper-division courses in science and engineering (excluding mathematics)

Suggested Schedule

FALL	WINTER	SPRING
JUNIOR YEAR		
Phys. 100A	Phys. 100B	Phys. 120A
Phys. 105A	Phys. 110B	Phys. 130A
Phys. 110A		
SENIOR YEAR		
Phys. 140A or	Restr. Elec.	Restr. Elec.
Chem. 127 or 131	Restr. Elec.	
Restr. Elec.		

Approved Lower-Division Elective Courses

One course in computing chosen from the following list:

MAE 10, FORTRAN for Engineers
MAE 03, Introduction to Engineering Graphics and Design
CSE 10, Introduction to Programming Techniques
CSE 30, Introduction to Systems Programming
Physics 105B, Mathematical and Computational Physics

Plus two of the following courses:

BILD 1, The Cell
BILD 2, Multicellular Life
BILD 3, Organismic and Evolutionary Biology
Chem. 6A, General Chemistry
Chem. 6B, General Chemistry
Chem. 6C, General Chemistry

GENERAL PHYSICS/SECONDARY EDUCATION MAJOR (B.A. DEGREE)

This program is intended for students preparing for a career as a physics teacher in secondary schools. It covers the essential topics in physics and provides a broadly based education in the natural sciences. The program includes three courses in general chemistry plus a lab, one course in organic chemistry plus a lab, and a course in earth science as required by the Single Subject Credential Program of the state of California. It also includes three courses in Practicum in Learning offered by the Education Studies Program. This degree is particularly suitable for students pursuing a Single Subject (Physics) credential for high schools. If you are interested in earning a California teaching credential from UCSD, contact the Education Studies Program (EDS) for information about the prerequisite and professional preparation requirements. It is recommended that you contact EDS as early as possible in your academic career.

The following courses are required for the general physics/secondary education major:

Lower-Division

1. Physics 2A-B-C-D and 2CL-DL
2. Chemistry 6A-B-C and 6BL
3. SIO 10, 12, or 30
4. Mathematics 20C-F

Upper-Division

1. Physics 100A-B, 105A, 110A-B, 120A, 130A
2. Chemistry 140A and 143A
3. SIO 50
4. EDS 129A-B-C

Suggested Schedule

FALL	WINTER	SPRING
JUNIOR YEAR		
Phys. 100A	Phys. 100B	Phys. 130A
Phys. 105A	Phys. 110B	Phys. 120A
Phys. 110A	Chem. 140A	Chem. 143A
SENIOR YEAR		
SIO 50	EDS 129B	EDS 129C
EDS 129A		

ENGINEERING PHYSICS PROGRAM

The engineering physics program is offered jointly by the Departments of Physics, MAE, and ECE, and is administered by the Department of ECE. (See "ECE, Engineering Physics Program.") Transfer students who have had prior course work in the major at other institutions must consult with the Department of Physics, Student Affairs Office, 1110-115 Urey Hall Addition to make an appointment to see a faculty advisor.

MINOR IN PHYSICS

Students may arrange minor programs or programs of concentration in physics by consulting with the Department of Physics Student Affairs Office, 1110-115 Urey Hall Addition, and their college for specific requirements. The Department of Physics

requires at least twenty-eight units, of which at least twenty units must be upper-division. All courses must be taken for a letter grade. Lower-division transfer courses are permitted.

ADVISING OFFICE

All students are assigned an academic advisor. It is strongly recommended students see their advisor at least once a quarter.

Additional advising information may be obtained from the Department of Physics Student Affairs Office, 1110-115 Urey Hall Addition (858) 534-3290.

HONORS PROGRAM

The Department of Physics offers an Honors Program for students who demonstrate excellence in the major. Students interested in the Honors Program should consult the Student Affairs Office. Eligibility for the Honors Program includes completion of all required lower-division physics courses, ten upper-division physics courses, and a GPA of at least 3.50 in the physics major.

The Honors Program consists of a minimum of eight units of Honors Thesis Research (Physics 199H), an Honors Thesis, and the presentation of the research to faculty and peers at UCSD's Undergraduate Research Conference or an Undergraduate Seminar. Admission to the Honors Program is contingent upon the prior approval of the Honors Thesis "research topic" by the Vice Chair for Education.

THE GRADUATE PROGRAM

The Department of Physics offers curricula leading to the following degrees:

M.S., Physics

C.Phil., Physics

Ph.D., Physics

Ph.D., Physics (Biophysics)

Ph.D. Physics Specialization in Computational Science

Biophysics students will receive their M.S. and C.Phil. degrees in physics. Only their Ph.D. will be in physics (biophysics).

Entering graduate students are required to have a sound knowledge of undergraduate mechanics, electricity, and magnetism; to have had senior courses or their equivalent in atomic and quantum physics, nuclear physics, and thermodynamics; and to have taken upper-division laboratory work. An introductory course in solid-state physics is desirable.

Requirements for the master of science degree can be met according to Plan II (comprehensive examination). (See "[Graduate Studies: The Master's Degree.](#)") The comprehensive examination is identical to the first-year departmental examination for Ph.D. students. A list of acceptable courses is available in the Department of Physics Graduate Student Affairs office. There is no foreign language requirement.

The program offers a M.S. in physics with specialization in materials physics. It is open only to UC San Diego undergraduates, and is a Plan I program only (thesis). During the fourth quarter prior to receipt of the B.S. Degree, students enrolled in the B.S. Degree program with specialization in materials physics (see above) may apply for admission to the M.S. program. To be eligible, students must have completed the

first two quarters of their junior year in residence at UCSD and have a GPA of at least 3.0 in both their major and overall undergraduate curriculum. It is strongly recommended that B.S. students who intend to apply to the M.S. program take MAE 160, ECE 103, and ECE 134 as restricted B.S. electives. It is the responsibility of the prospective B.S./M.S. student to select a faculty member (from the Department of Physics or, with physics department approval, from the MAE, ECE, or chemistry departments) who would be willing to serve as the student's advisor and with whom the student would complete at least twelve units of S/U graded research, which could commence as early as the undergraduate senior year. (Taken during the senior year, the units would count only toward the M.S. degree and not toward the B.S.) The student must confirm that the selected faculty advisor will not be on off-campus sabbatical leave during any quarter of the scheduled B.S./M.S. project. Students are expected to meet the requirements for the M.S. degree in one year (three consecutive, contiguous academic quarters) from the date of receipt of the B.S. Degree. Any deviation from this plan, such as a break in enrollment for one or more quarters, may result in the student being dropped from the program.

The requirements for the M.S. degree are as follows:

1. Completion of at least twelve and no more than twenty-four units of research, which may begin as early as the first quarter of the senior undergraduate year.
2. Completion of three required courses during the fifth (graduate) year (MAT SCI 201A-B-C), and two restricted electives (see below).
3. Completion of restricted elective courses so that the total number of units (research plus required courses plus elective courses) totals no less than 36 units taken as a graduate student. Students accumulate units for their research by enrolling in Physics 295 (M.S. Thesis Research), which may be taken repeatedly.
4. Maintenance of a grade-point average of at least 3.0 for all course work, both cumulatively and for each quarter of enrollment in the B.S./M.S. program.
5. Completion of a thesis, with an oral presentation to, and approval of, a three-member committee from the Department of Physics including the faculty advisor. If the faculty advisor is from outside the physics department, the committee shall consist of the advisor and two members from the physics department faculty.
6. Three complete, separate, and consecutive quarters of full-time residency as a graduate student that will commence the quarter immediately following the quarter in which the B.S. Degree is awarded (not counting summer session).
7. Although students may receive research or teaching assistantships if available from their advisor or through the Department of Physics, there is no guarantee of financial support associated with the M.S. program.
8. M.S. candidates will be permitted to serve as teaching assistants, although teaching will not

be a requirement for the degree. Students who obtain a teaching assistantship should make sure that it does not interfere with completion of the M.S. degree requirements within the one year time frame allotted.

M.S. Program: Fifth Year Curriculum

1. MAT SCI 201A-B-C
2. Physics 295 (M.S. Thesis Research)
3. Two restricted electives, to be chosen from Physics 201, 211A-B; MAT SCI 227, 240A-B-C; ECE 231, 233; other courses allowed by petition

DOCTORAL DEGREE PROGRAM

The department has developed a flexible Ph.D. program that provides a broad, advanced education in physics while at the same time giving students opportunity for emphasizing their special interests. This program consists of graduate courses, apprenticeship in research, teaching experience, and thesis research.

Entering students are assigned a faculty advisor to guide them in their program. Many students spend their first year as teaching assistants or fellows and begin apprentice research in their second year. When a student's association with a research area and research supervisor is well established, a faculty research progress committee is formed with the responsibility of conducting an annual review of progress and, at the appropriate time, initiating the formation of a doctoral committee. After three years of graduate study, or earlier, students complete the departmental examinations and begin thesis research. Students specializing in biophysics make up deficiencies in biology and chemistry during the first two years and complete the departmental examinations by the end of their third year of graduate study. There is no foreign language requirement.

ENTRANCE TESTING

An entrance test covering undergraduate physics is given to entering students during the first week of orientation to give better guidance to students in their graduate program. The results are not entered in the student's file. Entering students are encouraged, but not obliged, to bring the results to the first meeting with their academic advisor. Entering students may elect to take the departmental examination instead of taking the entrance test.

REQUIREMENTS FOR THE PH.D.

Students are required to pass a departmental examination, advanced graduate courses, a qualifying examination, teaching requirement and a final defense of the thesis as described below.

1. Departmental Written Examination

Physics students are required to take the departmental written examination after completing one year of graduate work at UCSD. The examination is on the level of material usually covered in upper-division courses and the graduate courses listed below:

Fall

Physics 200A (Theoretical Mechanics)
 Physics 201 (Mathematical Physics)
 Physics 212A (Quantum Mechanics)

Winter

Physics 200B (Theoretical Mechanics)
 Physics 203A (Adv. Classical Electrodynamics)
 Physics 212B (Quantum Mechanics)
 Spring

Physics 203B (Adv. Classical Electrodynamics)
 Physics 210A (Equilibrium Statistical Mechanics)
 Physics 212C (Quantum Mechanics)

The examination is offered twice a year, at the beginning of the fall and spring quarters, and lasts two days, four hours per day. The examination may be repeated once, the next time it is offered.

Biophysics Ph.D. students are required to take the departmental written examination within two years of graduate work at UCSD; not later than the beginning of the third year.

The University requires an annual evaluation of each graduate student's progress toward Ph.D. candidacy and thesis defense. To this end, a Research Progress Committee (RPC) is formed for every student during the spring quarter of the second year of graduate study. Students must demonstrate proficiency in giving technical talks through an oral presentation to the RPC.

2. Advanced Graduate Courses

Physics students are required to take five advanced graduate courses from at least three of the groups listed below no later than the end of the third year of graduate work. A 3.0 average over the five courses is required. (In lieu of the course requirement, students may petition to take an oral examination covering three areas of physics.)

- Group 1: Physics 218A-B-C (Plasma); 235 (Nonlin. Plas. Th.)
- Group 2: Physics 210B (Nonequil. Stat. Mech.); 210C, 211A, 211B (Solid State); 219 (C.M./Matl. SCI Lab), 230 (Adv. Solid State); 232 (Electronic Materials)
- Group 3: Physics 214 (Elem. Part.); 215A-B-C (Part. & Fields); 217 (Renorm. Field Th.); 229 (App. Quant. Mech.)
- Group 4: Physics 220 (Group Th.); 221A, 221B (Nonlinear Dyn.); Physics 241 and 242 (Comp. Phys); Physics 243 (Stochastic Methods) and 244 (Parallel Computing in Science and Engineering); Mathematics 210A-B, 210C (Mathematics Physics); Mathematics 259A-B-C (Geom. Physics)
- Group 5: Physics 225A-B (Relativ.); 271 (Bio. Neurons/Net); 272 (Bio. Molecules)
- Group 6: Physics 223 (Stel. Str.); 224 (Intrstel. Med.); 226 (Gal. & Gal. Dyn.); 227 (Cosmology), 228 (HE Astro. & Comp. Obj.)

Students enrolled in the Biophysics Ph.D. program select five courses from biology, biochemistry, chemistry, or physics in consultation with their advisor. At least three courses must be graduate

courses. For more information, see the Biophysics section, below.

3. Ph.D. Candidacy Examination

In order to be advanced to candidacy, students must have met the departmental requirements and obtained a faculty research supervisor. At the time of application for advancement to candidacy, a doctoral committee responsible for the remainder of the student's graduate program is appointed by the Graduate Council. The committee conducts the Ph.D. candidacy examination during which students must demonstrate the ability to engage in thesis research. This involves the presentation of a plan for the thesis research project. The committee may ask questions directly or indirectly related to the project and questions on general physics that it determines to be relevant. Upon successful completion of this examination, students are advanced to candidacy and are awarded the Candidate of Philosophy degree.

4. Instruction in Physics Teaching

All graduate students are required to participate in the physics undergraduate teaching program as part of their career training. The main component of this requirement is an evaluated classroom-based teaching activity. All graduate student teaching accomplishments are subject to the approval of the vice chair for education. There are several ways to satisfying the teaching requirement, including: (1) leading discussions as a teaching assistant, (2) practical classroom teaching, under faculty supervision, (3) participation in an approved teaching development program offered by the Department of Physics or the campus Center for Teaching Development, or (4) transferred teaching credit from another institution or department. Students who satisfy the requirement by teaching at UCSD should enroll in Physics 500 during the quarter in which they complete it.

5. Thesis Defense

When students have completed their theses, they are asked to present and defend them before their doctoral committees.

Time Limits for Progress to the Ph.D.

In accordance with university policy, the Department of Physics has established the following time limits for progress to the Ph.D. A student's research progress committee helps ensure that these time limits are met.

	Theorists	Experimentalists
Advancement to Candidacy	4 years	5 years
Total Registered Time and Support	7 years	8 years

PH.D. IN PHYSICS (BIOPHYSICS)

The Department of Physics offers a graduate program which prepares students for a career in biophysics and which leads to the following degrees:

- C.Phil. in Physics
- Ph.D. in Physics (Biophysics)

Biophysics students will receive their M.S. and C.Phil. degrees in physics. Only their Ph.D. will be in physics (biophysics).

The Ph.D. program consists of graduate courses, apprenticeship in research, teaching experience, and thesis research. Research in biophysics is being actively pursued in several departments (physics, chemistry/biochemistry, and biology) that also offer courses in, or courses relevant to, biophysics.

Requirements for the Ph.D. in Physics (Biophysics)

The specialization in biophysics requires that students complete many of the same requirements as for the physics Ph.D. Students must pass a departmental written examination, advanced graduate courses, Ph.D. candidacy examination, teaching requirement, and a final defense of the thesis. However, the requirements for the written examination and advanced courses differ slightly from those of the Ph.D. degree.

Biophysics Ph.D. students are required to take the departmental written examination within two years of beginning graduate studies at UCSD, and no later than the beginning of the third year. Biophysics students are required to pass five courses from biology, chemistry, biochemistry, or physics no later than the end of the third year of graduate study. The course plan shall be determined in consultation with the advisor. At least three of these courses must be graduate courses. A 3.0 average over the five courses is required. (In lieu of the course requirement, students may petition to take an oral examination covering three areas of physics.)

PH.D. IN PHYSICS WITH SPECIALIZATION IN COMPUTATIONAL SCIENCE

See "[Computational Science in Mathematics & Engineering \(CSME\)](#)" for more information.

The UCSD campus is offering a new comprehensive Ph.D. specialization in computational science that will be available to doctoral candidates in participating academic departments at UCSD.

This Ph.D. specialization is designed to allow students to obtain training in their chosen field of science, mathematics, or engineering with additional training in computational science integrated into their graduate studies. Prospective students must apply and be admitted into the Ph.D. program in physics, and then be admitted to the CSME program.

Areas of research in the Department of Physics will include computational astrophysics and cosmology, studying star formation and the large scale structure of the universe, computational condensed matter physics studying nanodevices, computational quantum field theory studying the four basic forces of nature, computational biological physics of protein folding and other biologically important complex structures, computational nonlinear dynamics, and computational plasma physics. Each faculty member works with graduate students on the listed research topics that will greatly benefit from the new program.

The specialization in computational science requires that students complete all home requirements for the physics Ph.D. degree. Students are required to pass the departmental written examination, advanced course requirements, Ph.D. candidacy

examination, teaching requirement, and a final defense of the thesis. The qualifying and elective courses for the CSME program (e.g., Physics 241-244) can be used as part of the advanced course requirement, which is the same as for the physics Ph.D.

Requirements for the Ph.D. in Physics with Specialization in Computational Science:

Qualifying Requirements: In addition to the home department qualifying exam requirements, Ph.D. students must take the final exams in three qualifying exam courses from the list below. Courses taken to satisfy the qualifying requirements will not count toward the elective requirements.

1. Math. 275 or MAE 290B (Numerical PDEs)
2. Phys. 244 or CSE 260 (Parallel Computing)
3. One course to be selected from List A

List A: CSME Qualifying Exam Courses

1. Phys. 243 (Stochastic Methods)
2. Math. 270A, B, or C (Numerical Analysis)
3. Math. 272A, B, or C (Advanced Numerical PDEs)
4. MAE 223 (Computational Fluid Dynamics)
5. MAE 232A or B (Computational Solid Mechanics)
6. MAE 280A or B (Linear Systems Theory)
7. To be determined by Executive Committee

Elective Requirements: To encourage Ph.D. students to both broaden themselves in an area of science or engineering as well as to obtain more specialized training in specific areas of computational science, students will be required to take and pass three elective courses from the following approved List B (four units per course). The Executive Committee may approve the use of courses not appearing on the following list on a case-by-case basis. Courses taken to satisfy the elective requirements will not count toward the qualifying requirements.

List B: Relevant Elective Graduate Courses in Mathematics, Science, and Engineering

1. Math. 270A-B-C (Numerical Analysis; not permitted for mathematics students)
2. Math. 271A-B-C (Optimization)
3. Math. 272A-B-C (Advanced Numerical PDEs)
4. Math. 273A-B-C (Computational Mathematics Project)
5. Phys. 141/241 (Computational Physics I)
6. Phys. 142/242 (Computational Physics II)
7. Phys. 221A-B (Nonlinear Dynamics)
8. Chem. 215 (Modeling Biological Macromolecules)
9. BGGN 260 (Neurodynamics)
10. To be determined by Executive Committee

Program Policies: The following is a list of policies for the Ph.D. specialization with regard to proficiency, qualifying, and elective requirements.

1. Proficiency in computer engineering must be demonstrated by the end of the first year.
2. The qualifying exams must be passed by the end of the second year, or, on petition, by end of the third year.
3. The qualifying exams can be attempted repeatedly but no more than once per quarter per subject.
4. The qualifying exams in the home department and the CSME qualifying exams must all be passed before the student is permitted to take the candidacy (senate) exam.
5. Two electives outside the home department must be taken.
6. The two electives can be taken at any time before defending the thesis.
7. One of the electives may be taken Pass/Fail; the other must be taken for a letter grade.

Recommended schedule for the Ph.D. in physics with specialization in computational science

YEAR 1: PHYSICS CORE COURSES

Phys. 200A	Phys. 200B	Phys. 203B
Phys. 201	Phys. 203A	Phys. 210A
Phys. 212A	Phys. 212B	Phys. 212C

YEAR 2: CSME QUALIFYING COURSES

Math. 275	Non-Phys. Elective	Phys. 244
Phys. 243	Adv. Phys. Course	Adv. Phys. Course

YEAR 3: CSME ELECTIVE COURSES

Non-Phys. Elective	Phys. 241	Phys. 242
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DEPARTMENTAL COLLOQUIUM

The department offers a weekly colloquium on topics of current interest in physics and on departmental research programs. Students are expected to register and attend the colloquium.

SUPPLEMENTARY COURSE WORK AND SEMINARS

The department offers regular seminars in several areas of current interest. Students are strongly urged to enroll for credit in seminars related to their research interests and, when appropriate, to enroll in advanced graduate courses beyond the departmental requirement. To help beginning students choose a research area and a research supervisor, the department offers a special seminar (Physics 261) that surveys physics research at UCSD.

COURSE CREDIT BY EXAMINATION

Students have an option of obtaining credit for a physics graduate course by taking the final examination without participating in any class exercises. They must, however, officially register for the course and notify the instructor and the Department of Physics graduate student affairs office of their intention no later than the first week of the course.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

The Physics 1 sequence is primarily intended for biology.

The Physics 2 sequence is intended for physical science and engineering majors and those biological science majors with strong mathematical aptitude.

The Physics 4 sequence is intended for all physics majors and for students with an interest in physics. This five-quarter sequence covers the same topics as the Physics 2 sequence, but it covers these topics more slowly and in more depth. The Physics 4 sequence provides a solid foundation for the upper-division courses required for the physics major.

Note: Since some of the material is duplicated in the Physics 1, 2 and 4 sequences, credit cannot be obtained for both. Please check with the Physics Student Affairs Office when switching sequences. (Example: Physics 1A followed by Physics 2A, no credit for Physics 2A.)

Physics 5, 6, 7, 8, 9, 10, 11, and 12 are intended for non-science majors. Physics 5, 6, 7, 8, 9, 10, and 12 do not use calculus while Physics 11 uses some calculus.

1A. Mechanics (3)

First quarter of a three-quarter introductory physics course, geared towards life-science majors. Equilibrium and motion of particles in Newtonian mechanics, examples from astronomy, biology and sports, oscillations and waves, vibrating strings and sound. **Prerequisites:** Mathematics 10A or 20A, prior or concurrent enrollment in Mathematics 10B or 20B, concurrent enrollment in Physics 1AL laboratory. (F,W,S)

1AL. Mechanics Laboratory (2)

Physics laboratory course to accompany Physics 1A. Experiments in mechanics. **Prerequisite:** concurrent enrollment in Physics 1A. (F,W,S)

1B. Electricity and Magnetism (3)

Second quarter of a three-quarter introductory physics course geared toward life-science majors. Electric fields, magnetic fields, DC and AC circuitry. **Prerequisites:** Physics 1A, 1AL, and prior or concurrent enrollment in Mathematics 10C–D or 20C. Concurrent enrollment in Physics 1BL. (F,W,S)

1BL. Electricity and Magnetism Laboratory (2)

Physics laboratory course to accompany Physics 1B. Experiments in electricity and magnetism. Course materials fee is required. **Prerequisite:** concurrent enrollment in Physics 1B. (F,W,S)

1C. Waves, Optics and Modern Physics (3)

Third quarter of a three-quarter introductory physics course geared toward life-science majors. Behavior of systems under combined thermal and electric forces, the interaction of light with matter as illustrated through optics and quantum mechanics. Examples from biology and instrumentation. (First offered winter 2005) **Prerequisites:** Physics 1B, 1BL, Mathematics 10C or 10D or 20C. Concurrent enrollment in Physics 1CL. (F,W,S)

1CL. Waves, Optics, and Modern Physics Laboratory (2)

Physics laboratory course to accompany Physics 1C. Experiments in waves, optics, and modern physics. Course materials fee is required. First offered in winter 2005. **Prerequisite:** concurrent enrollment in Physics 1C. (F,W,S)

2A. Physics–Mechanics (4)

A calculus-based science-engineering general physics course covering vectors, motion in one and two dimensions, Newton's first and second laws, work and energy, conservation of energy, linear momentum, collisions, rotational kinematics, rotational dynamics, equilibrium of rigid bodies, oscillations, gravitation. **Prerequisites:** Mathematics 20A, and concurrent enrollment in Mathematics 20B. (F,W,S)

2B. Physics–Electricity and Magnetism (4)

Continuation of Physics 2A covering charge and matter, the electric field, Gauss's law, electric potential, capacitors and dielectrics, current and resistance, electromotive force and circuits, the magnetic field, Ampere's law, Faraday's law, inductance, electromagnetic oscillations, alternating currents and Maxwell's equations. **Prerequisites:** Physics 2A, Mathematics 20B, and concurrent enrollment in Mathematics 20C. (F,W,S)

2BL. Physics Laboratory–Mechanics and Electrostatics (2)

One hour lecture and three hours' laboratory. Experiments include gravitational force, linear and rotational motion, conservation of energy and momentum, collisions, oscillations and springs, gyroscopes. Experiments on electrostatics involve charge, electric field, potential, and capacitance. Data reduction and error analysis are required for written laboratory reports. **Prerequisite:** concurrent enrollment in Physics 2B or 4C. (F,W,S) Course materials fee is required.

2C. Physics–Fluids, Waves, Thermodynamics, and Optics (4)

Continuation of Physics 2B covering fluid mechanics, waves in elastic media, sound waves, temperature, heat and the first law of thermodynamics, kinetic theory of gases, entropy and the second law of thermodynamics, Maxwell's equations, electromagnetic waves, geometric optics, interference and diffraction. **Prerequisites:** Physics 2B, Mathematics 20C, and concurrent enrollment in Mathematics 20D. (F,W,S)

2CL. Physics Laboratory–Electricity and Magnetism, Waves, and Optics (2)

One hour lecture and three hours' laboratory. Experiments on refraction, interference/diffraction using lasers and microwaves; lenses and the eye; acoustics; oscilloscope and L-R-C circuits; oscillations, resonance and damping, measurement of magnetic fields; and the mechanical equivalence of heat. **Prerequisites:** prior or concurrent enrollment in Physics 1C, 2C, or 4D. (F,W,S) Course materials fee is required.

2D. Physics–Relativity and Quantum Physics (4)

A modern physics course covering atomic view of matter, electricity and radiation, atomic models of Rutherford and Bohr, relativity, X-rays, wave and particle duality, matter waves, Schrödinger's equation, atomic view of solids, natural radioactivity. **Prerequisites:** Physics 2B and Mathematics 20D. (F,W,S)

2DL. Physics Laboratory–Modern Physics (2)

One hour of lecture and three hours of laboratory. Experiments to be chosen from refraction, diffraction and interference of microwaves, Hall effect, thermal band gap, optical spectra, coherence of light, photoelectric effect, e/m ratio of particles, radioactive decays, and plasma physics. **Prerequisites:** 2BL or 2CL, prior or concurrent enrollment in Physics 2D or 4E. (S) Course materials fee is required.

4A. Physics for Physics Majors–Mechanics (4)

The first quarter of a five-quarter calculus-based physics sequence for physics majors and students with a serious interest in physics. The topics covered are vectors, particle kinematics and dynamics, work and energy, conservation of energy, conservation of momentum, collisions, rotational kinematics and dynamics, equilibrium of rigid bodies. **Prerequisites:** Mathematics 20A and concurrent enrollment in Mathematics 20B. (W)

4B. Physics for Physics Majors–Mechanics, Fluids, Waves, and Heat (4)

Continuation of Physics 4A covering oscillations, gravity, fluid statics and dynamics, waves in elastic media, sound waves, heat and the first law of thermodynamics, kinetic theory of gases, second law of thermodynamics, gaseous mixtures and chemical reactions. **Prerequisites:** Physics

4A, Mathematics 20B, and concurrent enrollment in Mathematics 20C. (S)

4C. Physics for Physics Majors–Electricity and Magnetism (4)

Continuation of Physics 4B covering charge and Coulomb's law, electric field, Gauss's law, electric potential, capacitors and dielectrics, current and resistance, magnetic field, Ampere's law, Faraday's law, inductance, magnetic properties of matter, LRC circuits, Maxwell's equations. **Prerequisites:** Physics 4B, Mathematics 20C, and concurrent enrollment in Mathematics 20E. (F)

4D. Physics for Physics Majors–Electromagnetic Waves, Optics, and Special Relativity (4)

Continuation of Physics 4C covering electromagnetic waves and the nature of light, cavities and wave guides, electromagnetic radiation, reflection and refraction with applications to geometrical optics, interference, diffraction, holography, special relativity. **Prerequisites:** Physics 4C, Mathematics 20E, and prior or concurrent enrollment in Mathematics 20D. (W)

4E. Physics for Physics Majors–Quantum Physics (4)

Continuation of Physics 4D covering experimental basis of quantum mechanics: Schrödinger equation and simple applications; spin; structure of atoms and molecules; selected topics from solid state, nuclear, and elementary particle physics. **Prerequisites:** Physics 4D, Mathematics 20D, 20E, and prior or concurrent enrollment in Mathematics 20F. (S)

5. The Universe (4)

Introduction to astronomy. Topics include the earth's place in the universe; the atom and light; the birth, life, and death of stars; the Milky Way galaxy; normal and active galaxies; and cosmology. Physics 5 or 7, and SIO 10 and 30 form a three-quarter sequence. Students may not receive credit for both Physics 5 and Physics 7. Restricted to P/NP grading option if taken after Physics 1A, 2A, or 4A. (F,S)

7. Introductory Astronomy (4)

Introduction to astronomy and astrophysics. Topics same as Physics 5. This course uses basic pre-calculus level mathematics (algebra, proportions, logs, similar triangles). Physics 5 or 7 and Earth Sciences 10 and 30 form a three-quarter sequence. Students may not receive credit for both Physics 5 and Physics 7. Restricted to P/NP grading option if taken after Physics 1A, 2A, or 4A. (W)

8. Physics of Everyday Life (4)

Examines phenomena and technology encountered in daily life from a physics perspective. Topics include waves, musical instruments, telecommunication, sports, appliances, transportation, computers, and energy sources. Physics concepts will be introduced and discussed as needed employing some algebra. No prior physics knowledge is required. Restricted to P/NP grading option if taken after Physics 1A, 2A, or 4A. (S)

9. The Solar System (4)

A non-mathematical exploration of our Solar System and other planetary systems for non-science majors. The sun, terrestrial and giant planets, satellites, asteroids, comets and meteors. The formation of planetary systems, space exploration, the development and search for life. (F)

10. Concepts in Physics (4)

This is a one-quarter general physics course for non-science majors. Topics covered are motion, energy, heat, waves, electric current, radiation, light, atoms and molecules, nuclear fission and fusion. This course emphasizes concepts with minimal mathematical formulation. **Prerequisite:** college algebra or equivalent. Restricted to P/NP grading option if taken after Physics 1A, 2A, or 4A. (W)

11. Survey of Physics (4)

Survey of physics for non-science majors with strong mathematical background, including calculus. Physics 11 describes the laws of motion, gravity, energy, momentum, and relativity. A laboratory component consists of two experiments with gravity and conservation principles. **Prerequisites:** Mathematics 10A or 20A and concurrent enrollment in Math 10B or 20B. (F)

12. Energy and the Environment (4)

A course covering energy fundamentals, energy use in an industrial society and the impact of large-scale energy

consumption. It addresses topics on fossil fuel, heat engines, solar energy, nuclear energy, energy conservation, transportation, air pollution and global effects. Concepts and quantitative analysis. (S)

87. Freshman Seminar in Physics and Astrophysics (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

98. Directed Group Study (2)

Directed group study on a topic, or in a field not included in the regular departmental curriculum. (P/NP grades only.)

99. Independent Study (2)

Independent reading or research on a topic by special arrangement with a faculty member. (P/NP grading only.) **Prerequisites:** lower-division standing. Completion of thirty units at UCSD undergraduate study, a minimum UCSD GPA of 3.0, and a completed and approved "Special Studies" form. Department stamp required.

UPPER-DIVISION

100A. Electromagnetism (4)

Coulomb's law, electric fields, electrostatics; conductors and dielectrics; steady currents, elements of circuit theory. Four hours lecture. **Prerequisites:** Physics 2C or 4D, Mathematics 20D; 20E, 20F. (Concurrent enrollment in Math. 20F permitted.) (F)

100B. Electromagnetism (4)

Magnetic fields and magnetostatics, magnetic materials, induction, AC circuits, displacement currents; development of Maxwell's equations. Four hours lecture. **Prerequisite:** Physics 100A. (W)

100C. Electromagnetism (4)

Electromagnetic waves, radiation theory; application to optics; motion of charged particles in electromagnetic fields; relation of electromagnetism to relativistic concepts. Four hours lecture. **Prerequisite:** Physics 100B. (S)

105A. Mathematical and Computational Physics (4)

A combined analytic and mathematical-based numerical approach to the solution of common applied mathematics problems in physics and engineering. Topics: Fourier series and integrals, special functions, initial and boundary value problems, Green's functions; heat, Laplace and wave equations. **Prerequisites:** Mathematics 20E and 20F and Physics 4E or 2D. (F)

105B. Mathematical and Computational Physics (4)

A continuation of Physics 105A covering selected advanced topics in applied mathematical and numerical methods. Topics include statistics, diffusion and Monte-Carlo simulations; Laplace equation and numerical methods for non-separable geometries; waves in inhomogeneous media, WKB analysis; nonlinear systems and chaos. **Prerequisite:** Physics 105A. (W)

110A. Mechanics (4)

Phase flows, bifurcations, linear oscillations, calculus of variations, Lagrangian dynamics, conservation laws, central forces, systems of particles, collisions, coupled oscillations. Four-hour lecture. **Prerequisites:** Physics 2C or 4D, Mathematics 20D, 20E, 20F (concurrent enrollment in Mathematics 20F permitted). (F)

110B. Mechanics (4)

Noninertial reference systems, dynamics of rigid bodies, Hamilton's equations, Liouville's theorem, chaos, continuum mechanics, special relativity. **Prerequisites:** Physics 110A and Mathematics 20E. (W)

SIO 111/Physics 111. Introduction to Ocean Waves and Tides (4)

This course will cover a broad range of physical oceanography topics, including linear dynamics of surface gravity waves, dispersion relations, spectral descriptions, group velocity, shoaling waves, ray theory, edge waves, Coriolis force, the tide-generating force, Laplace's tide equations,

Kelvin waves. **Prerequisites:** Math. 20A–E and Physics 2A–C or consent of instructor. (W)

120A–B. Physical Measurements (4–4)

A laboratory-lecture course in physical measurements with an emphasis on electronic methods. Topics include circuit theory, special circuits. Fourier analysis, noise, transmission lines, transistor theory, amplifiers, feedback, operational amplifiers, oscillators, pulse circuits, digital electronics. Three hours lecture, four hours laboratory. **Prerequisites:** Physics 2CL and 2DL, Physics 100A. (S,F) Course materials fee is required.

121. Experimental Techniques (4)

A laboratory-lecture courses providing content and experiences useful in modern physics laboratories. Topics include: mechanical design and machining; mechanics of materials; thermal design/control; vacuum and cryogenic technologies; optical raytracing and design; practical electronics; computer interface to scientific equipment. **Prerequisite:** Physics 120A. (W)

130A. Quantum Physics (4)

Phenomena which led to the development of quantum mechanics. Wave mechanics; the Schrödinger equation, interpretation of the wave function, the uncertainty principle, piece-wise constant potentials, simple harmonic oscillator, central field and the hydrogen atom. Observables and measurements. Four hours lecture. **Prerequisites:** Physics 2C or 2D, 4E, or equivalent. (S)

130B. Quantum Physics (4)

Matrix mechanics, angular momentum and spin, Stern-Gerlach experiments, dynamics of two-state systems, approximation methods, the complete hydrogen spectrum, identical particles. Four hours lecture. **Prerequisite:** Physics 130A. (F)

130C. Quantum Physics (4)

Scattering theory, symmetry and conservation laws, systems of interacting particles, interaction of electromagnetic radiation with matter, Fermi golden rule, the relativistic electron. **Prerequisites:** Physics 100C or equivalent, 130B. (W)

133/219. Condensed Matter/Materials Science Laboratory (4)

A project-oriented laboratory course utilizing state-of-the-art experimental techniques in materials science. The course prepares students for research in a modern condensed matter-materials science laboratory. Under supervision, the students develop their own experimental ideas after investigating current research literature. With the use of sophisticated state-of-the-art instrumentation students conduct research, write a research paper, and make verbal presentations. **Prerequisites:** Physics 2CL and 2DL for undergraduates; Physics 152A or Physics 211A for graduate students. (S) Course materials fee is required.

137. String Theory (4)

Quantum mechanics and gravity. Electromagnetism from gravity and extra dimensions. Unification of forces. Quantum black holes. Properties of strings and branes. **Prerequisites:** Physics 100A and 110A or consent of instructor, Physics 130A may be taken concurrently. (S)

140A. Statistical and Thermal Physics (4)

Integrated treatment of thermodynamics and statistical mechanics; statistical treatment of entropy, review of elementary probability theory, canonical distribution, partition function, free energy, phase equilibrium, introduction to ideal quantum gases. **Prerequisite:** Physics 130A, or consent of instructor. (F)

140B. Statistical and Thermal Physics (4)

Applications of the theory of ideal quantum gases in condensed matter physics, nuclear physics and astrophysics; advanced thermodynamics, the third law, chemical equilibrium, low temperature physics; kinetic theory and transport in non-equilibrium systems; introduction to critical phenomena including mean field theory. **Prerequisite:** Physics 140A, or consent of instructor. (W)

141. Computational Physics I: Probabilistic Models and Simulations (4)

Project-based computational physics laboratory course with student's choice of Fortran90/95, or C/C++.

Applications from materials science to the structure of the early universe are chosen from molecular dynamics, classical and quantum Monte Carlo methods, physical Langevin/Fokker-Planck processes, and other modern topics. Graduate students will do advanced projects. **Prerequisite:** upper-division standing or consent of instructor. Conjoined with Physics 241. (W)

142. Computational Physics II: PDE and Matrix Models (4)

Project-based computational physics laboratory course for modern physics and engineering problems with student's choice of Fortran90/95, or C/C++. Applications of finite element PDE models are chosen from quantum mechanics and nanodevices, fluid dynamics, electromagnetism, materials physics, and other modern topics. Graduate students will do advanced projects. **Prerequisite:** upper-division standing or consent of instructor. Conjoined with Physics 242. (S)

151. Elementary Plasma Physics (4)

Particle motions, plasmas as fluids, waves, diffusion, equilibrium and stability, nonlinear effects, controlled fusion. Three hours lecture. **Prerequisite:** Math. 20D or consent of instructor. Physics 100 (B,C) or ECE 107 and Physics 110A are suggested. Cross-listed with MAE 117A. (S)

152A. Condensed Matter Physics (4)

Physics of the solid state. Binding mechanisms, crystal structures and symmetries, diffraction, reciprocal space, phonons, free and nearly free electron models, energy bands, solid state thermodynamics, kinetic theory and transport, semiconductors. **Prerequisites:** Physics 130A or Chemistry 133, and Physics 140A. (W)

152B. Electronic Materials (4)

Physics of electronic materials. Semiconductors: bands, donors and acceptors, devices. Metals: Fermi surface, screening, optical properties. Insulators: dia-/ferro-electrics, displacive transitions. Magnets: dia-/para-/ferro-/antiferromagnetism, phase transitions, low temperature properties. Superconductors: pairing, Meissner effect, flux quantization, BCS theory. Students enrolled in Physics 232 will complete a special topics paper. **Prerequisite:** Physics 152A or consent of instructor. Conjoined with Physics 232. (S)

154. Elementary Particle Physics (4)

The constituents of matter (quarks and leptons) and their interactions (strong, electromagnetic, and weak). Symmetries and conservation laws. Fundamental processes involving quarks and leptons. Unification of weak and electromagnetic interactions. Particle-astrophysics and the Big Bang. **Prerequisites:** Physics 130B.

155. Nonlinear Dynamics (4)

Qualitative aspects of Hamiltonian and dissipative dynamical systems: stability of orbits, integrability of Hamiltonian systems, chaos and nonperiodic motion, transition to chaos. Examples to be drawn from mechanics, fluid mechanics, and related physical systems. Numerical work and graphical display and interpretation will be emphasized. Three hours lecture. **Prerequisites:** Physics 100B and 110B. (S)

160. Stellar Astrophysics (4)

Introduction to stellar astrophysics: observational properties of stars, solar physics, radiation and energy transport in stars, stellar spectroscopy, nuclear processes in stars, stellar structure and evolution, degenerate matter and compact stellar objects, supernovae and nucleosynthesis. Physics 160, 161, and 162 may be taken as a three-quarter sequence for students interested in pursuing graduate study in astrophysics or individually as topics of interest. **Prerequisite:** Physics 2A, 2B, 2C, 2D or 4A, 4B, 4C, 4D, 4E. (F)

161. Black Holes and The Milky Way Galaxy (4)

The structure and content of the Milky Way galaxy and the physics of black holes. Topics will be selected from: general relativity, theory and observation of black holes, galactic X-ray sources, galactic structure, physical processes in the interstellar medium, star formation. Physics 160, 161, and 162 may be taken as a three-quarter sequence for students interested in pursuing graduate study in astrophysics or individually as topics of interest. **Prerequisites:** Physics 2A, 2B, 2C, 2D or 4A, 4B, 4C, 4D, 4E. (W)

162. Galaxies and Cosmology (4)

The structure and properties of galaxies, galaxy dynamics and dark matter, the expanding universe, plus some of the following topics: the big bang, early universe, galaxy formation and evolution, large scale structure, active galaxies and quasars. Physics 160, 161, and 162 may be taken as a three-quarter sequence for students interested in pursuing graduate study in astrophysics or individually as topics of interest. **Prerequisites:** Physics 2A, 2B, 2C, 2D or 4A, 4B, 4C, 4D, 4E. (S)

170. Medical Instruments: Principles and Practice (4)

The principles and clinical applications of medical diagnostic instruments, including electromagnetic measurements, spectroscopy, microscopy; ultrasounds, X-rays, MRI, tomography, lasers in surgery, fiber optics in diagnostics. **Prerequisite:** Physics 1C, or 2C, or equivalent. (F)

171/271. Biophysics of Neurons and Networks (4–4)

Fundamental limits to measurements on nervous systems, the biophysics of excitable membranes and neurons, and the fundamentals of recurrent neuronal networks. The emphasis is on information processing by the nervous system through physical reasoning and mathematical analysis. Three hours lecture. The graduate version, Physics 271, will include a report at the level of a research proposal. **Prerequisites:** Physics 100A and 110A, BILD 1, Chemistry 6C and Physics 140A, for graduate students, consent of instructor. The graduate version, Physics 271, will include a report at the level of a research proposal. (F)

172/272. Biophysics of Molecules (4–4)

Physical concepts and techniques used to study the structure and function of biological molecules, the thermodynamics and kinetics of biological activity, and physical descriptions of biological processes. Examples from enzyme action, protein folding, photobiology, and molecular motors. Three hours lecture. **Prerequisites:** Physics 100A and 110A, BILD 1, Chemistry 6C and Physics 130A; and graduate students, consent of instructor. The graduate version, Physics 272, will include a report at the level of a research proposal. (W)

173. Modern Physics Laboratory: Biological and Quantum Physics (4)

A selection of experiments in contemporary physics and biophysics. Students select among pulsed NMR, Mossbauer, Zeeman effect, light scattering, holography, optical trapping, voltage clamp and genetic transcription of ion channels in oocytes, fluorescent imaging, and flight control in flies. **Prerequisites:** Physics 120A, BILD 1, and Chemistry 6BL. (S)

180/280. Teaching and Learning Physics (4)

How people learn and understand key concepts in physics. Readings in physics, physics education research, and cognitive science. Field work teaching and evaluating pre-college and college students. Useful for students interested in teaching and learning physical sciences. **Prerequisites:** Physics 1, 2, or 4 series, or consent of instructor. Cross-listed with EDS 105.

191. Undergraduate Seminar on Physics (1)

Undergraduate seminars organized around the research interests of various faculty members. **Prerequisite:** Physics 2A or 4A series.

192. Senior Seminar in Physics (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in Physics (at the upper-division level). Senior Seminars may be offered in all campus departments. Topics will vary from quarter to quarter. Senior Seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors.

195. Physics Instruction (2–4)

Students will be responsible for and teach a class section of a lower-division physics course. They will also attend a weekly meeting on teaching methods and materials conducted by the professor who supervises their teaching. (P/NP grades only) **Prerequisite:** consent of instructor. (F,W,S)

197. Physics Internship (4)

An enrichment program which provides work experience with industry, government offices, etc., under the supervision of a faculty member and industrial supervisor. **Prerequisite:** Completion of 90 units with 2.5 GPA and consent of faculty advisor.

198. Directed Group Study (2 or 4)

Directed group study on a topic or in a field not included in the regular departmental curriculum. (P/NP grades only.) **Prerequisites:** consent of instructor and departmental chair. (F,W,S)

199. Research for Undergraduates (2 or 4)

Independent reading or research on a problem by special arrangement with a faculty member. (P/NP grades only.) **Prerequisites:** consent of instructor and departmental chair. (F,W,S)

199H. Honors Thesis Research for Undergraduates (2–4)

Honors thesis research for seniors participating in the Honors Program. Research is conducted under the supervision of a physics faculty member. **Prerequisite:** admission to the Honors Program in physics. (F,W,S)

GRADUATE

200A. Theoretical Mechanics (4)

Lagrange's equations and Hamilton's principle; symmetry and constants of the motion. Applications to: charged particle motion; central forces and scattering theory; small oscillations; anharmonic oscillations; rigid body motion; continuum mechanics. **Prerequisite:** Physics 110B or equivalent. (F)

200B. Theoretical Mechanics (4)

Hamilton's equations, canonical transformations; Hamilton-Jacobi theory; action-angle variables and adiabatic invariants; introduction to canonical perturbation theory, nonintegrable systems and chaos; Liouville equation; ergodicity and mixing; entropy; statistical ensembles. **Prerequisite:** Physics 200A. (W)

201. Mathematical Physics (5)

An introduction to mathematical methods used in theoretical physics. Topics include: a review of complex variable theory, applications of the Cauchy residue theorem, asymptotic series, method of steepest descent, Fourier and Laplace transforms, series solutions of ODE's and related special functions, Sturm Liouville theory, variational principles, boundary value problems, and Green's function techniques. (F)

203A. Advanced Classical Electrodynamics (5)

Electrostatics, symmetries of Laplace's equation and methods for solution, boundary value problems, electrostatics in macroscopic media, magnetostatics, Maxwell's equations, Green functions for Maxwell's equations, plane wave solutions, plane waves in macroscopic media. **Prerequisite:** Physics 100C or equivalent. (W)

203B. Advanced Classical Electrodynamics (4)

Special theory of relativity, covariant formulation of electrodynamics, radiation from current distributions and accelerated charges, multipole radiation fields, waveguides and resonant cavities. **Prerequisite:** Physics 203A. (S)

210A. Equilibrium Statistical Mechanics (4)

Approach to equilibrium: BBGKY hierarchy; Boltzmann equation; H-theorem. Ensemble theory; thermodynamic potentials. Quantum statistics; Bose condensation. Interacting systems: Cluster expansion; phase transition via mean-field theory; the Ginzburg criterion. **Prerequisites:** Physics 140A–B, 152A, 200A–B, or equivalent; concurrent enrollment in Physics 212C. (S)

210B. Nonequilibrium Statistical Mechanics (4)

Transport phenomena; kinetic theory and the Chapman-Enskog method; hydrodynamic theory; nonlinear effects and the mode coupling method. Stochastic processes; Langevin and Fokker-Planck equation; fluctuation-dissipation relation; multiplicative processes; dynamic field theory; Martin-Siggia-Rose formalism; dynamical scaling theory. **Prerequisite:** Physics 210A. (F)

210C. Statistical Field Theory (4)

Phase transition and critical phenomena: Landau-Ginzburg model and statistical field theory; Goldstone modes; breakdown of mean-field theory. Universality; scaling theory; the renormalization group. Epsilon expansion; large-N expansion; the nonlinear-sigma model. Topological defects; duality; the Kosterlitz-Thouless transition. **Prerequisite:** Physics 210A or consent of instructor. (W)

211A. Solid-State Physics (5)

The first of a two-quarter course in solid-state physics. Covers a range of solid-state phenomena that can be understood within an independent particle description. Topics include: chemical versus band-theoretical description of solids, electronic band structure calculation, lattice dynamics, transport phenomena and electrodynamics in metals, optical properties, semiconductor physics. **Prerequisite:** Physics 152A or equivalent. (F)

211B. Solid-State Physics (4)

Continuation of 211A. Deals with collective effects in solids arising from interactions between constituents. Topics include electron-electron and electron-phonon interactions, screening, band structure effects, Landau Fermi liquid theory. Magnetism in metals and insulators, superconductivity; occurrence, phenomenology, and microscopic theory. **Prerequisites:** Physics 210A, 211A. (offered in alternate years) (W)

212A. Quantum Mechanics (4)

Hilbert space formulation of quantum mechanics and application to simple systems: states and observables, uncertainty relations and measurements, time evolution, and mixed states and density matrix. Symmetries: commuting observables and symmetries, rotation group representations, Clebsch-Gordan coefficients, Wigner-Eckhardt theorem, and discrete symmetries (parity, time reversal, etc.). **Prerequisite:** Physics 130B or equivalent. (F)

212B. Quantum Mechanics (4)

Time independent perturbation theory: non-degenerate and degenerate cases, Zeeman effect, fine structure, exclusion principle, and many-electron atoms. Time dependent perturbation theory: interaction picture and Dyson series, transition rates. Radiation theory: quantization of EM field, calculation of atomic level transition rates, line width, and spontaneous decay. **Prerequisite:** Physics 212A. (W)

212C. Quantum Mechanics (4)

Scattering theory: Lippman-Schwinger formalism, Born approximation, partial waves, inelastic processes, and spin dependence. Path integrals: introductions and simple examples, rigid rotator, and Bohm-Aharonov effect. Dirac equation: single particle equation, hydrogen atom, and holes. **Prerequisites:** Physics 212A–B. (S)

214. Physics of Elementary Particles (4)

Classification of particles using symmetries and invariance principles, quarks and leptons, quantum electrodynamics, weak interactions, e+p- interactions, deep-inelastic lepton-nucleon scattering, pp collisions, introduction to QCD. **Prerequisite:** Physics 215A. (W)

215A. Particles and Fields (4)

The first quarter of a three-quarter course on field theory and elementary particle physics. Topics covered include the relation between symmetries and conservation laws, the calculation of cross sections and reaction rates, covariant perturbation theory, and quantum electrodynamics. (F)

215B. Particles and Fields (4)

Continuation of 215A. Gauge theory quantization by means of path integrals, SU(3) symmetry and the quark model, spontaneous symmetry breakdown, introduction to QCD and the Glashow-Weinberg-Salam model of weak interactions, basic issues of renormalization. **Prerequisite:** Physics 215A. (W)

215C. Particles and Fields (4)

Modern applications of the renormalization group in quantum chromodynamics and the weak interactions. Unified gauge theories, particle cosmology, and special topics in particle theory. **Prerequisites:** Physics 215A–B. (offered in alternate years) (S)

217. Field Theory and the Renormalization Group (4)

Application of field theoretic and renormalization group methods to problems in condensed matter, or particle physics. Topics will vary and may include: phase transition and critical phenomena; many body quantum systems; quantum chromodynamics and the electroweak model. **Prerequisite:** Physics 210A.

218A. Plasma Physics (4)

The basic physics of plasmas is discussed for the simple case of an unmagnetized plasma. Topics include: thermal equilibrium statistical properties, fluid and Landau theory of electron and ion plasma waves, velocity space instabilities, quasi-linear theory, fluctuations, scattering or radiation, Fokker-Planck equation. (F)

218B. Plasma Physics (4)

This course deals with magnetized plasma. Topics include: Appleton-Hartree theory of waves in cold plasma, waves in warm plasma (Bernstein waves, cyclotron damping). MHD equations, MHD waves, low frequency modes, and the adiabatic theory of particle orbits. **Prerequisite:** Physics 218A. (W)

218C. Plasma Physics (4)

This course deals with the physics of confined plasmas with particular relevance to the controlled fusion. Topics include: topology of magnetic fields, confined plasma equilibria, energy principles, ballooning and kink instabilities, resistive MHD modes (tearing, rippling and pressure-driven), gyrokinetic theory, microinstabilities and anomalous transport, and laser-plasma interactions relevant to inertial fusion. **Prerequisite:** Physics 218B. (S)

133/219. Condensed Matter/Materials Science Laboratory (4)

A project-oriented laboratory course utilizing state-of-the-art experimental techniques in materials science. The course prepares students for research in a modern condensed matter-materials science laboratory. Under supervision, the students develop their own experimental ideas after investigating current research literature. With the use of sophisticated state-of-the-art instrumentation students conduct research, write a research paper, and make verbal presentations. **Prerequisites:** Physics 2CL and 2DL for undergraduates; Physics 152A or Physics 211A for graduate students. (S)

220. Group Theoretical Methods in Physics (4)

Study of group theoretical methods with applications to problems in high energy, atomic, and condensed matter physics. Representation theory, tensor methods, Clebsch-Gordan series. Young tableaux. The course will cover discrete groups, Lie groups and Lie algebras, with emphasis on permutation, orthogonal, and unitary groups. **Prerequisite:** Physics 212C. (S)

221A. Nonlinear and Nonequilibrium Dynamics of Physical Systems (4)

An introduction to the modern theory of dynamical systems and applications thereof. Topics include maps and flows, bifurcation theory and normal form analysis, chaotic attractors in dissipative systems, Hamiltonian dynamics and the KAM theorem, and time series analysis. Examples from real physical systems will be stressed throughout. **Prerequisite:** Physics 200B. (Offered in alternate years.) (W)

221B. Nonlinear and Nonequilibrium Dynamics of Physical Systems (4)

Nonlinear dynamics in spatially extended systems. Material to be covered includes fluid mechanical instabilities, the amplitude equation approach to pattern formation, reaction-diffusion dynamics, integrable systems and solitons, and an introduction to coherent structures and spatio-temporal chaos. **Prerequisites:** Physics 210B and 221A. (Offered in alternate years.) (S)

222A. Elementary Particle Physics (4)

Weak interactions; neutrino physics; C,P, and CP violation; electroweak gauge theory and symmetry breaking. Design of detectors and experiments; searches for new phenomena. **Prerequisites:** Physics 214. (W)

223. Stellar Structure and Evolution (4)

Energy generation, flow, hydrostatic equilibrium, equation of state. Dependence of stellar parameters (central surface temperature, radius, luminosity, etc.) on stellar mass and

relation to physical constants. Relationship of these parameters to the H-R diagram and stellar evolution. Stellar interiors, opacity sources, radiative and convective energy flow. Nuclear reactions, neutrino processes. Polytypic models. White dwarfs and neutron stars. **Prerequisites:** Physics 130C or equivalent, Physics 140A–B or equivalent. (S/U grades permitted.) (Offered in alternate years.) (F)

224. Physics of the Interstellar Medium (4)

Gaseous nebulae, molecular clouds, ionized regions, and dust. Low energy processes in neutral and ionized gases. Interaction of matter with radiation, emission and absorption processes, formation of atomic lines. Energy balance, steady state temperatures, and the physics and properties of dust. Masers and molecular line emission. Dynamics and shocks in the interstellar medium. **Prerequisites:** Physics 130A–B or equivalent, Physics 140A–B or equivalent. (S/U grades permitted.) (Offered in alternate years.)

225A–B. General Relativity (4-4)

This is a two-quarter course on gravitation and the general theory of relativity. The first quarter is intended to be offered every year and may be taken independently of the second quarter. The second quarter will be offered in alternate years. Topics covered in the first quarter include special relativity, differential geometry, the equivalence principle, the Einstein field equations, and experimental and observational tests of gravitation theories. The second quarter will focus on more advanced topics, including gravitational collapse, Schwarzschild and Kerr geometries, black holes, gravitational radiation, cosmology, and quantum gravitation. (225B offered in alternate years.) (F,W)

226. Galaxies and Galactic Dynamics (4)

The structure and dynamics of galaxies. Topics include potential theory, the theory of stellar orbits, self-consistent equilibria of stellar systems, stability and dynamics of stellar systems including relaxation and approach to equilibrium. Collisions between galaxies, galactic evolution, dark matter, and galaxy formation. **Prerequisite:** consent of instructor. (Offered in alternate years.)

227. Cosmology (4)

An advanced survey of topics in physical cosmology. The Friedmann models and the large-scale structure of the universe, including the observational determination of H_0 (the Hubble constant) and q_0 (the deceleration parameter). Galaxy number counts. A systematic exposition of the physics of the early universe, including vacuum phase transitions; inflation; the generation of net baryon number, fluctuations, topological defects and textures. Primordial nucleosynthesis, both standard and nonstandard models. Growth and decay of adiabatic and isocurvature density fluctuations. Discussion of dark matter candidates and constraints from observation and experiment. Nucleocosmochronology and the determination of the age of the universe. **Prerequisite:** consent of instructor. (Offered in alternate years.)

228. High-Energy Astrophysics and Compact Objects (4)

The physics of compact objects, including the equation of state of dense matter and stellar stability theory. Maximum mass of neutron stars, white dwarfs, and super-massive objects. Black holes and accretion disks. Compact X-ray sources and transient phenomena, including X-ray and γ -ray bursts. The fundamental physics of electromagnetic radiation mechanisms: synchrotron radiation, Compton scattering, thermal and nonthermal bremsstrahlung, pair production, pulsars, particle acceleration models, neutrino production and energy loss mechanisms, supernovae, and neutron star production. **Prerequisites:** Physics 130A–B–C or equivalent. (Offered in alternate years.)

230. Advanced Solid-State Physics (4)

Selection of advanced topics in solid-state physics; material covered may vary from year to year. Examples of topics covered: disordered systems, surface physics, strong-coupling superconductivity, quantum Hall effect, low-dimensional solids, heavy fermion systems, high-temperature superconductivity, solid and liquid helium. **Prerequisite:** Physics 211B. (S)

152B/232. Electronic Materials (4)

Physics of electronic materials. Semiconductors: bands, donors and acceptors, devices. Metals: Fermi surface,

screening, optical properties. Insulators: dia-/ferro-electrics, displacive transitions. Magnets: dia-/para-/ferro-/antiferromagnetism, phase transitions, low temperature properties. Superconductors: pairing, Meissner effect, flux quantization, BCS theory. **Prerequisite:** Physics 152A, Phys. 211 or consent of instructor. Graduate students in Phys. 232 will complete a special topics paper. (S)

235. Nonlinear Plasma Theory (4)

This course deals with nonlinear phenomena in plasmas. Topics include: orbit perturbation theory, stochasticity, Arnold diffusion, nonlinear wave-particle and wave-wave interaction, resonance broadening, basics of fluid and plasma turbulence, closure methods, models of coherent structures. **Prerequisite:** Physics 218C or consent of instructor. (Offered in alternate years.) (W)

239. Special Topics (1-3)

From time to time a member of the regular faculty or a resident visitor will find it possible to give a self-contained short course on an advanced topic in his or her special area of research. This course is not offered on a regular basis, but it is estimated that it will be given once each academic year. (S/U grades permitted.)

141/241. Computational Physics I: Probabilistic Models and Simulations (4-4)

Project-based computational physics laboratory course with student's choice of Fortran90/95 or C/C++. Applications from materials science to the structure of the early universe are chosen from molecular dynamics, classical and quantum Monte Carlo methods, physical Langevin/Fokker-Planck processes, and other modern topics. Graduate students will do advanced projects. **Prerequisites:** upper-division standing or consent of instructor; graduate standing for 241. (W)

142/242. Computational Physics II: PDE and Matrix Models (4-4)

Project-based computational physics laboratory course for modern physics and engineering problems with student's choice of Fortran90/95 or C/C++. Applications of finite element PDE models are chosen from quantum mechanics and nanodevices, fluid dynamics, electromagnetism, materials physics, and other modern topics. Graduate students will do advanced projects. **Prerequisites:** upper-division standing; graduate standing for 242. (S)

243. Stochastic Methods (4)

Introduction to methods of stochastic modeling and simulation. Topics include: random variables; stochastic processes; Markov processes; one-step processes; the Fokker-Planck equation and Brownian motion; the Langevin approach; Monte-Carlo methods; fluctuations and the Boltzmann equation; and stochastic differential equations. (F)

244. Parallel Computing in Science and Engineering (4)

Introduction to basic techniques of parallel computing, the design of parallel algorithms, and their scientific and engineering applications. Topics include: parallel computing platforms; message-passing model and software; design and application of parallel software packages; parallel visualization; parallel applications. (S)

250. Condensed Matter Physics Seminar (0-1)

Discussion of current research in physics of the solid state and of other condensed matter. (S/U grades only.) (F,W,S)

251. High-Energy Physics Seminar (0-1)

Discussions of current research in nuclear physics, principally in the field of elementary particles. (S/U grades only.) (F,W,S)

252. Plasma Physics Seminar (0-1)

Discussions of recent research in plasma physics. (S/U grades only.) (F,W,S)

253. Astrophysics and Space Physics Seminar (0-1)

Discussions of recent research in astrophysics and space physics. (S/U grades only.) (F,W,S)

257. High-Energy Physics Special Topics Seminar (0-1)

Discussions of current research in high-energy physics. (S/U grades only.) (F,W,S)

258. Astrophysics and Space Physics Special Topics Seminar (0-1)

Discussions of current research in astrophysics and space physics. (S/U grades only.) (F,W,S)

260. Physics Colloquium (0-1)

Discussions of recent research in physics directed to the entire physics community. (S/U grades only.) (F,W,S)

261. Seminar on Physics Research at UCSD (0-1)

Discussions of current research conducted by faculty members in the Department of Physics. (S/U grades only.) (W,S)

266. Recent Topics in Condensed Matter Physics (1-3)

The course is dedicated to recent developments in the area of condensed matter physics through lectures given by graduate students and postdocs. The course teaches practical skills, delivering research lectures, and answering questions in front of a research audience. **Prerequisite:** physics graduate students in good standing. (F,W,S)

171/271. Biophysics of Neurons and Networks (4-4)

Fundamental limits to measurements on nervous systems, the biophysics of excitable membranes and neurons, and the fundamentals of recurrent neuronal networks. The emphasis is on information processing by the nervous system through physical reasoning and mathematical analysis. Three hours lecture. The graduate version, Physics 271, will include a report at the level of a research proposal. **Prerequisites:** Physics 100A and 110A, BILD 1, Chemistry 6C and Physics 140A, for graduate students, consent of instructor. The graduate version, Physics 271, will include a report at the level of a research proposal. (F)

172/272. Biophysics of Molecules (4-4)

Physical concepts and techniques used to study the structure and function of biological molecules, the thermodynamics and kinetics of biological activity, and physical descriptions of biological processes. Examples from enzyme action, protein folding, photobiology, and molecular motors. Three hours lecture. **Prerequisites:** Physics 100A and 110A, BILD 1, Chemistry 6C and Physics 130A and graduate students consent of instructor. The graduate version, Physics 272, will include a report at the level of a research proposal. (W)

180/280. Teaching and Learning Physics (4)

How people learn and understand key concepts in physics. Readings in physics, physics education research, and cognitive science. Field work teaching and evaluating pre-college and college students. Useful for students interested in teaching and learning physical sciences. Undergraduate students are required to read and discuss papers in class. Graduate students are expected to read the papers and prepare an annotated bibliography on the background literature, then lead the in-class discussion on the topics covered in the papers. **Prerequisites:** Physics 1, 2, or 4 series, or consent of instructor.

295. M.S. Thesis Research in Materials Physics (1-12)

Directed research on M.S. dissertation topic. (F,W,S)

297. Special Studies in Physics (1-4)

Studies of special topics in physics under the direction of a faculty member. **Prerequisites:** consent of instructor and departmental vice chair, education. (S/U grades permitted.) (F,W,S)

298. Directed Study in Physics (1-12)

Research studies under the direction of a faculty member. (S/U grades permitted.) (F,W,S)

299. Thesis Research in Physics (1-12)

Directed research on dissertation topic. (F,W,S)

500. Instruction in Physics Teaching (1-4)

This course, designed for graduate students, includes discussion of teaching, techniques and materials necessary to teach physics courses. One meeting per week with course instructors, one meeting per week in an assigned recitation section, problem session, or laboratory section. Students are required to take a total of two units of Physics 500. (F,W,S)

Political Science

PROFESSORS

Amy B. Bridges, Ph.D.
William M. Chandler, Ph.D.
Ellen T. Comisso, Ph.D.
Wayne A. Cornelius, Ph.D., *Emeritus*
Paul W. Drake, Ph.D., *Emeritus*
Steven P. Erie, Ph.D.
Clark C. Gibson, Ph.D., Chair
Peter A. Gourevitch, Ph.D.
Germaine A. Hoston, Ph.D.
Alan C. Houston, Ph.D.
Peter H. Irons, Ph.D., J.D., *Emeritus*
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Samuel L. Popkin, Ph.D.
Phillip G. Roeder, Ph.D., *Academic Senate*
Distinguished Teaching Award
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Peter H. Smith, Ph.D.
Kaare Strom, Ph.D.
Tracy B. Strong, Ph.D.
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Distinguished Teaching Award

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Harvey Goldman, Ph.D.
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Daniel Hallin, Ph.D.
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Richard Kronick, Ph.D.
Mathew D. McCubbins
Susan L. Shirk, Ph.D.

Barbara Walter, Ph.D.

ASSOCIATE ADJUNCT PROFESSOR

David S. Law, Ph.D., J.D.

LECTURERS WITH POTENTIAL SECURITY OF EMPLOYMENT

Maureen C. Feeley, Ph.D.
OFFICE: Social Science Building
<http://polisci.ucsd.edu>

THE MAJOR PROGRAM

Political science addresses some of the fundamental problems facing human society. Questions concerning world peace, government policies aimed at achieving economic stability and growth, the management of environmental quality, control over political competition, the possibility of using law to affect social and political change, and the gap between the rich and poor in the United States and abroad are all on the research agenda of contemporary political scientists. The general purpose of the major is to address these and other issues systematically, and, simultaneously, to raise the broad theoretical questions which can help students relate today's political debates to those debates about politics which have kept a theoretical tradition alive for over 2,000 years.

Students may major in political science as a general program of study, or they may concentrate in one of six areas: (1) American politics, (2) comparative politics, (3) international relations, (4) political theory, (5) public law, and (6) public policy. All majors in political science must satisfy the following sixteen courses: PS 30 (Political Inquiry), three of the following four lower-division courses (Political Science 10, 11, 12 and 13) and twelve upper-division courses. (Note: Lower-division courses PS 27 and PS 40 may not be used to satisfy requirements in the political science major or minor.) Moreover, as stated below, students concentrating in one of the fields must satisfy that field's particular lower- and upper-division requirements.

REQUIREMENTS FOR MAJOR IN POLITICAL SCIENCE WITHOUT AN AREA OF CONCENTRATION

1. Three of the four lower-division courses from 10, 11, 12, 13.
2. Political Science 30
3. Any twelve upper-division political science courses

REQUIREMENTS FOR MAJOR IN POLITICAL SCIENCE WITH AN AREA OF CONCENTRATION

Major in Political Science/American Politics

1. Lower-division required: PS 10 (in addition to two other lower-division courses from 11, 12, 13)
2. Political Science 30
3. Five upper-division American courses:

- a. at least two of which must be from the 100 sequence: 100A-B-C, 100DA, 100E, 100H, 100J, 100K, 100L, 100M, 100N
- b. the additional courses for the American concentration must be chosen from: 102C, 102E-F-G, 102J-K-L, 103A-B-C, 104A-B-C-D, 104F, 104I, 104L-M, 105A-B-C, 108

Major in Political Science/Comparative Politics

1. Lower-division required: PS 11 (in addition to two other lower-division courses from 10, 12, 13)
2. Political Science 30
3. Five upper-division courses, including
 - a. at least one from the following thematic courses: 120K, 122A-B, 123, 124A, 125, 125A, 126AA-AB, 127, 136A-B-C, 137A, 150A-B
 - b. and at least one each from two of the following three regional areas:
Asia: 121, 121B, 130H, 131C, 132C, 133A, 133D, 133DD, 133G, 133J
Europe: 120A-B-C-D-E, 120H, 120I-J-K, 126AA-AB, 130AA, 130AD
Latin America: 134AA, 134B, 134D; 134I

Major in Political Science/International Relations

1. Lower-division required: PS 12 (in addition to two other lower-division courses from 10, 11, 13)
2. Political Science 30
3. Five upper-division IR courses with at least one each from the following two groups:
 - a. Foreign Policy/National and International Security: 140B-C, 142A, 142I-J-K-L-M-N-O-P, 143A, 145A, 146A, 146E, 150A, 152
 - b. Political Economy/Theory of International Relations: 126AA-AB, 140A, 141B, 142L, 144AB, 142L, 144E-F, 145C, 146A, 152

Major in Political Science/Political Theory

1. Three of four lower-division courses from 10, 11, 12, 13
2. Political Science 30
3. 110A-B-C
4. And at least two additional courses from 110DA, 110EA, 110EB, 110EC, 110ED, 110H, 110J, 110N, 110T, 112A, 112C, 113A-B, 114B, 115A, 116A, 119A

Major in Political Science/Public Law

1. Lower-division required: PS 10 (in addition to two other lower-division courses from 11, 12, 13)
2. Political Science 30
3. Five of the following: 100A-B, 102L, 104A-B-C-D, 104F, 104I, 104L-M

Major in Political Science/Public Policy

1. Lower-division required: PS 10 (in addition to two other lower-division courses from 11, 12, 13)

2. Political Science 30
3. 160AA
4. One of 160AB, 167A, 168
5. Two of 100A-B-C, 100E-F-G, 100I-J
6. One of 102B-C, 102E, 102L, 103A, 103B, 142A, 142J, 150A-B, 162, 163, 165, 166F

Two upper-division courses in a field may be substituted for that field's lower-division course. However, these courses cannot also be used to satisfy the upper-division course requirements for a concentration of that field.

Since course offerings change from year to year, students are strongly advised to consult the department for the latest listing of courses before preregistration.

Agreements signed between UC San Diego and several community colleges allow students to apply some community college courses toward lower-division course requirements for the major. Transfer students must, however, take at least one of the lower-division courses (10, 11, 12, 13) in residence at UCSD. Courses taken elsewhere may be credited toward the major. Please check with an undergraduate student affairs advisor for more information on credit for courses taken elsewhere.

Students who pass the Advanced Placement (AP) Tests in American or Comparative Politics may petition to be exempted from taking PS 10 or 11 (respectively). Effective fall 2004, students must pass with a score of 5 to be exempted from taking PS 10 or 11.

At least nine courses in political science must be taken in residence at UCSD. A total maximum of six courses may be taken elsewhere and applied toward the major. This applies to transfer students, students who pass the AP exam(s), as well as students who study abroad on the Education Abroad Program (EAP) or the Opportunities Abroad Program (OAP). Students planning to transfer course work completed elsewhere are urged to consult an undergraduate student affairs advisor.

Double majors who include political science as one of their two majors must fulfill the requirements of both programs. Please consult an undergraduate student affairs advisor for more information.

Students must maintain an overall 2.0 GPA in the major. To be counted toward satisfying the requirements for the major, upper- and lower-division courses must be completed with a C- or better grade. Courses taken to satisfy requirements for the major may not be taken Pass/Not Pass with the exception of a maximum of two independent study courses (PS 199).

Honors candidates for departmental honors are required to take PS 191A and B in which they write a senior thesis. To be admitted to the Honors Seminar a student must be of senior standing in the first quarter of the seminar, have a minimum GPA of 3.6 in political science, have completed all lower-division requirements including Political Science 30 and five upper-division courses. Also, students must have an advisor prior to enrolling in the Honors Seminar. These courses may be counted toward the upper-division requirement.

CAREER GUIDANCE

The premise of our educational philosophy is that the best professional preparation for productive careers which we can provide is one which is broad, theoretical, and only indirectly related to the current job market. Our majors graduate into a wide range of career options.

Many political science majors at UCSD will seek admission to a law school. Although law schools make no recommendation concerning the usefulness of any undergraduate major, a B.A. in political science should be seen as a useful complement to a law degree. Students who take courses in American government, policy analysis, and law and politics find that they develop a keen understanding of the role of law in the general political process. This helps students understand the limits and possibilities of the legal process in fostering change or in preserving the status quo. This same curriculum provides a solid foundation for a career in journalism. Students with any specific questions regarding law are advised to consult with career services.

Increasingly, political science majors are preparing for careers in business or as policy analysts in both the public and private sectors. Many of these students pursue advanced degrees in public policy or study for a master's in business administration. Students interested in this option should look into public policy, American, or comparative politics as an area of concentration. Some political science majors are interested in careers in international organization or diplomacy. These students should look into international relations as an area of concentration. In addition, a broad array of courses in comparative politics is essential for anyone interested in a career of international service.

A political science major offers excellent preparation for teaching in the elementary schools. If you are interested in earning a California teaching credential from UCSD, contact the Teacher Education Program for information about the prerequisite and professional preparation requirements. It is recommended that you contact TEP as early as possible in your academic career.

Students interested in majoring or minoring in political science should stop by the Department of Political Science Office, SSB 301, or visit our Web site at <http://www.polisci.ucsd.edu>.

STUDY ABROAD

Political science majors are encouraged to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP). Information on EAP/OAP is given in the "Education Abroad Program" section of the UC San Diego General Catalog. Interested students should contact the Programs Abroad Office in the International Center and visit its Web site at <http://programsabroad.ucsd.edu>. Financial aid can be used for EAP/OAP study, and special study-abroad scholarships are also available.

MINOR IN POLITICAL SCIENCE

For students entering UCSD winter 1998 or later the following guidelines for a political science minor will apply: seven political science courses, not including Political Science 27 and 40, with a minimum of

five upper-division. Continuing students may follow the guidelines for a minor of a total of six political science courses, with a minimum of three upper-division. All courses taken for a political science minor must be taken for a letter grade.

INTERDISCIPLINARY MINOR

The Department of Political Science takes part in one interdisciplinary minors offered at UCSD. The law and society minor offers students the opportunity to examine the role of the legal system in society. Students should note that Law and Society 101 (Contemporary Legal Issues) may be used in fulfilling the twelve upper-division course requirement for the political science major. Additional information on this program is available through the Warren Interdisciplinary Programs Office.

RESEARCH

The Department of Political Science is closely affiliated with several research centers/institutes/projects currently on campus. Faculty members directly involved include: Steven Erie, director, Urban Studies Program; J. Lawrence Broz, coordinator, Project in International Affairs; Germaine Hoston, director, Center for TransPacific Studies in Values, Culture, and Politics; Mathew McCubbins, director, Public Policy Research Project; Zoltan Hajnal and Thaddeus Kousser, coordinators, American Political Institutions Project; Wayne Cornelius, director, Center for Comparative Immigration Studies; and Clark Gibson, coordinator, Political Economy of Development Series. For further information please refer to the General Catalog section on "Research at UCSD."

THE PH.D. PROGRAM

The Department of Political Science at the University of California, San Diego offers a program of graduate studies leading to the Ph.D. degree. Instruction is provided in the major fields of the discipline. For purposes of comprehensive examinations, the discipline is broken into four fields: American politics, comparative politics, international relations, and political theory. The department also offers a variety of courses that are of a methodological or epistemological nature, spanning the various fields.

PROGRAM OVERVIEW

Course Work

Students must complete eighteen quarter courses before the end of the second year with an overall grade point average of 3.3 or better. All students must complete the six-course core curriculum, Political Science 200A-C and 204A-C. No other UCSD courses may be substituted to fulfill this requirement. Fifteen of these courses must be offered by the department, with a number between Political Science 200 and 279. (Political Science 200A-C and 204A-C count toward this requirement). No more than three courses, offered within or outside the department, may be taken on a satisfactory/unsatisfactory basis. In some individual fields the faculty normally recommends that students take

more graded courses in political science than the minimum.

Additional requirements, such as course work or research skills including proficiency in a foreign language, may be set by the faculty in any examination area as a prerequisite for taking the General Examination in that area.

A student who has completed work toward a graduate degree in political science at another institution prior to enrollment at UCSD is subject to all requirements of the UCSD program. The only exception is as follows: With permission of the department's director of graduate studies a student that has received a graduate degree in political science at another institution may count up to four quarter-course equivalents (taken at other institutions) toward the eighteen-course requirement, including the core curriculum.

Good progress toward the Ph.D. requires that a student complete nine courses by the end of the first year. In addition to the six-course core curriculum, students are advised to complete two or three field core courses during their first year. At the end of the second year good progress requires completion of eighteen courses, of which at least fifteen must be numbered between Political Science 200 and 279.

A student who has not made good progress in course work may receive no more than a 33 percent teaching or research assistantship from the department for the following year. Students on a UCSD fellowship may receive no more than two-thirds of their stipend for the following year.

General Examination

By the end of the second year, a student must stand for the General Examination. The General Examination consists of written examinations in each of two fields and in a focus area, and an oral examination. The department offers examinations in four fields: American politics, comparative politics, international relations, and political theory. Each field also offers examinations in a number of focus areas that represent a specialized sub-field within a major research literature. By the first day of spring quarter of the second year each student must submit to the graduate coordinator a General Examination plan identifying the two fields within which exams will be taken, and the topic of the focus-field. The General Examination will normally take place during the seventh week of spring quarter. Normally, each written examination will be taken on a separate day within a one-week period, and the oral examination will be given within two weeks of the completion of the written examinations.

Written Examinations

Written field examinations last four hours. These examinations cover major theoretical approaches in a field. They are structured so that passing requires general knowledge and understanding of important work in the field as a whole. Written focus-area examinations last four hours. These examinations cover in greater depth one subfield within a major research literature. Written examinations are open-note and open-book. Students are expected to do their own work, and to compose their answers on

the day of the examination. Text from computer files may not be downloaded into these answers.

Oral Examinations

The oral examination normally lasts between one and two hours, and covers all three written examinations. It may also include discussion of the student's seminar paper. A student must take the oral examination, even if one or more of the written examinations is such that it is deemed impossible to pass the entire examination.

Each field has a designated field coordinator, appointed by the department chair in consultation with the director of graduate studies. The field coordinator, in consultation with the faculty in the field, prepares the written examinations. Each General Examination is graded by a committee of four faculty members, with two from each of the student's examination fields. These examiners are nominated by the field coordinator and appointed by the department chair. Students are normally informed of the composition of General Examination boards during the fourth week of the spring quarter.

Each General Examination is graded in its entirety. A student passes or fails the entire examination, not simply parts of it. The examination committee may assign a grade of fail, pass, or distinction. A student passes the General Examination if at least three examiners vote to assign a grade of pass or better. A student receives a grade of distinction by vote of at least three examiners. The student will receive written notification of the examination committee's decision. A student who fails the General Examination must retake it at least one week prior to the start of the fall quarter of the third year. A student who fails the General Examination twice will not be permitted to continue in the graduate program in political science.

Good progress toward the Ph.D. requires that a student complete the General Examination by the end of the second year. A student who has not attempted all parts of the General Examination by the end of the second year may not continue in the program.

Seminar Papers

A student must complete one seminar paper in one of his or her examination fields. This paper may be written as part of the requirements for a regularly scheduled seminar course or in an independent research course.

Certification that a paper fulfills the seminar paper requirement is at the sole discretion of the faculty member supervising the work (i.e., the instructor of the course for which the paper was written). A student may not take the General Examination before fulfilling the seminar paper requirement. A final draft of the paper, along with the appropriate form certifying that the paper meets the seminar paper requirement, must be submitted to the graduate coordinator before the written portion of the General Examination may be taken. Copies of the seminar paper will be distributed to the General Examination committee.

Departmental Workshops

A student must complete one seminar paper in one of his or her examination fields. This paper may be written as part of the requirements for a regularly scheduled seminar course or in an independent research course.

Certification that a paper fulfills the seminar paper requirement is at the sole discretion of the faculty member supervising the work (i.e., the instructor of the course for which the paper was written).

A student may not take the General Examination before fulfilling the seminar paper requirement. A final draft of the paper, along with the appropriate form certifying that the paper meets the seminar paper requirement, must be submitted to the graduate coordinator before the written portion of the General Examination may be taken. Copies of the seminar paper will be distributed to the General Examination committee.

Masters in Political Science

Doctoral students in the Department of Political Science who do not already hold an M.A. may apply for an M.A. after successfully completing fifteen quarter courses, nine of which must be numbered between Political Science 200 and 279, and one seminar paper approved by a member of the department.

Advancement to Candidacy

A student must complete one seminar paper in one of his or her examination fields. This paper may be written as part of the requirements for a regularly scheduled seminar course or in an independent research course.

Certification that a paper fulfills the seminar paper requirement is at the sole discretion of the faculty member supervising the work (i.e., the instructor of the course for which the paper was written).

A student may not take the General Examination before fulfilling the seminar paper requirement. A final draft of the paper, along with the appropriate form certifying that the paper meets the seminar paper requirement, must be submitted to the graduate coordinator before the written portion of the General Examination may be taken. Copies of the seminar paper will be distributed to the General Examination committee.

Dissertation

By the end of the sixth year good progress requires completion of the dissertation. A student who fails to complete the dissertation by the end of the sixth year may be denied all departmental financial assistance.

Advising and Evaluation

Each incoming student is assigned a temporary faculty advisor by the director of graduate studies. At the end of the first year students are given the opportunity to confirm that advisor or select a new one. At the beginning of the third year each student must select a faculty member from the department to serve as prospectus advisor. The prospectus advisor will help guide the student in writing the prospectus and selecting a dissertation committee. It

is not assumed that the prospectus advisor will subsequently chair the dissertation committee, or even be a member of it. Those roles should be determined as the prospectus develops.

During the spring quarter each student is evaluated by his or her advisor in consultation with the departmental faculty. The student will receive a written evaluation from the advisor each year. The student must sign this evaluation for it to become an official part of the student's departmental file. As part of the first-year review each student must complete a plan of study that identifies a faculty seminar paper supervisor, two examination fields, a focus area, and intended preparation in each. This plan must be signed by the student's faculty advisor and submitted to the graduate coordinator by the end of spring quarter of the first year.

Student Petitions

To contest an evaluation or any departmental action a student must do so in writing. A petition should be submitted to the director of graduate studies no later than the end of the quarter following the evaluation (or other action) contested by the student.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

10. Introduction to Political Science: American Politics (4)

This course surveys the processes and institutions of American politics. Among the topics discussed are individual political attitudes and values, political participation, voting, parties, interest groups, Congress, presidency, Supreme Court, the federal bureaucracy, and domestic and foreign policy making.

11. Introduction to Political Science: Comparative Politics (4)

The nature of political authority, the experience of a social revolution, and the achievement of an economic transformation will be explored in the context of politics and government in a number of different countries.

12. Introduction to Political Science: International Relations (4)

The issues of war/peace, nationalism/internationalism, and economic growth/redistribution will be examined in both historical and theoretical perspectives.

13. Power and Justice (4)

An exploration of the relationship between power and justice in modern society. Materials include classic and contemporary texts, films and literature.

27. Ethics and Society (4)

(Same as Phil. 27) An examination of ethical principles (e.g., utilitarianism, individual rights, etc.) and their social and political applications to contemporary issues such as abortion, environmental protection, and affirmative action. Ethical principles will also be applied to moral dilemmas familiar in government, law, business, and the professions. Satisfies the Warren College ethics and society requirement. **Prerequisites:** CAT 2 and 3, DOC 2 and 3, MCWP 40 and 50, Hum. 1 and 2, MMW 2 and 3, WCWP 10A–B, or WARR 11A–B.

30. Political Inquiry (4)

Introduction to the logic of inference in social science and to quantitative analysis in political science and public policy including research design, data collection, data description

and computer graphics, and the logic of statistical inference (including linear regression).

40. Introduction to Law and Society (4)

This course is designed as a broad introduction to the study of law as a social institution and its relations to other institutions in society. The focus will be less on the substance of law (legal doctrine and judicial opinions) than on the process of law—how legal rules both reflect and shape basic social values and their relation to social, political, and economic conflicts within society.

87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to 15 to 20 students, with preference given to entering freshmen. May not be used to fulfill any major or minor requirements in political science.

99R. Independent Study (1)

Independent study or research under direction of a member of the faculty. **Prerequisites:** Student must be of freshman class standing, and a Regents Scholar; Approved Special Studies Form.

UPPER-DIVISION

Minimum requirement for all upper-division courses is at least one quarter of lower-division political science, or upper-division standing.

AMERICAN POLITICS

100A. The Presidency (4)

The role of the presidency in American politics. Topics will include nomination and election politics, relations with Congress, party leadership, presidential control of the bureaucracy, international political role, and presidential psychology.

100B. The U.S. Congress (4)

This course will examine the nomination and election of congressmen, constituent relationships, the development of the institution, formal and informal structures, leadership, comparisons of House with Senate, lobbying, and relationship with the executive branch.

100C. American Political Parties (4)

This course examines the development of the two major parties from 1789 to the present. Considers the nature of party coalitions, the role of leaders, activists, organizers, and voters, and the performance of parties in government.

100DA. Voting, Campaigning, and Elections (4)

A consideration of the nature of public opinion and voting in American government. Studies of voting behavior are examined from the viewpoints of both citizens and candidates, and attention is devoted to recent efforts to develop models of electoral behavior for the study of campaigns. The role of mass media and money also will be examined.

100E. Interest Group Politics (4)

The theory and practice of interest group politics in the United States. Theories of pluralism and collective action, the behavior and influence of lobbies, the role of political action committees, and other important aspects of group action in politics are examined. **Prerequisite:** sophomore standing.

100H. Race and Ethnicity in American Politics (4)

This course examines the processes by which racial and ethnic groups have/have not been incorporated into the American political system. The course focuses on the political experiences of European immigrant groups, blacks, Latinos, and Asians.

100J. Race in American Political Development (4)

Readings examine how the multiracial character of the United States has shaped the broad outlines of American politics. Cases include the founding/the Constitution, southern politics, social organization in formerly Mexican

regions, the New Deal, consequences of limited suffrage. **Prerequisite:** upper-division standing.

100K. Railroads and American Politics (4)

The railroads transformed the economy and politics of the United States in the nineteenth century. The railroads were the first big businesses and their sheer size lead inevitably to conflict with governments at all levels. This conflict shaped modern politics. **Prerequisite:** upper-division standing.

100M. Political Psychology (4)

We begin with hypotheses about how people develop political attitudes, and methods to test those hypotheses. The second half focuses on emerging cognitive neuroscience insights, including brain imaging, and asks how these inform theories of political cognition, affect, and behavior. **Prerequisite:** upper-division standing.

100N. Politics in Washington (4)

Examines Washington as a political community, its institutions, culture, and history. In addition to its elected officeholders and senior government officials, it examines Washington's subcommunities: the national news industry, diplomatic service, the representation of interests. **Prerequisite:** department approval is required.

100O. Perspectives on Race (4)

Drawing heavily from the political psychology literature, this course looks at race in American politics from a variety of perspectives. We consider psychological, genetic, neuroscience, economic, political, sociological, and legal views of what drives powerful dynamics of race in our country. **Prerequisite:** upper-division standing.

100P. Economic Entrepreneurs and American Politics (4)

This course is concerned with the interaction between representative democracy and capitalism in American political history. The key to understanding this interaction is the role of the entrepreneur in the economy and how unexpected economic change shapes politics. **Prerequisite:** upper-division standing.

102C. American Political Development (4)

Examines selected issues and moments in the political history of the United States, comparing competing explanations and analyses of U.S. politics. Likely topics include the founding, "American exceptionalism," change in the party system, race in U.S. politics, the "new institutionalism."

102E. Urban Politics (4)

(Same as USP107) This survey course focuses upon the following six topics: the evolution of urban politics since the mid-nineteenth century; the urban fiscal crisis; federal/urban relationships; the "new" ethnic politics; urban power structure and leadership; and selected contemporary policy issues such as downtown redevelopment, poverty, and race.

102F. Mass Media and Politics (4)

This course will explore both the role played by mass media in political institutions, processes and behaviors, and reciprocally, the roles played by political systems in guiding communication processes.

102G. Special Topics in American Politics (4)

An undergraduate course designed to cover various aspects of American politics. May be repeated for credit two times, provided each course is a separate topic, for a maximum of twelve units.

102J. Advanced Topics in Urban Politics (4)

(Same as USP 110) Building upon the introductory urban politics course, the advanced topics course explores issues such as community power, minority empowerment, and the politics of growth. A research paper is required. Students wishing to fulfill the paper requirement with field research should enroll in the subsequent PS 102JJ course (offered Summer Session 2). **Prerequisite:** consent of instructor.

102JJ. Field Research in Urban Politics (2)

(Same as USP 111) To be taken with the approval of the PS 102J instructor, this course allows students to do original field research on topics in urban politics. This course is offered in Summer Session 2 subsequent to a 102J course.

Prerequisite: consent of instructor. May not be used to fulfill any major or minor requirements in Political Science.

102K. The Urban Underclass (4)

The lives of individuals living in ghetto poverty in the United States. Causes and consequences of ghetto poverty. Political debates surrounding the underclass and different possible solutions. **Prerequisite:** upper-division standing.

102L. The Politics of Regulation (4)

Politics and policy-making issues in regulation. Themes: regulation versus legislation; general versus specific grants of regulatory power; market versus command mechanisms; private property; and risk assessment. Emphasis on American regulatory policy, examples from current regulatory debates (e.g., health care and environment). **Prerequisite:** upper-division standing.

103A. California Government and Politics (4)

(Same as USP 109) This survey course explores six topics: 1) the state's political history; 2) campaigning, the mass media, and elections; 3) actors and institutions in the making of state policy; 4) local government; 5) contemporary policy issues; e.g., Proposition 13, school desegregation, crime, housing and land use, transportation, water; 6) California's role in national politics.

103B. Politics and Policymaking in Los Angeles (4)

(Same as USP 113) This course examines politics and policymaking in the five-county Los Angeles region. It explores the historical development of the city, suburbs, and region; politics, power, and governance; and major policy challenges facing the city and metropolitan area. **Prerequisite:** upper-division standing.

103C. Politics and Policymaking in San Diego (4)

(Same as USP 115) This course examines how major policy decisions are made in San Diego. It analyzes the region's power structure (including the roles of non-governmental organizations and the media), governance systems and reform efforts, and the politics of major infrastructure projects. **Prerequisite:** upper-division standing or consent of instructor.

104A. The Supreme Court and the Constitution (4)

An introduction to the study of the Supreme Court and constitutional doctrine. Topics will include the nature of judicial review, federalism, race, and equal protection. The relation of judicial and legislative power will also be examined.

104B. Civil Liberties—Fundamental Rights (4)

This course will examine issues of civil liberties from both legal and political perspectives. Topics will include the First Amendment rights of speech, press, assembly, and religion; other "fundamental" rights, such as the right to privacy; and some issues in equal protection. Conflicts between governmental powers and individual rights will be examined.

104C. Civil Liberties—The Rights of Criminals and Minorities (4)

Examines the legal issues surrounding the rights of "marginal" groups such as aliens, illegal immigrants, and the mentally ill. Also includes a discussion of the nature of discrimination in American society.

104D. Judicial Politics (4)

Introduction to the study of law and courts as political institutions and judges as political actors, including the role of the judiciary in our constitutional system and decision making both within the Supreme Court and within the judicial hierarchy.

104F. Seminar in Constitutional Law (4)

This seminar will provide an intensive examination of a major issue in constitutional law, with topics varying from year to year. Recent topics have included equal protection law and the rights of civilians in wartime. Students will be required to do legal research on a topic, write a legal brief, and argue a case to the seminar. **Prerequisites:** PS 104A/B; department stamp.

104I. Law and Politics—Courts and Political Controversy (4)

This course will examine the role of the courts in dealing with issues of great political controversy, with attention

to the rights of speech and assembly during wartime, questions of internal security, and the expression of controversial views on race and religion. The conflict between opposing Supreme Court doctrines on these issues will be explored in the context of the case studies drawn from different historical periods.

104L. Positive Political Theory of Law (4)

We will discuss modern theories of the origins of law and legal behavior.

104M. Law and Sex (4)

How law regulates and impacts sexuality and orientation with focus on constitutional law in areas of privacy, free speech, association, regulation of sexual conduct under criminal law pornography, procreation, reproductive rights, and regulation of family status. **Prerequisite:** upper-division standing. Credit will not be allowed for students who have taken Political Science 102G Law and Sex in the following quarters: spring 2002, (section A00); spring 2001 (section A00); fall 1999 (section A00).

105A. Latino Politics in the U.S. (4)

This course examines contemporary issues in Latino politics in the U.S.; comparisons of racial and ethnic group experiences in the U.S.; Latino access to the political system through political participation. **Prerequisite:** upper-division standing.

105B. Understanding Interracial Conflict (4)

This course examines and seeks to explain patterns of conflict and cooperation between different racial and ethnic groups within the United States. Why do groups cooperate under certain circumstances and fall into conflict in others? **Prerequisite:** upper-division standing.

108. Politics of Multiculturalism (4)

This course will examine central issues in debates about race, ethnicity, and multiculturalism in the United States. It will look at relations not only between whites and minorities, but also at those among racial and ethnic communities. **Prerequisite:** upper-division standing.

POLITICAL THEORY

110A. Citizens and Saints: Political Thought from Plato to Augustine (4)

This course focuses on the development of politics and political thought in ancient Greece, its evolution through Rome and the rise of Christianity. Readings from Plato, Aristotle, Augustine, Machiavelli, and others.

110B. Sovereigns, Subjects, and the Modern State: Political Thought from Machiavelli to Rousseau (4)

The course deals with the period which marks the rise and triumph of the modern state. Central topics include the gradual emergence of human rights and the belief in individual autonomy. Readings from Machiavelli, Hobbes, Locke, Rousseau, and others.

110C. Revolution and Reaction: Political Thought from Kant to Nietzsche (4)

The course deals with the period which marks the triumph and critique of the modern state. Central topics include the development of the idea of class, of the irrational, of the unconscious, and of rationalized authority as they affect politics. Readings drawn from Rousseau, Kant, Hegel, Marx, Nietzsche, and others.

110DA. Freedom and Discipline: Political Thought in the Twentieth Century (4)

This course addresses certain problems which are characteristic of the political experience of the twentieth century. Topics considered are revolution, availability of tradition, and the problems of the rationalization of social and political relations. Readings from Nietzsche, Weber, Freud, Lenin, Gramsci, Dewey, Oakeshott, Arendt, Merleau-Ponty.

110EA. American Political Thought from Revolution to Civil War (4)

The first quarter examines the origins and development of American political thought from the revolutionary period to the end of the nineteenth century with special emphasis on the formative role of eighteenth-century liberalism and the tensions between "progressive" and "conservative" wings of the liberal consensus.

110EB. American Political Thought from Civil War to Civil Rights (4)

The second quarter examines some of the major themes of American political thought in the twentieth century including controversies over the meaning of democracy, equality, and distributive justice, the nature of "neoconservatism," and America's role as a world power.

110EC. American Political Thought: Contemporary Debates (4)

This course explores contemporary issues in American political thought. Topics may include liberalism and rights, gender and sexuality, race and ethnicity, cultural diversity, and the boundaries of modern citizenship. Readings include political pamphlets, philosophical treatises, court decisions, and works of literature.

110ED. Seminar in American Political Thought (4)

This seminar explores debates over ideals, institutions, and identities in American political thought. Themes and topics will vary. Readings will include political pamphlets, philosophical treatises, court decisions, and works of literature. **Prerequisites:** upper-division standing; department stamp.

110G. International Political Thought (4)

This course explores theories of politics that are oriented beyond state borders. Key topics include international order, cosmopolitanism, human rights, just war, global justice, migration, citizenship, identity, and commercial society. The course examines thinkers from classical antiquity to contemporary times. **Prerequisite:** upper division standing.

110H. Democracy and Its Critics (4)

This course will examine the historical development of the ideal of democracy from Periclean Athens to the present in the light of criticism by such thinkers as Plato, Tocqueville, and Mosca and difficulties encountered in efforts to realize the ideal.

110J. Power in American Society (4)

This course examines how power has been conceived and contested during the course of American history. The course explores the changes which have occurred in political rhetoric and strategies as America has moved from a relatively isolated agrarian and commercial republic to a military and industrial empire.

110T. Modern Political Ideologies (4)

An examination of some of the ideas and values associated with major social and political movements in Europe and the United States since the French Revolution. Topics will vary and may include liberalism, populism, democracy, communism, nationalism, fascism, and feminism.

112A. Economic Theories of Political Behavior (4)

An introduction to theories of political behavior developed with the assumptions and methods of economics. General emphasis will be upon theories linking individual behavior to institutional patterns. Specific topics to be covered will include collective action, leadership, voting, and bargaining.

112C. Political Theory and Artistic Vision (4)

The course explores the modes of political thinking found in arts, especially in drama and literature. It may include ends and means, political leadership, and political economy. Students may not receive credit for both POLI 112CS and POLI 112C. **Prerequisite:** upper-division standing.

113A. East Asian Thought in Comparative Perspective (4)

This course examines the major traditions of East Asian thought in comparative perspective. Topics include Confucianism, Taoism, Buddhism, and contemporary nationalist and East Asian political thought. Throughout, focused comparisons and contrasts will be made between western and eastern thought. **Prerequisite:** upper-division standing.

113B. Chinese and Japanese Political Thought I (4)

Examines philosophical traditions of ancient and modern China and Japan, to understand how these have been reflected in Chinese and Japanese development. Course will be in English; however, students with Chinese or Japanese language skills will have opportunity to use these. Graduate

students will be required to complete a seminar-length research paper; undergraduate students will write a paper. **Prerequisites:** upper-division standing for 113B.

114B. Marxist Political Thought (4)

An introduction to Marxist thought from its roots in the western tradition through its development in non-western contexts. Emphasis is placed on how adaptations were made in Marxism to accommodate the specific challenges of each environment.

115A. Gender and Politics (4)

Our understanding of politics, power, conflict, and quality continue to be challenged and transformed by considering gender as it intersects with nationality, race, class, and ethnicity. We will consider the importance of gender in each of the subfields of political science.

116A. Feminist Theory (4)

Readings in historical and contemporary feminist theory; development of gender as a category of political analysis; alternative perspectives on core concepts and categories in feminist thought.

118B. The Political Theory of Liberation Theology (4)

A comparative study of liberation theologies, including Continental, Latin American, South African, and East Asian. **Prerequisite:** PS 118A.

119A. Special Topics in Political Theory (4)

An undergraduate course designed to cover various aspects of political theory. May be repeated for credit two times, provided each course is a separate topic, for a maximum of twelve units.

COMPARATIVE POLITICS

120A. Political Development of Western Europe (4)

An examination of various paths of European political development through consideration of the conflicts which shaped these political systems: the commercialization of agriculture; religion and the role of the church; the army and the state bureaucracy; and industrialization. Stress will be on alternative paradigms and on theorists.

120B. The German Political System (4)

An analysis of the political system of the Federal Republic of Germany with an emphasis on the party system, elections, executive-legislative relations, and federalism. Comparisons will be made with other West European democracies and the Weimar Republic.

120C. Politics in France (4)

This course will examine the consequences of social and economic change in France. Specific topics will include institutional development under a semi-presidential system, parties, and elections.

120D. Germany: Before, During, and After Division (4)

Consideration of political, economic, and security factors that have kept Germany at the center of European developments for more than a century.

120E. Scandinavian Politics (4)

Introduction to the politics and societies of the Scandinavian states (Denmark, Finland, Norway, and Sweden). Focuses on historical development, political culture, constitutional arrangements, political institutions, parties and interest groups, the Scandinavian welfare states, and foreign policy. **Prerequisite:** upper-division standing.

120H. European Integration (4)

This course reviews the origins and development of the European Community/European Union and its institutions, theories of integration and the challenges inherent in the creation of a supranational political regime.

120I. Politics in Italy (4)

This course will provide a comparative perspective on the development and functioning of the Italian political system. It includes analysis of political institutions, ideological traditions, parties and elections, political elites in the policy process, and the evolving importance of Italy within European integration.

120K. Politics of Developing Countries (4)

This course critically examines central concepts and theories of development, and assesses their utility in

understanding political, economic, and social change in three regions of the developing world: Latin American, sub-Saharan Africa, and Southeast Asia.

121. Government and Politics of the Middle East (4)

This course examines general themes affecting the region (social structure and regime type, religion and modernization, bonds and tensions), the character of major states, and efforts to resolve the conflict between Israel and its Arab and Islamic neighbors. **Prerequisite:** upper-division standing.

121B. Politics in Israel (4)

An interdisciplinary study of Israel as both a unique and yet a common example of a modern democratic nation-state. We will examine Israel's history, its political, economic, and legal systems, social structure and multicultural tensions, the relation between state and religion, national security, and international relations.

122. Politics of Human Rights (4)

What do we mean by "international human rights"? Are they universal? This course examines human rights abuse and redress over time, and across different regions of the world. From this empirically grounded perspective, we critically evaluate contemporary human rights debates. **Prerequisite:** upper-division standing.

123. Politics of Empire in Comparative Perspective (4)

In between "rises" and "declines," empires are political entities with highly heterogeneous populations that must be governed. The course examines the similarities and differences in imperial governance, comparing the internal and external political dynamics of traditional (Roman, Ottoman), modernizing (Habsburg), and modern (British) empires. **Prerequisite:** upper-division standing.

125. The Politics of Conservation in Developing Countries (4)

Conservation in developing countries concerns resources that are extremely important to policymakers, militaries, environmental organizations, communities, and individuals. This course examines these groups' struggle for control over wildlife and forests—from the capital to the village—on several continents.

125A. Communities and the Environment (4)

A popular new idea in environmental protection is to include local communities in conservation efforts. But what are these communities? What challenges do they face in governing their own resources? This course uses both theory and case studies to explore the political economy of community-based conservations.

126AA. Fundamentals of Political Economy: Modern Capitalism (4)

This course explores how economic factors affect political institutions and how political action affects economic behavior in the United States and Western Europe. Particular attention is given to relations between business and labor, economic policy choices, and the impact of international trade. **Prerequisite:** PS 11 or consent of instructor.

126AB. Politics and Economics in Eastern Europe (4)

This course explores the interrelationship of politics and economics in Eastern Europe, analyzing the historic evolution of the area, the socialist period, and contemporary political and economic change there. **Prerequisite:** upper-division standing.

127. Politics of Developing Countries (4)

This course critically examines central concepts and theories of development, and assesses their utility in understanding political, economic, and social change in the developing world. Central case studies are drawn from three regions: Latin America, Sub-Saharan Africa, and Southeast Asia. **Prerequisite:** upper-division standing.

130AA. The Soviet Successor States (4)

An overview of the historical background and contemporary politics of the fifteen successor states of the Soviet Union.

130AD. The Politics of the Russian Revolution (4)

An examination of the dynamics of the Russian Revolution from 1905 through the Stalinist period and recent years in light of theories of revolutionary change. Emphasis

is placed on the significance of political thought, socio-economic stratification, and culturo-historical conditions.

131C. The Chinese Revolution (4)

An analysis of the dynamics of the Chinese Revolution from the fall of the Qing Dynasty (1644–1911) to the present. Emphasis is placed on the relationship between political thought and the dynamics of the revolutionary process.

132C. Political Development and Modern China (4)

Political development has dominated the study of comparative politics among U.S. academicians since the revival of the Cold War in 1947. This course examines critically this paradigm and its Western philosophical roots in the context of the experience of modern China.

133A. Japanese Politics: A Developmental Perspective (4)

This course will analyze the political systems of modern Japan in comparative-historical perspective.

133D. Political Institutions of East Asian Countries (4)

This course discusses the following major topics in three East Asian countries (Japan, South Korea, and Taiwan) from a comparative perspective: (a) economic and political development (b) political institutions (c) public policies.

133DD. Comparative Analysis of East Asian Institutions (4)

This seminar is designed to be advanced follow-up to PS 133D. It examines present-day East Asian government institutions in much greater depth. **Prerequisite:** PS 133D.

133J. Korean Politics (4)

This course is primarily about the politics and political economy of South Korea, but will also briefly look at politics and political economy of North Korea as well as foreign and unification policies of the two Koreas. **Prerequisite:** upper-division standing.

134AA. Comparative Politics of Latin America (4)

Comparative analysis of contemporary political systems and developmental profiles of selected Latin American countries, with special reference to the ways in which revolutionary and counter-revolutionary movements have affected the political, economic, and social structures observable in these countries today. Analyzes the performance of "revolutionary" governments in dealing with problems of domestic political management, reducing external economic dependency, redistributing wealth, creating employment, and extending social services. Introduction to general theoretical works on Latin American politics and development. **Prerequisite:** PS 11 or consent of instructor.

134B. Politics in Mexico (4)

General survey of the Mexican political system as it operates today. Emphasis on factors promoting the breakdown of Mexico's authoritarian regime and the transition to a more democratic political system. Changing relationship between the state and various segments of Mexico society (economic elites, peasants, urban labor, and the Church). New patterns of civil-military relations.

134D. Selected Topics in Latin American Politics (4)

A comparative analysis of contemporary political issues in Latin America. Material to be drawn from two or three countries. Among the topics: development, nationalism, neoimperialism, political change. **Prerequisite:** upper-division standing.

134I. Politics in the Southern Cone of Latin America (4)

This course is a comparative analysis of twentieth-century political developments and issues in the southern cone of Latin America: Argentina, Chile, and Uruguay. The course will also examine the social and economic content and results of contrasting political experiments. **Prerequisite:** upper-division standing.

134N. Politics in Central America (4)

Focused examination of political conflict in one or more countries of the region, emphasizing issues, ideology, and process in grassroots political organization. Limited coverage of international politics.

136A. Nationalism and Ethnic Conflict (4)

Appropriate case studies from around the world will be selected.

136B. Comparative Politics and Political Culture (4)

This course is designed to provide undergraduates with a sound introduction to cultural interpretations of power and politics. The course will also attempt to render an explicit account of the process of theory formation in social science. Special attention will be given to Africa and Asia.

136C. Comparative Bureaucracy (4)

Politics of the administrative state in the world's democracies. How political institutions influence governance across different types of democratic institutional environments.

137A. Comparative Political Parties and Interest Groups (4)

This course serves as an introduction to the comparative study of political parties and interest groups as well as an analytical introduction to parties, interest groups, and their role in democratic representation. **Prerequisite:** upper-division standing.

138D. Special Topics in Comparative Politics (4)

An undergraduate course designed to cover various aspects of comparative politics. May be repeated for credit two times, provided each course is a separate topic, for a maximum of twelve units.

INTERNATIONAL RELATIONS**140A. International Law and Organizations (4)**

International law and organizations are central to the efforts to create a world order to limit armed conflict, regulate world economy, and advance programs for economic redistribution among nations, and set minimum standards of human rights. This course explains the theory of international law and organizations that is accepted by diplomats and compares this viewpoint to the analysis of social scientists concerning the past record and likely future of world order concerning conflict, economic redistribution, and human rights.

140B. Concepts and Aspects of Revolution (4)

Introduction to the analytical and comparative study of revolutionary movements and related forms of political violence. Topics include: the classical paradigm; types of revolutionary episodes; psychological theories; ideology and belief systems; coups; insurgencies; civil wars; terrorism and revolutionary outcomes. **Prerequisite:** upper-division standing.

140C. International Crisis Diplomacy (4)

A survey of international peacekeeping and peace enforcement in civil conflicts with a simulation of international diplomacy. **Prerequisite:** upper-division standing.

141B. Scientific Analysis of Conflict and Peace (4)

The use of data to evaluate theories of conflict. Course will examine the relationship between theory and evidence, measurement and research design. Specific issues examined may include the relationship of power, preference, economic relations, and domestic politics to conflict and peace. **Prerequisites:** POLI 12 and POLI 30.

142A. United States Foreign Policy (4)

United States foreign policy from the colonial period to the present era. Systematic analysis of competing explanations for U.S. policies—strategic interests, economic requirements, or the vicissitudes of domestic politics. Interaction between the U.S., foreign states (particularly allies), and transnational actors are examined. **Prerequisite:** PS 12 or consent of instructor.

142I. National and International Security (4)

A survey of theories of defense policies and international security.

142J. National Security Strategy (4)

A survey of American strategies for national defense. Topics may include deterrence, coercive diplomacy, limited war, and unconventional warfare.

142K. Politics and Warfare (4)

This course offers an exploration of general theories of the origins of warfare; the impact of the state on war in the modern world; and the micro-foundations of combat and compliance in the context of the costs of war and military mobilization. The course should be of special interest to students in international relations and comparative politics.

142L. Insurgency and Terrorism (4)

"Terrorism" uses "illegitimate" violence to achieve political goals. This course uses philosophical, historical, and contemporary material from distinct cultures to understand which actions are defined as "terrorist," who uses them, why, and when, as well as the determinants of their effectiveness.

142M. U.S. Foreign Policy/Regional Security (4)

Lectures and readings examine U.S. foreign policy in Europe, Latin America, and East Asia with attention to current problems with specific nations (e.g., Bosnia) and issues (e.g., terrorism). This course integrates historical, comparative, and foreign perspectives on regional security dynamics. Credit will not be given to students who took PS 154 Special Topic/International Relations with the subtitle U.S. Foreign Policy/Regional Security, in spring 1998, spring 2001, or fall 2002.

142N. American Defense Policy (4)

An introduction to analytic techniques for assessing policy options in the field of national security. **Prerequisite:** upper-division standing.

142O. International Terrorism (4)

(Same as SOCD 177.) This course covers the definitions, history, and internationalization of terrorism; the interrelation of religion, politics, and terror; and the representation of terrorism in the media. A number of organizations and their activities in Europe and the Middle East are examined. **Prerequisite:** upper-division standing.

142P. Crisis Areas in World Politics (4)

This course examines the most critical areas in contemporary world politics. While the emphasis will be placed on American involvement in each crisis, an effort will be made to acquaint the student with its historical and political background. Credit will not be allowed for students who have taken POLI 154 "Crisis Areas in World Politics" in the following quarters: SP01; SP02; SP03; SP04; SP05; WI06; SP06; SI06; FA06; WI07; SP07(A00); SI07(A00). **Prerequisite:** upper-division standing.

143A. War and Society (4)

How has warfighting evolved over the centuries? How has it varied across cultures? What has war been like for soldiers and civilians? How do societies mobilize for war, and how do they change in the short and long term from fighting? **Prerequisite:** upper-division standing.

144AB. Selected Topics in International Political Economy (4)

This course will consider major theories purporting to explain and predict the workings of the international order from the point of view of political economy. An extended discussion of one aspect of the economic order (e.g., the multinational corporation) will serve as the test case. PS 144AA and one quarter of economics recommended. **Prerequisite:** PS 12.

144E. The Politics of International Trade (4)

Examines theories of trade and protectionism, focusing both on relations among advanced industrial nations and on relations between developed and developing countries. Topics include standard and strategic trade theory, nontariff barriers to trade, export-led growth strategies, regional trade agreements, and the future of the WTO.

144F. The Politics of International Trade and Finance (4)

Examines the welfare and distributional aspects of international trade and finance as they relate to the politics of economic policymaking. Topics include: globalization in historical perspective; origins and consequences of trade policy; exchange-rate arrangements; international capital flows; currency crises; economic development.

145A. International Politics and Drugs (4)

This course examines the domestic and international aspects of the drug trade. It will investigate the drug issues from the perspectives of consumers, producers, traffickers, money launderers, and law enforcement. Course material covers the experience of the United States, Latin America, Turkey, Southeast Asia, Western Europe, and Japan.

145C. International Relations After the Cold War: Theory and Prospect (4)

The nature of international politics appears to have changed dramatically since 1989. This course applies different theoretical approaches to enhance our understanding of the new international environment, future prospects for peace and war, and current problems of foreign policy. **Prerequisite:** upper-division standing.

146A. The U.S. and Latin America: Political and Economic Relations (4)

An analytical survey of U.S. relations with Latin America from the 1820s to the present, with particular emphasis on the post-Cold War environment. Topics include free trade and economic integration; drugs and drug trafficking; illegal migration and immigration control. Focus covers U.S. policy, Latin American reactions, dynamics of cooperation, and options for the future.

150A. Politics of Immigration (4)

Comparative analysis of attempts by the United States and other industrialized countries to initiate, regulate and reduce immigration from Third World countries. Social and economic factors shaping outcomes of immigration policies, public opinion toward immigrants, anti-immigration movements, and immigration policy reform options in industrialized countries. **Prerequisites:** upper-division standing required.

151. International Organizations (4)

Surveys the theory and function of IOs (UN, NATO, EU, World Bank, IMF) in promoting international cooperation in security, peacekeeping, trade, environment, and human rights. We discuss why IOs exist, how they work, and what challenges they face. **Prerequisites:** PS 12, upper-division standing.

154. Special Topics in International Relations (4)

An undergraduate course designed to cover various aspects of international relations. May be repeated for credit two times, provided each course is a separate topic, for a maximum of twelve units.

POLICY ANALYSIS**160AA. Introduction to Policy Analysis (4)**

(Same as USP 101) This course will explore the process by which the preferences of individuals are converted into public policy. Also included will be an examination of the complexity of policy problems, methods for designing better policies, and a review of tools used by analysts and policy makers. **Prerequisite:** PS 10 or 11.

160AB. Introduction to Policy Analysis (4)

In this course, students will use their knowledge of the political and economic foundations of public policy making to conduct research in a wide variety of public policy problems. **Prerequisite:** PS 160AA.

162. Environmental Policy (4)

This course will explore contemporary environmental issues such as global warming, endangered species, and land use. Students will be asked to analyze various policy options and to write case analyses. Policies may be debated in class.

163. Analyzing Politics (4)

Politics are understood as the combination of individual preferences and decisions into collective choices. What are the issues involved in aggregating individual preferences, what is the choice of rules—formal and informal—for doing so.

165. Special Topic: Policy Analysis (4)

An undergraduate course designed to cover various aspects of policy analysis. May be repeated for credit two times, provided each course is a separate topic, for a maximum of twelve units.

168. Policy Assessment (4)

The use of real data to assess policy alternatives. Introduction to benefit/cost analysis, decision theory, and the valuation of public goods. Applications to health, environmental, and regulatory economic policy making.

170A. Introductory Statistics for Political Science and Public Policy (4)

Introduction to the use of statistics in both political science and public policy concentrating on regression based approaches. Students undertake a series of small quantitative analyses and one project. **Prerequisites:** upper-division standing.

SPECIAL STUDIES

191A–B. Senior Honors Seminar: Frontiers of Political Science (4-4)

This course is open only to seniors interested in qualifying for departmental honors. Admission to the course will be determined by the department. Each student will write an honors essay under the supervision of a member of the faculty.

192. Senior Seminar in Political Science (1)

The senior seminar is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in political science at the upper-division level. Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisite:** department stamp and/or consent of instructor.

194. Research Seminar in Washington, D.C. (4)

(Same as Com/Gen 194; USP 194, H10 193, SocE 194, COGS 194) Course attached to six-unit internship taken by students participating in the UCDC program. Involves weekly seminar meetings with faculty and teaching assistant and a substantial research paper. **Prerequisites:** participating in UCDC program.

197I. Political Science Washington Internship (6, 8)

This internship is attached to the UC in DC Program. Students participating in the UC in DC Program are placed in an internship in the Washington, D.C., area, requiring approximately seventeen to twenty-three hours per week. **Prerequisites:** must be enrolled in the UC in DC Program; departmental stamp required.

199. Independent Study for Undergraduates (2 or 4)

Independent reading in advanced political science by individual students. (P/NP grades only.) **Prerequisite:** consent of instructor.

GRADUATE

All graduate courses are categorized as either seminars or independent study.

SEMINARS

200A. Foundations of Political Science (4)

An introduction to the theoretical concepts in the discipline of political science that are commonly used across various sub-fields. Each week will introduce the core concept(s) and discuss applications from several, if not all sub-fields in the department. **Prerequisite:** graduate student standing.

200B. Democracy (4)

An overview of the normative and positive issues associated with modern democracies. The appeal and the social, political, and economic arrangements of democracies will be explored. **Prerequisite:** graduate student standing.

200C. States and Markets (4)

An overview of the normative and positive issues associated with decentralized (market) versus centralized (political) mechanics of allocation. The appropriate role of government in the economy will be explored. **Prerequisite:** graduate student standing.

204A. Research Design (4)

This course will study various approaches to knowledge accumulation in social science. A basic outline of scientific method will be used to examine the difference between theories as assumptions and axioms and hypotheses as "if-then" statements derived from theory. Experimental, quasi-experimental, and qualitative designs will be discussed. **Prerequisite:** graduate student standing.

204B. Quantitative Methods I (4)

The use of quantitative methods (particularly multiple regression and its extensions) in political science. Emphasis on understanding the methods and using them in political science applications. **Prerequisite:** graduate student standing.

204C. Game Theory 1 (4)

This course introduces students to the rudiments of decision theory and game theory. Emphasis will be placed on modeling and solving games. **Prerequisite:** graduate student standing.

210A. Systems of Political Thought: Thucydides to Augustine (4)

This course is a preparation for the field examination in political theory. It will provide an intensive and critical introduction to European political thought from Thucydides to Augustine. Some of the secondary literature on this period will also be explored. **Prerequisite:** graduate standing or consent of instructor.

210B. Systems of Political Thought: Machiavelli to Rousseau (4)

This course is a preparation for the field examination in political theory. It will provide an intensive and critical introduction to European political thought from Machiavelli to Rousseau. Some of the secondary literature on this period will also be explored. **Prerequisite:** graduate standing or consent of instructor.

210C. Systems of Political Thought: Kant to Nietzsche (4)

This course is a preparation for the field examination in political theory. It will provide an intensive and critical introduction to European political thought from Kant to Nietzsche. Some of the secondary literature on this period will also be explored. **Prerequisite:** graduate standing or consent of instructor.

210D. Systems of Political Thought: Contemporary (4)

This course is a preparation for the field examination in political theory. It will provide an intensive and critical introduction to twentieth-century political thought. Some of the secondary literature on this period will also be explored. **Prerequisite:** graduate standing or consent of instructor.

214. Marxist and Post-Marxist Political Philosophy (4)

An examination of selected texts in Marxist and post-Marxist political philosophy, with a focus on the theme of individual and collective identity including issues concerning alienation, consciousness, and ideology. **Prerequisite:** graduate standing.

216. Contemporary Liberal and Democratic Theory (4)

Normative approaches to liberty, equality, justice, and democracy, mostly Anglo-American and empirical approaches to justice. Thinkers such as Rawls, Habermas, Nozick, Dworkin, Raz, Roemer, Elster, Ostrom, Bowles, and Gintis may be considered. **Prerequisite:** graduate standing.

219. Special Topics in Political Theory (4)

This seminar is an examination of the different approaches to the study of political theory. Issues and research areas will vary each time the course is offered. **Prerequisite:** graduate standing or consent of instructor.

220A. Comparative Politics: State and Society (4)

This course will provide a general literature review in comparative politics to serve as preparation for the field examination. **Prerequisite:** graduate standing, or consent of instructor.

220B. Comparative Politics: Institutions (4)

This is a second course in comparative politics designed as a preparation for the field examination. It will focus on the comparative study of political institutions. **Prerequisite:** graduate standing, or consent of instructor.

220C. Origins of the State (4)

Survey of theories, with empirical cases explaining origins of the modern state. **Prerequisite:** graduate standing.

222A. American Politics in Comparative Perspective (4)

Research seminar that focuses on the systematic comparison of the American political system with about thirty other contemporary democracies, particularly the other large

industrialized countries. A central aim will be to assess the claims about American "exceptionalism." **Prerequisite:** graduate standing.

223A. Comparative Parliamentary Studies (4)

A survey of the academic literature on parliamentary studies, comparing the research on legislative elections, behavior, and organization in American, European, and Asian democracies. The course will also compare various approaches to studying legislative activity. **Prerequisite:** graduate standing.

224. The Politics of Democratization (4)

A survey of theories explaining the processes of democratization and democratic stability. **Prerequisite:** graduate standing.

224A. Elections in Consolidating Democracies (4)

Course looks at elections in consolidating democracies with an eye to evaluating existing theories of elections with new data. Also explores new empirical patterns in countries around the world, especially Africa, Latin America, Eastern Europe, and the Soviet successor states. **Prerequisite:** graduate student standing or consent of instructor.

225B. The Nation-State (4)

A reading and research seminar on the origins, development, and politics of nationalism and the nation-state. **Prerequisite:** graduate standing.

227. Comparative Political Economy (4)

An introduction to seminal and current research in comparative political economy. Course explores how various political institutions and processes affect economic outcomes (e.g. growth, inequality, and redistribution) and how the economy influences politics (e.g. democratization, electoral institutions, and welfare states). **Prerequisite:** POLI 200C or consent of instructor.

228. Comparative Bureaucracy (4)

This course examines the politics of the administrative state in the world's democracies. The course focuses on how political institutions affect the nature of governance in democracies. **Prerequisite:** graduate student standing.

229. Special Topics in Comparative Politics (4)

This seminar is an examination of the different approaches to the study of comparative politics. Issues and research areas will vary each time the course is offered. **Prerequisite:** graduate standing or consent of instructor.

231E. Politics of Development (4)

This course provides an overview of previous and current efforts to explain political and economic development in non-western settings. **Prerequisite:** graduate standing or consent of instructor.

235A. Latin American Politics (4)

Introductory reading seminar on Latin American politics to acquaint students with leading schools of thought, provide critical perspective on premises and methodology, and identify themes for further inquiry. Themes include authoritarianism, revolution, democratization, regional conflict, and emergence of middle-level powers. **Prerequisite:** graduate standing.

236. Immigration Policy and Politics (4)

An interdisciplinary seminar covering origins, consequences, and characteristics of worker migration from Third World countries (especially Mexico, Central America, and the Caribbean basin) to the United States, from the nineteenth century to the present. **Prerequisite:** graduate standing or consent of instructor.

238. State and Society in Modern East Asia (4)

An examination of the role of the state in economic development in major East Asian societies and its impact on democratization. Case studies will vary but will include China, Japan, and Korea, as well as at least one other society. **Prerequisite:** graduate standing.

240. International Relations Theory (4)

A survey of the principal theories and approaches to the study of international relations. **Prerequisite:** graduate standing or consent of instructor.

243. International Security (4)

A colloquium surveying the major theoretical controversies in the study of international and national security. **Prerequisite:** graduate standing or consent of instructor.

244A. European Integration (4)

This seminar provides perspectives on the theories and politics of European integration. Analysis will focus on the development of the European Union, the functioning of core institutions, and the challenges of creating a supranational political regime.

245. International Political Economy (4)

A seminar surveying the major theoretical controversies in the study of international political economy. **Prerequisite:** graduate standing or consent of instructor.

247A. Quantitative International Relations (4)

Explores empirical research in international relations with special emphasis on international conflict. Topics covered include theories on the causes of war, the distribution of power and conflict, formal and informal alignment, interdependence and conflict, linkages between domestic and international processes, and issues of research design. Students who have previously taken 247 may not take this course for credit. **Prerequisite:** graduate standing or consent of instructor.

247B. Formal Models in International Relations (4)

Explores formal analytic and primarily game-theoretic research in international relations with emphasis on conflict and bargaining. Topics include: causes of war and peace, conventional and nuclear deterrence, crisis bargaining, arms race, and two-level games.

248. Special Topics in International Relations (4)

(Same as IRGN 290) This seminar is an examination of the different approaches to the study of international relations. Issues and research areas will vary each time the course is offered. **Prerequisite:** graduate standing or consent of instructor.

251. American Political Institutions (4)

A critical examination of major contributions to the theoretical and empirical literature on the U.S. Congress, presidency, and federal bureaucracy. **Prerequisite:** graduate standing or consent of instructor.

252. American Politics: Behavior (4)

Theoretical and empirical perspectives on voting and other forms of political participation, parties, interest groups, and public opinion in the United States. **Prerequisite:** graduate standing or consent of instructor.

253. Research in State Politics (4)

This seminar will survey the existing literature in state politics with an eye toward proposing new research designs. Topics will include the variation across states in electoral systems, campaign finance laws, political culture, legislative institutions, judicial arrangements, and policy outcomes. **Prerequisite:** graduate standing or consent of instructor.

254. American Political Development (4)

This course examines the historical evolution of the American state with particular attention to theories of political development. Special topics include the development of the party system, electoral and policy realignments, and the evolution of national political institutions. **Prerequisite:** graduate standing in any discipline of the social sciences or humanities or consent of instructor.

255. Urban Politics (4)

Examines central works on the development of political institutions in U.S. cities; analyses of community power structures; who governs, why, and to what ends; processes and prospects for minority empowerment; the prominence of "growth machines"; the political economy of contemporary cities. **Prerequisite:** graduate standing or consent of instructor.

256A. Judicial Politics (4)

Judicial politics is the study of law and courts as political institutions and judges as political actors, focusing on decision-making and power relations within courts, within the judicial hierarchy, and within the constitutional system. **Prerequisite:** graduate standing or consent of instructor.

257. Voting and Elections (4)

This course is designed to acquaint graduate students with the central themes and issues in the study of voting in national elections. **Prerequisite:** graduate standing or consent of instructor.

259. Special Topics in American Politics (4)

This seminar is an examination of the different approaches to the study of American politics. Issues and research areas will vary each time the course is offered. **Prerequisite:** graduate standing or consent of instructor.

270. Mathematical and Statistical Foundations (4)

This course reviews essential calculus and linear algebra and introduces probability theory (probability rules, random variables, univariate and multivariate distributions) and mathematical statistics (sampling distributions, estimation and inference frameworks). **Prerequisite:** graduate standing.

276. Mathematical Modeling (4)

This course demonstrates how to construct mathematical models of phenomena of interest to political science. Specific applications examined may include models for the distributions of state size, war magnitude, and democracy over time and space. **Prerequisite:** graduate standing.

277. Measurement Theory (4)

This course is concerned with methods of estimating latent dimensions of preference and similarity from individuals' observed choices and judgments. Factor Analysis, Multidimensional Scaling, and related techniques are studied both with classical maximum likelihood and Bayesian methods. **Prerequisite:** graduate standing.

279. Special Topics in Methodology (4)

This seminar is an examination of the different approaches to the study of methodology. Issues and research areas will vary each time the course is offered. **Prerequisite:** graduate standing or consent of instructor.

282A-B-C. Workshop on State and Society (4-4-4)

Examination of recent research in American politics, comparative politics, and political theory concerning the relationship of politics to society; development and presentation of research projects by graduate students; presentations of research projects by faculty. Second-year students present seminar paper; third-year students present dissertation prospectus; candidates make yearly presentations of dissertation research. **Prerequisite:** PS 202 or consent of instructor.

283A-B-C. Workshop in International Relations (4-4-4)

Examination of recent research in international politics; development and presentation of research projects by graduate students; presentations of research projects by faculty. Second year students present seminar paper; third year students present dissertation prospectus; candidates make yearly presentation of dissertation research. **Prerequisite:** PS 202 or permission of instructor.

284. Workshop on Scientific Communication (4)

Forms of scientific communication, practical exercise in scientific writing and short oral communication, and in criticism and editing; preparation of illustrations, preparation of proposals; scientific societies, and the history of scientific communication. Examples from any field of science, most commonly political science, economics, and law. **Prerequisite:** PS 202 or consent of instructor.

INDEPENDENT STUDY**298. Directed Reading (1-12)**

Guided and supervised reading in the literature of the several fields of political science.

299. Dissertation Research (1-12)

Independent work by graduate students engaged in research and writing of second-year paper and doctoral dissertation, under direct supervision of advisor.

500. Apprentice Teaching (1-4)

A course in which teaching assistants are aided in learning proper teaching methods by means of supervision of their work by the faculty: handling of discussions, preparation, and grading of examinations and other written exercises,

and student relations. Twenty-four units of teaching apprenticeship meets the department teaching requirement for the Ph.D. degree.

501. Seminar on Teaching Development—American Politics (1-4)

A seminar designed for graduate students serving as teaching assistants in American politics, includes discussion of teaching theories, techniques, and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. **Prerequisite:** graduate standing.

502. Seminar on Teaching Development—Comparative Politics (1-4)

A seminar designed for graduate students serving as teaching assistants in comparative politics, includes discussion of teaching theories, techniques, and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. **Prerequisite:** graduate standing.

503. Seminar on Teaching Development—International Relations (1-4)

A seminar designed for graduate students serving as teaching assistants in international relations, includes discussion of teaching theories, techniques, and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. **Prerequisite:** graduate standing.

504. Seminar on Teaching Development—Political Theory (1-4)

A seminar designed for graduate students serving as teaching assistants in political theory, includes discussion of teaching theories, techniques, and materials, conduct of discussion sessions, and participation in examinations, under the supervision of the instructor in charge of the course. **Prerequisite:** graduate standing.

Psychology

PROFESSORS

Thomas D. Albright, Ph.D., *Adjunct*
Norman H. Anderson, Ph.D., *Emeritus*
Stuart M. Anstis, Ph.D.
Mark I. Appelbaum, Ph.D.
Richard C. Atkinson, Ph.D., *Emeritus*
Ursula Bellugi, Ph.D., *Adjunct*
Sandra A. Brown, Ph.D.
Nicholas Christenfeld, Ph.D.
Michael Cole, Ph.D.
Diana Deutsch, Ph.D., *Emerita*
J. Anthony Deutsch, D. Phil, *Emeritus*
Karen R. Dobkins, Ph.D.
Ebbe B. Ebbesen, Ph.D., *Emeritus*
Karen Emmorey, Ph.D., *Adjunct*
Edmund J. Fantino, Ph.D.
Michael R. Gorman, Ph.D.
Gail D. Heyman, Ph.D.
Vladimir J. Konecni, Ph.D.
George F. Koob, Ph.D., *Adjunct*
James A. Kulik, Ph.D.
Stephen Link, Ph.D., *Adjunct*
Donald I. A. MacLeod, Ph.D.
George Mandler, Ph.D., *Emeritus*
Craig R.M. McKenzie, Ph.D.
Don Norman, Ph.D., *Emeritus*
Harold E. Pashler, Ph.D.
John M. Polich, Ph.D., *Adjunct*
Vilayanur S. Ramachandran, Ph.D., M.B.B.S.
Keith Rayner, Ph.D.
Timothy C. Rickard, Ph.D.
Pamela A. Sample, Ph.D., *Adjunct*
Laura E. Schreibman, Ph.D.
Larry R. Squire, Ph.D.
Ben A. Williams, Ph.D., *Emeritus*
Piotr Winkielman, Ph.D.
John T. Wixted, Ph.D., *Chair*

ASSOCIATE PROFESSORS

Leslie J. Carver, Ph.D.
Victor S. Ferreira, Ph.D.
Christine R. Harris, Ph.D.

ASSISTANT PROFESSORS

Stephan Anagnostaras, Ph.D.
Adam R. Aron, Ph.D.
David A. Barner, Ph.D.
Timothy Q. Gentner, Ph.D.
David Huber, Ph.D.
David Liu, Ph.D.
Cory Miller, Ph.D.
John Serences, Ph.D.
Ed Vul, Ph.D.

STUDENT SERVICES OFFICE: 1533 Mandler Hall
<http://psychology.ucsd.edu>

THE UNDERGRADUATE PROGRAM

MAJOR PROGRAMS

The department offers three degree programs: bachelor of arts (B.A.), bachelor of science (B.S.), and the contiguous bachelor of science (B.S.)/master of arts (M.A.). We offer courses in all major areas of experimental psychology, with emphasis in behavior analysis, clinical psychology, cognitive psychology and cognitive neuropsychology, developmental psychology, human information processing, neuroscience and behavior, psychopathology, sensation and perception, and social psychology. The department emphasizes research in the experimental and theoretical analysis of human and animal behavior, and the study of the mind. Students who major in psychology can expect to develop a knowledge of a broad range of content areas, as well as basic skills in experimental and analytic procedures. Once a student has decided upon a major in psychology, he or she is highly encouraged to consult with the Psychology Student Affairs Office.

Majors must have departmental approval for electives taken outside the department. Of the required courses in the area of specialization (three regular upper-division courses and two research experiences), no more than two may be taken outside the department. We recommend consulting the department before enrolling in courses offered by other departments.

PREREQUISITES FOR THE B.A.

Experimental psychology uses the tools and knowledge of science: calculus, probability theory, computer science, chemistry, biology, physics, and statistics. Accordingly, students in upper-division courses must have an adequate background in these topics. Prerequisites for individual courses are specified in the catalog.

The prerequisites for the bachelor of arts degree in psychology are as follows:

1. Three lower-division, general-introductory natural science courses from the listing of the approved UC San Diego courses below or their equivalent. (The three courses can be distributed in any manner.)
 - Biology: 1, 2, 3, 10, 20, 24, 26
 - Chemistry: 4, 6A, 6B, 6C, 11, 12, 13
 - Physics: Any of the 1 and 2 series, 10, 11
2. Three formal skills courses, at least one of which must be calculus. The other two courses may consist of any combination of courses in calculus or logic. Acceptable calculus courses at UC San Diego include Mathematics 10A-B-C, 20A-B-C. Acceptable logic courses at UCSD include Philosophy 10 and 12.
3. One introduction to computer programming course. Acceptable courses at UCSD are CSE 3, CSE 5A, CSE 5B, CSE 8A, CSE 8B, CSE 11, CSE 12, MAE 5, MAE 9, MAE 10, or CogSci 18. Other courses will be considered by petition only if they are primarily concerned with programming in a high-level computer language.

All courses listed under 1–3 may be taken Pass/Not Pass.

4. One quarter of statistics. Acceptable courses at UCSD are Psychology 60, Economics 120A, Sociology 60, Mathematics 11, 181, or 183, BIEB 100, Cognitive Science 14, or equivalent. Statistics **MUST** be taken for a letter grade.

Students should complete these lower-division requirements by the end of the sophomore year.

MAJOR REQUIREMENTS FOR THE B.A.

A minimum of twelve upper-division courses in psychology is required. Five must be taken from the core courses (Psychology 101–106), and at least seven from the upper-division elective courses. A minimum of six upper-division psychology courses must be taken at UCSD. These courses must be taken for a letter grade; courses taken as Pass/Not Pass prior to declaring psychology as a major cannot be used to satisfy the major requirement. Excluded from credit toward the major are Psychology 199 (Special Studies); however, Psychology 195 (Undergraduate Instructional Apprentice) can be credited once. Majors must obtain departmental approval for electives taken outside the department. A grade-point average of at least 2.0 in the upper-division courses of the major is required for graduation.

PREREQUISITES FOR THE B.S.

In general, the lower-division courses required for the B.S. degree in psychology overlap with the B.A. major. However, to fulfill the formal skills, we require the mathematics sequence 20A-B-C.

MAJOR REQUIREMENTS FOR THE B.S.

A minimum of twelve upper-division courses is required. Five of these courses must come from the core courses (Psychology 101–106). The seven elective courses may be chosen from any of the upper-division courses listed for the psychology program at UCSD. B.S. students must choose an area of concentration (behavior analysis, clinical psychology, cognitive psychology, and cognitive neuropsychology, developmental psychology, neuroscience and behavior, sensation and perception, or social psychology), and three courses of the seven electives must be in the chosen area of concentration.

In addition to the twelve upper-division courses, all B.S. degree students must complete course(s) to fulfill the research experience requirement. Research experience courses may comprise either one laboratory course or two Psychology 199 courses (Independent Study). If two Psychology 199 courses are taken to fulfill this requirement, they must be directed by the faculty within the chosen area of concentration and culminate in a research paper approved by the advisor and submitted to the Psychology Student Affairs Office no later than the graduating quarter. The 199 sequence should be taken with the same faculty member.

UPPER-DIVISION COURSE REQUIREMENTS FOR THE B.S.

Core Courses, of which five have to be taken for any area of concentration:

PSYC 101. Intro to Developmental Psychology
PSYC 102. Intro to Sensation and Perception
PSYC 103. Intro to Principles of Behavior
PSYC 104. Intro to Social Psychology
PSYC 105. Intro to Cognitive Psychology

PSYC 106. Intro to Physiological Psychology

Areas of concentration and their associated courses are listed in alphabetical order below.

(Subject to change—for additional qualifying courses, see the department's Student Affairs Office, 1533 Mandler Hall).

Concentration in Behavior Analysis

Behavior analysis is based on the principles of Pavlovian and operant conditioning, and other aspects of contemporary associative learning theory. It also includes the application of reinforcement principles and other behavior modification techniques in applied settings (applied behavior analysis).

Courses

- PSYC 109. Lab/Applied Behavior Analysis
- PSYC 120. Learning and Motivation*
- PSYC 121. Lab/Operant Psychology*
- *to be taken concurrently with PSYC 120
- PSYC 132. Hormones and Behavior
- PSYC 134. Eating Disorders
- PSYC 135. Evolutionary Principles/Animal Social Behavior
- PSYC 140. Lab/Human Behavior*
- *to be taken concurrently with PSYC 120
- PSYC 143. Control and Analysis of Human Behavior
- PSYC 154. Behavior Modification
- PSYC 168. Psychological Disorders of Childhood
- PSYC 171. Neurobiology Learning and Memory
- PSYC 184. Choice and Self Control
- PSYC 188. Impulse Control Disorders
- PSYC 199. Independent Study courses in this field must culminate in a research paper to fulfill lab requirement (but do not count as upper-division psychology courses towards the major).

Concentration in Neuroscience and Behavior

This area studies how the nervous system mediates behavioral effects in the realms of motivation, perception, learning and memory, and attention. It also includes human neurophysiology and aphasia.

Courses

- PSYC 107. Lab/Substance Abuse Research
- PSYC 114. Lab/Psychophysiological Perspectives on the Social Mind
- PSYC 125. Clinical Neuropsychology and Assessment
- PSYC 129. Logic of Perception
- PSYC 132. Hormones and Behavior
- PSYC 133. Circadian Rhythms—Biological Clocks
- PSYC 134. Eating Disorders
- PSYC 135. Evolutionary Principles/Animal Social Behavior
- PSYC 150. Cognitive Neuroscience of Vision
- PSYC 159. Physiological Basis of Perception
- PSYC 169. Brain Damage and Mental Function
- PSYC 170. Introduction to Cognitive Neuropsychology
- PSYC 171. Neurobiology Learning and Memory
- PSYC 179. Drugs, Addiction, and Mental Disorders
- PSYC 181. Drugs and Behavior
- PSYC 188. Impulse Control Disorders
- PSYC 189. Brain, Behavior, and Evolution
- PSYC 190. Parenting

PSYC 199. Independent Study courses in this field must culminate in a research paper to fulfill lab requirement (but do not count as upper-division psychology courses towards the major).

Concentration in Clinical Psychology

This area studies psychological and physiological causes of and treatments for mental illness in children and adults.

Courses

- PSYC 107. Lab/Substance Abuse Research
- PSYC 109. Lab/Applied Behavior Analysis
- PSYC 124. Intro to Clinical Psychology
- PSYC 125. Clinical Neuropsychology and Assessment
- PSYC 132. Hormones and Behavior
- PSYC 133. Circadian Rhythms—Biological Clocks
- PSYC 134. Eating Disorders
- PSYC 151. Test and Measurement
- PSYC 154. Behavior Modification
- PSYC 155. Social Psychology and Medicine
- PSYC 163. Abnormal Psychology
- PSYC 168. Psychological Disorders in Children
- PSYC 172. Human Sexuality
- PSYC 184. Choice and Self-Control
- PSYC 188. Impulse Control Disorders
- PSYC 190. Parenting
- PSYC 199. Independent Study courses in this field must culminate in a research paper to fulfill lab requirement (but do not count as upper-division psychology courses towards the major).

Concentration in Cognitive Psychology and Cognitive Neuropsychology

1. The cognitive area studies reasoning, thinking, language, judgment, and decision-making in adults and children (including attention, memory, and visual and auditory information processing).
2. The cognitive neuropsychology area studies cognitive processes and their implementation in the brain. Cognitive neuroscientists use methods drawn from brain damage, neuropsychology, cognitive psychology, functional neuroimaging, and computer modeling.

Courses

- PSYC 108. Introduction to Cognitive Neuroscience
- PSYC 114. Lab/Psychophysiological Perspectives on the Social Mind
- PSYC 115. Lab/Cognitive Psychology
- PSYC 118. Lab 118A-B/Language Processing
- PSYC 119. Lab/Psycholinguistics
- PSYC 128. Psychology of Reading
- PSYC 129. Logic of Perception
- PSYC 137. Social Cognition
- PSYC 141. Evolution and Human Nature
- PSYC 142. Psychology of Consciousness
- PSYC 144. Memory and Amnesia
- PSYC 145. Psychology of Language
- PSYC 146. Language and Conceptual Development
- PSYC 148. Psychology of Judgment and Decision
- PSYC 150. Cognitive Neuroscience of Vision
- PSYC 152. Concepts of Intelligence
- PSYC 156. Cognitive Development in Infancy
- PSYC 161. Introduction to Engineering Psychology

PSYC 170. Introduction to Cognitive Neuropsychology

- PSYC 171. Neurobiology Learning and Memory
- PSYC 187. Development of Social Cognition
- PSYC 191. Psychology of Sleep
- PSYC 199. Independent Study courses in this field must culminate in a research paper to fulfill lab requirement (but do not count as upper-division psychology courses towards the major).

Concentration in Developmental Psychology

This area studies all aspects of human development with emphasis on social and personality development, perceptual development, and language acquisition. Also includes the study of developmental psychopathology.

Courses

- PSYC 109. Lab/Applied Behavior Analysis
 - PSYC 114. Lab/Psychophysiological Perspectives on the Social Mind
 - PSYC 133. Circadian Rhythms—Biological Clocks
 - PSYC 135. Evolutionary Principles/Animal Social Behavior
 - PSYC 136. Cognitive Development
 - PSYC 141. Evolution and Human Nature
 - PSYC 145. Psychology of Language
 - PSYC 152. Concepts of Intelligence
 - PSYC 156. Cognitive Development in Infancy
 - PSYC 158. Interpersonal Relationships
 - PSYC 168. Psychological Disorder of Childhood
 - PSYC 172. Human Sexuality
 - PSYC 180. Adolescence
 - PSYC 185. Applied Developmental Psychology
 - PSYC 187. The Development of Social Cognition
 - PSYC 190. Parenting
 - PSYC 199. Independent Study courses in this field must culminate in a research paper to fulfill lab requirement (but do not count as upper-division psychology courses towards the major).
- (For additional qualifying courses, see the department's Student Affairs Office, 1533 Mandler Hall.)

Concentration in Sensation and Perception

This area studies how our sense organs and brain make it possible for us to construct our consciously experienced representation of the environment. Experiments using stimuli and computer control are used to test models of sensory or perceptual processes. Processes of particular interest include color vision, motion perception, and auditory illusions and paradox.

Courses

- PSYC 125. Clinical Neuropsychology and Assessment
- PSYC 128. Psychology of Reading
- PSYC 129. Logic of Perception
- PSYC 138. Sound and Music Perception
- PSYC 150. Cognitive Neuroscience of Vision
- PSYC 159. Physiological Basis of Perception
- PSYC 169. Brain Damage and Mental Functions
- PSYC 182. Allusions and the Brain

PSYC 199. Independent Study courses in this field must culminate in a research paper to fulfill lab requirement (but do not count as upper-division psychology courses towards the major).

Concentration in Social Psychology

This area studies human behavior in social situations, with specialization in such topics as emotion, aggression, social cognition, and aesthetics. It also encompasses applied social psychology, including psychology and the law and behavioral medicine.

Courses

PSYC 114. Lab/Psychophysiological Perspectives on the Social Mind

PSYC 127. Applied Social Psychology

PSYC 130. Delay of Gratification

PSYC 135. Evolutionary Principles/Animal Social Behavior

PSYC 137. Social Cognition

PSYC 139. Social Psychology of Sports

PSYC 141. Evolution and Human Nature

PSYC 149. Social Psychology of Theater

PSYC 152. Concepts of Intelligence

PSYC 153. Psychology of Emotion

PSYC 155. Social Psychology and Medicine

PSYC 157. Happiness

PSYC 158. Interpersonal Relationships

PSYC 160. Groups

PSYC 162. Psychology and the Law

PSYC 172. Human Sexuality

PSYC 175. Psychology and the Arts

PSYC 178. Industrial Organization Psychology

PSYC 186. Psychology and Social Policy

PSYC 187. Development of Social Cognition

PSYC 190. Parenting

PSYC 199. Independent Study courses in this field must culminate in a research paper to fulfill lab requirement (but do not count as upper-division psychology courses towards the major).

HONORS PROGRAM

Students are encouraged to participate in the department's honors program. It is strongly recommended for all students interested in graduate school. A minimum overall GPA of 3.3 (3.5 for transfer students, based on transfer GPA) is a prerequisite. Admission is granted by application in the fall quarter of the junior year (Deadline: October 31). This program is composed of the following courses.

1. Junior Year

Winter:

- Junior Honors Research Seminar (PSYC 110)
- Advanced Statistics and Research Methods (PSYC 111A)

Spring:

- Advanced Statistics and Research Methods (PSYC 111B)

2. Senior Year: A year-long independent research project (PSYC 194-A-B-C) under the sponsorship of a faculty advisor. This research culminates in an honors thesis.

3. At least one laboratory course (Psychology 107, 109, 114, 115, 118A, 118B, 119, 120/121, 120/140, 127) or, upon petitioning, two Psychology 199 Independent Study courses culminating in a research paper accepted by the advisor (199s,

however, do not count as upper-division credit toward the major).

Successful completion of the Honors Program requires a grade of A- in the Psychology 194 series and a minimum GPA of 3.5 in the upper-division courses taken for the major.

MINOR PROGRAM

The minor in psychology consists of seven four-unit courses from the Department of Psychology course offerings, of which at least twenty units (five four-unit courses) must be upper-division. At least four upper-division courses must be taken at UCSD for a letter grade. PSYC 199 (Independent Study) may count for one upper-division course towards the minor.

If Psychology 60 (Statistics) is chosen as one of the lower-division courses, it, too, has to be taken for a letter grade. The application for a minor can be obtained from your college. A grade-point average of at least 2.0 is required for graduation.

EDUCATION ABROAD

Students are often able to participate in the UC Education Abroad Program (EAP) and UCSD's Opportunities Abroad Program (OAP) while still making progress toward the major. Students considering this option should discuss their plans with the Psychology Student Affairs Office before going abroad, and courses taken abroad must be approved by the department. Students may only receive credit for up to two core courses (PSYC 101-106) from their courses taken abroad. Information on EAP/OAP is detailed in the Education Abroad Program of the UC San Diego General Catalog. Interested students should contact the Program Abroad Office in the International Center.

TRANSFER CREDIT

In general, all introductory courses in experimental psychology are accepted for lower-division credit toward a psychology minor. Lower-division courses covering special topics in psychology (e.g., personal adjustment, human sexuality) will be accepted only if: 1) the student had a general introductory course as a prerequisite, and 2) the student had satisfied this prerequisite before taking the special topics course. Upper-division psychology courses will be evaluated for transfer credit on a course by course basis.

THE GRADUATE PROGRAM

The Department of Psychology provides broad training in experimental psychology. Increased specialization and the general burgeoning of knowledge make it impossible to provide training in depth in every aspect of experimental psychology, but most aspects are represented in departmental research.

PREPARATION

Apart from the general university requirements, the department generally expects adequate undergraduate preparation in psychology. A major in the subject, or at least a strong minor, is normally a prerequisite, but applicants with good backgrounds in such fields as biology and mathematics are also acceptable.

LANGUAGE REQUIREMENTS

There is no foreign language requirement.

GRADUATE CURRICULUM

Students must fulfill all course requirements (stated below) while registered as graduate students in psychology at UC San Diego. There may occasionally be exceptions granted to this rule. Requests for exception should be in the form of petitions from students and their advisors to the Committee on Graduate Affairs. It is in the best interest of the student if these petitions are forthcoming at the time of admission to the graduate program. In this way, the committee, the students, and their advisors will all be aware of the course requirements before any of them are taken.

PROGRAM OF STUDY

Courses are divided into six areas: *behavior analysis* (including basic and applied), *neuroscience and behavior* (including neuropsychology and neurophysiology), *cognitive* (including attention, language, and perception), *developmental* (including language acquisition), *sensation and perception* (including vision and audition), and *social* (including health and law). The Graduate Affairs Committee provides an approved list of courses from these areas. In the first year of study, each student must fulfill the following four requirements:

1. Each student must fulfill a quantitative methods requirement, either by taking two quantitative methods courses approved by the Graduate Affairs Committee (currently 201A and 201B), or by showing a satisfactory knowledge of these courses through an examination.
2. In addition to the quantitative methods requirement, each student is expected to take four proseminars and four approved courses from the list prepared by the Graduate Affairs Committee. All course work must be completed by the end of the third year.
3. Each first-year graduate student is required to submit a research paper on the research project (Psychology 270ABC). The paper should be comparable in style, length, and quality to papers published in the normal, refereed journals of the student's research area. (The publication manual of the American Psychological Association, fourth edition, 1995, gives an acceptable format.)

The research paper will be read and evaluated by the student's research advisor and by at least two other readers appointed by the graduate advisor.

The research paper is presented orally at a research meeting held at the end of the spring quarter. Attendance at this meeting is a requirement for the department's graduate students and faculty. Typically, each student is allowed ten minutes to present the paper, with a five-minute question period following the presentation.

4. A teaching requirement must be met. (See below.)

All students are evaluated by the entire faculty at the end of the academic year. The normal

minimum standards for allowing a student to continue beyond the first year are

- a. Satisfactory completion of the first-year research project (including oral presentation)
- b. At least a B average in the courses which fulfill the area requirements
- c. Having a faculty advisor in the Department of Psychology

Any student whose needs cannot be reasonably met with courses conforming to these guidelines may petition the Graduate Affairs Committee. The petition should contain a specific list of courses and a statement of justification and must be approved by the student's advisor.

ADVANCING TO CANDIDACY

In order to advance to Ph.D. candidacy a student must

1. Complete all first-year requirements
2. Complete an additional four elective courses from the list prepared by the Graduate Affairs Committee
3. Complete the qualifying examination for the Ph.D.

The qualifying examination is divided into two sections to be taken separately by all students. Part I of the qualifying exam consists of a paper written by the student that is modeled after those published in *Psychological Bulletin* or *Psychological Review*. Ideally, the paper would consist of a detailed review and theoretical synthesis of a coherent body of research. The paper should demonstrate independent and original thinking on the part of the student, and should either take a theoretical stance or recommend experiments designed to resolve theoretical ambiguities (i.e., the paper should not merely review published research).

Students form a qualifying committee in much the same way that they form a dissertation committee. The same rules apply, except that members from outside the department need not be included (although up to two may be). Once the committee is formed, the student should prepare a brief (e.g., three pages) proposal defining the area of research and the theoretical issues that will be addressed in the paper. A proposal meeting is then arranged (usually in spring quarter of the student's second year), and committee members may at that time recommend changes in the scope of the paper and define their expectations.

The paper does not have a prescribed length, although low-end and high-end limits of thirty and fifty pages, respectively, seem reasonable. An oral defense of the paper is required (and should be completed by the end of the student's third year).

Part II of the qualifying examination is the defense of the dissertation proposal. This will normally follow *Part I* of the qualifying examination and will be an oral examination including outside examiners.

TEACHING

In order to acquire adequate teaching experience, all students are required to participate in the teaching activities of the department for at least four years (one quarter for the first year and two quarters the second through the fourth year).

RESIDENCY

Each student must complete the requirements for qualification for candidacy for the Ph.D. degree by the end of the third year of residence. Any student failing to qualify by this time will be placed on probation. A student who fails to qualify by the end of the spring quarter of the fourth year of residence will automatically be terminated from the department.

No students may allow more than eight calendar years to elapse between starting the graduate program and completing the requirements for the Ph.D. Degree students will automatically be terminated from the program at the end of the spring quarter of their eighth calendar year in the department.

RESEARCH

In each year of graduate study, students enroll in a research practicum (Psychology 270 in the first year; Psychology 296 or 299 in subsequent years). Students are assigned to current research projects in the department and receive the personal supervision of a member of the staff.

DEPARTMENTAL PH.D. TIME LIMIT POLICIES

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed eight years. Total registered time at UCSD cannot exceed eight years.

SPECIALIZATION IN ANTHROPOGENY

This is a transdisciplinary graduate specialization in anthropogeny with the aim of providing graduate students the opportunity to specialize in research and education on explaining the origins of the human phenomenon. The aim is to rectify the absence of existing training programs that provide such a broad and explicitly transdisciplinary approach—spanning the social and natural sciences—and focusing on one of the oldest questions known to humankind, namely, the origins of humans and humanity. This specialization is not a stand-alone program, but aims at providing graduate students who have just embarked on their graduate careers with the opportunity to interact and communicate with peers in radically different disciplines throughout the duration of their Ph.D. projects. Such communication across disciplines from the outset is key to fostering a capacity for interdisciplinary "language" skills and conceptual flexibility

ADMISSION TO THE SPECIALIZATION

The psychology graduate program will advertise the specialization to those students in our programs who have an interest in human origins. Qualifying applicants will have the opportunity to enroll for the specialization.

SPECIALIZATION REQUIREMENTS

Students pursuing this specialization will be required to take a series of courses in addition to research rounds over four years of study. It is advised that students begin their course work in their second year.

- Course work: Introduction to Anthropogeny (BIOM 225) and Advanced Anthropogeny (BIOM

229) are each taken once, in the winter and spring of the students' second year. Current Topics in Anthropogeny (BIOM 218) is to be taken every quarter for four years.

- Research Rounds: Monthly seminars during which all participating students talk about their respective research.

QUALIFYING EXAMINATION

Psychology students in the anthropogeny specialization must meet the departmental requirement for advancement to candidacy, including the qualifying paper and dissertation proposal. In addition, students must meet internal deadlines, mentoring provisions, and proposal standards of the anthropogeny specialization track.

DISSERTATION

Ph.D. students must complete a dissertation, which meets all requirements of the home program. In addition, it is expected that the Ph.D. dissertation is broadly related to human origins and will be interdisciplinary in nature.

TIME LIMITS

It is expected that students will retain the same time to degree as students not pursuing this specialization. Additional course load consists only of two regular courses (two quarters twenty lectures each). The third proposed course takes place only three times a year from Friday noon to Saturday evening.

MAJOR REQUIREMENTS FOR THE CONTIGUOUS B.S./M.A.

A contiguous program leading to a bachelor of science degree and a master of arts degree in psychology is offered to those undergraduate students who are enrolled in the bachelor of science major offered in the Department of Psychology at UC San Diego. Qualified students are able to obtain the M.A. degree within one year following receipt of the B.S. degree. Students interested in applying to this program must consult with the B.S./M.A. advisor in the Psychology Student Affairs Office fall quarter of their junior year.

The program is open only to UCSD undergraduates. The Department of Psychology does not have financial aid available for students enrolled in this program.

ELIGIBILITY AND ENROLLMENT

To be eligible, students must have completed the first two quarters of their junior year in residence at UCSD and must have an overall UCSD GPA of at least 3.0 and students' major GPA should be at least 3.3. It is the responsibility of the prospective student to select a faculty member who would be willing to serve as the student's advisor and in whose laboratory the student would complete at least twenty-four units of research over a two-year period. Twelve of the twenty-four units of research Psychology (194A-B-C or 196A-B-C) must be completed during the student's senior undergraduate year and must be taken *in addition* to the requirements for the bachelor of science degree. The remaining twelve units of research will be taken in their year of graduate study as part of their M.A.

There are two applications:

1. In fall quarter of the junior year, students apply to the contiguous B.S./M.A. track if they fulfill the above requirements.
2. In the spring quarter of their senior year, students apply to the M.A. program.

REQUIREMENTS FOR THE M.A.

For an M.A. in psychology, students must pick a concentration in one of six areas: Behavioral, Cognitive, Developmental, Neuroscience and Behavior, Sensation and Perception, and Social.

Students who have been approved (by both the Department of Psychology and UCSD Office of Graduate Studies) for the program must enroll in their graduate year in

- PSYC 201A-B. Quantitative Methods
- PSYC 270A-B-C. Introduction to Laboratory Experimentation
- Four psychology seminars, two of which are in their area of concentration. In addition, three of the four seminars must be pro-seminars, which include
- PSYC 217. Developmental Psychology
- PSYC 218. Cognitive Psychology
- PSYC 219. Behavioral Psychology
- PSYC 220. Social Psychology
- PSYC 221. Sensation and Perception
- PSYC 222. Behavioral Psychology
- One PSYC 500. Teaching Instruction

This amounts to forty units of graduate work.

All course work is to be approved by the advisors (forms available from the Psychology Student Affairs Office). Students are expected to meet the graduate requirements for the M.A. in *one year* (three consecutive, contiguous, academic quarters, beginning in the fall after graduation). Any deviation from this plan, such as a break in enrollment for one or more quarters, will cause the student to be dropped from the program.

All forms required for the program must be submitted and approved by the Psychology Student Affairs Office, including the Application for Candidacy. Students must pay fees and be officially enrolled at UCSD during the quarter that the master's degree is to be awarded. The thesis draft should be submitted to the Office of Graduate Studies for review before the final copy is officially submitted.

See the [Psychology Student Affairs Office](#) for further details.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

EXPERIMENTAL REQUIREMENTS

Psychology at UCSD is a laboratory science. We are concerned with the scientific development of knowledge about human and animal behavior and thought. Accordingly, experience with experimental procedures plays an important role in the undergraduate and graduate training of students.

1. Psychology (4)

A comprehensive series of lectures covering the basic concepts of modern psychology in the areas of human information processing, learning and memory, motivation, developmental processes, language acquisition, social psychology, and personality.

2. General Psychology: Biological Foundations (4)

A survey of physiological and psychological mechanisms underlying selected areas of human behavior. Emphasis will be upon sensory processes, especially vision, with emphasis also given to the neuropsychology of motivation, memory, and attention.

3. General Psychology: Cognitive Foundations (4)

This course is an introduction to the basic concepts of cognitive psychology. The course surveys areas such as perception, attention, memory, language, and thought. The relation of cognitive psychology to cognitive science and to neuropsychology is also covered.

4. General Psychology: Behavioral Foundations (4)

This course will provide a basic introduction to behavioral psychology, covering such topics as classical conditioning, operant conditioning, animal learning and motivation, and behavior modification.

6. General Psychology: Social Foundations (4)

This course will provide a basic introduction to social psychology, covering such topics as emotion, aesthetics, behavioral medicine, person perception, attitudes and attitude change, and behavior in social organizations.

7. General Psychology: Developmental Foundations (4)

This course is an introduction to cognitive and social changes that take place over the course of a lifetime. This course introduces influential theories of child development, such as those of Freud or Piaget, together with recent criticisms of these theories.

60. Introduction to Statistics (4)

Introduction to the experimental method in psychology and to mathematical techniques necessary for experimental research. **Prerequisite:** one year mathematics or consent of instructor.

87. Freshmen Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen. **Prerequisite:** none.

90. Undergraduate Seminar (1)

This seminar introduces the various subdisciplines in psychology and their research methods, and also explores career and graduate school opportunities. This includes informal presentations by faculty, graduate students, and other professionals.

99. Independent Study (2,4)

Independent study or research under direction of a member of the faculty. **Prerequisites:** lower-division standing, completion of at least thirty units of undergraduate study at UCSD with a minimum UCSD GPA of 3.0; completed and approved Special Studies form.

UPPER-DIVISION

101. Introduction to Developmental Psychology (4)

A lecture course on a variety of topics in the development of the child, including the development of perception, cognition, language, and sex differences. **Prerequisite:** upper-division standing; Psychology 60 or BIEB 100 or COGS 14 or Econ. 120A or Math. 11 or Math. 181A or Math. 183 or Soc/L 60.

102. Introduction to Sensation and Perception (4)

An introduction to problems and methods in the study of perception and cognitive processes. **Prerequisites:** upper-division standing; Psychology 60 or BIEB 100 or COGS 14 or Econ. 120A or Math. 11 or Math. 181A or Math. 183 or Soc/L 60.

103. Introduction to Principles of Behavior (4)

An example of the principles of conditioning and their application to the control and modification of human behavior. **Prerequisites:** upper-division standing; Psychology 60 or BIEB 100 or COGS 14 or Econ. 120A or Math. 11 or Math. 181A or Math. 183 or Soc/L 60.

104. Introduction to Social Psychology (4)

An intensive introduction and survey of current knowledge in social psychology. **Prerequisites:** upper-division standing; Psychology 60 or BIEB 100 or COGS 14 or Econ. 120A or Math. 11 or Math. 181A or Math. 183 or Soc/L 60.

105. Introduction to Cognitive Psychology (4)

Introduction to experimental study of higher mental processes. Topics to be covered include pattern recognition, perception, and comprehension of language, memory, and problem solving. **Prerequisites:** upper-division standing; Psychology 60 or BIEB 100 or COGS 14 or Econ. 120A or Math. 11 or Math. 181A or Math. 183 or Soc/L 60.

106. Introduction to Physiological Psychology (4)

Intensive introduction to current knowledge of physiological factors in learning, motivation, perception, and memory. **Prerequisites:** upper-division standing; Psychology 60 or BIEB 100 or COGS 14 or Econ. 120A or Math. 11 or Math. 181A or Math. 183 or Soc/L 60.

107. Lab/Substance Abuse Research (4)

This lab course examines theory and research design and methods for substance abuse in adolescent adult populations. This course serves as preparation for individual research topics culminating in a paper.

108. Introduction to Cognitive Neuroscience (4)

This course covers background history, neuroanatomy, methods, and results from neuroimaging and neuropsychological studies of behavior. Topics include attention, motor control, executive function, memory, learning, emotion, and language. **Prerequisites:** upper-division standing; Psychology 60 or BIEB 100 or COGS 14 or Econ. 120A or Math. 11 or Math. 181A or Math. 183 or Soc/L 60.

109. Lab/Applied Behavior Analysis (4)

This course will provide students with hands-on training in the application of behavioral research technology to a clinical population. Students will meet weekly for lecture, discussion, research article reviews, and specific technique training. In addition, students will work on a research project. **Prerequisite:** Psychology 199 in the Schreibman autism laboratory recommended.

110. Juniors Honors Research Seminars (4)

Meetings consist of research seminars by a range of departmental faculty, exposing students to contemporary research problems in all branches of experimental psychology. Class discussions will follow faculty presentations. Evaluation is based on assigned papers. **Prerequisites:** admission by application with a minimum UCSD GPA of 3.3. Department stamp required. Application forms are available from the Student Services Office and due by the end of October of each fall quarter.

111A. Research Methods I (6)

Designed to provide training in the applications of advanced statistical methods in the context of initial instruction in experimental design. Emphasis will be placed on the development of statistical problem-solving skills, practical computer applications, and scientific report writing. **Prerequisites:** minimum grade of B in Psychology 60 or

equivalent and junior standing. Open to honors students or consent of instructor. Department stamp required.

111B. Research Methods II (6)

Designed to extend the material of Psychology 111A. Focusing on the techniques developed previously. Participate in data collection, data organization, statistical analysis, and graphic displays, emphasis placed on developing scientific report writing, presentations, and critical thinking about experimental methods. **Prerequisite:** Psychology 111A or consent of instructor.

114. Laboratory in Psychophysiological Perspectives on the Social Mind (4)

Lab course on the use of psychophysiological methods to investigate "the social mind," or the cognitive and emotional processes involved in understanding and reacting to other people. Overview of major research topics and methods applying selected techniques in actual experiments. Students will engage in developing individual research questions to actively participate in designing and conducting the experiments. **Prerequisite:** upper-division standing.

115. Laboratory in Cognitive Psychology (4)

Lecture and laboratory work in human information processing. **Prerequisite:** upper-division standing or consent of instructor.

118A. Real-Time Examination of Language Processing (4)

This lab course examines the design and methods for the real-time examination of language processing in normal and disordered (aphasic, dyslexic, child language impaired, etc.) language populations. This course serves as preparation for individual research topics in Psychology 118B. **Prerequisite:** a course in language or cognition (see professor for exceptions).

118B. Real-Time Examination of Language Processing (4)

This lab is a continuation of Psychology 118A. The introduction to laboratory methods is now applied to individual research projects culminating in a lab presentation and paper. **Prerequisite:** Psychology 118A or consent of instructor.

119. Psycholinguistics/Cognition Laboratory (4)

Methods and practicum in experimental study of language, reading, and related cognitive processes (reasoning, problem solving) in young adult populations. **Prerequisites:** Psychology 118A-B or consent of instructor. Department stamp required.

120. Learning and Motivation (4)

Survey of research and theory in learning and motivation. Includes instincts, reinforcement, stimulus control, choice, aversive control, and human application. **Prerequisite:** upper-division standing. Must be taken concurrently with Psychology 121 or Psychology 140.

121. Laboratory in Operant Psychology (4)

Lecture and laboratory in operant psychology. **Prerequisite:** upper-division standing. May be taken concurrently with Psychology 120.

123. Cognitive Control and Frontal Lobe Function (4)

Cognitive control refers to the optimization of behavior according to one's goals. This class examines: anatomy; neuroscience methods; working memory, switching, and stopping; prefrontal pharmacology; ADHD and other neuropsychiatric disorders; addiction and emotion regulation; development, rehabilitation, and criminal responsibility. **Note:** Students may not enroll in Psychology 123 after receiving credit for Psychology 193 Cognitive Control and Frontal Lobe Function. **Prerequisite:** department stamp.

124. Introduction to Clinical Psychology (4)

Introduction to major concepts and models used in psychological assessment and psychotherapeutic intervention. Several modalities of psychotherapy (individual, group, and family) will be reviewed along with research on their efficacy. **Prerequisite:** Psychology 163.

125. Clinical Neuropsychology and Assessment (4)

A fundamental grounding in basic neuropsychological principles. Major topics include functional neuroanatomy

and physiology of the human brain, neurobehavioral presentations of common neurologic and psychiatric conditions, and an introduction to diagnostic neuropsychological assessment and methods. **Prerequisite:** Psychology 60.

127. Methods in Applied Social Psychology (4)

Emphasizes learning of experimental and quasi-experimental methodology applicable to social problems. Students carry out field research in areas such as the psychology of law (judicial decision-making), traffic-related behavior (risk taking), environmental psychology, and other areas of student interest. **Prerequisites:** Psychology 104 and 60.

128. Psychology of Reading (4)

Basic information about the nature of reading will be covered. Topics include word recognition, eye movements, inner speech, sentence processing, memory for text, learning to read, methods for teaching reading, reading disabilities and dyslexia, and speed reading. **Prerequisite:** Psychology 105 or Psychology 145 or consent of instructor.

129. Logic of Perception (4)

Lectures will cover three topics: 1) tradition of experimental work on perception that dates back to Hemholtz; 2) discussion and criticisms of theories of perception; 3) recent physiological work on the visual pathways that may give us insights into neural mechanisms underlying perception. **Prerequisite:** upper-division standing.

130. Delay of Gratification (4)

This course will review the research on delay of gratification. It will cover what makes it in general so tough, what situations make it possible, who can do it, and what the implications of this ability are. **Prerequisite:** upper-division standing.

132. Hormones and Behavior (4)

A survey of the effects of chemical signals (hormones, neurohormones and pheromones) on behavior as well as reciprocal effects of behavior on these chemical systems. Specific topics covered include aggression, sex and sexuality, feeding, learning, memory and mood. Animal studies will be emphasized. **Prerequisite:** Psychology 106 or consent of instructor.

133. Circadian Rhythms—Biological Clock (4)

Examples and fundamental properties of the daily biological clock in humans, animals and microbes. Experimental approaches employed to understand how organisms keep time and how this applies to human health. **Prerequisite:** Psychology 106 or BILD 1 or consent of instructor. This course is cross-listed with BIMM 116.

134. Eating Disorders (4)

This course will cover the biology and psychology of eating disorders such as anorexia nervosa, bulimia nervosa, and binge eating disorder. Abnormal, as well as normal eating will be discussed from various perspectives including endocrinological, neurobiological, psychological, sociological, and evolutionary. **Prerequisite:** upper-division standing.

135. Animal Behavior (4)

Mechanisms that regulate the behavior of animals, including neural, endocrine, genetic, and environmental mechanisms, with a strong emphasis on evolution (natural and sexual selection). Topics include communication, sociality, mating strategies, and parental behavior. **Prerequisites:** upper-division standing and consent of instructor.

136. Cognitive Development (4)

This course examines the foundations and growth of the mind, discussing the development of perception, imagery, concept formation, memory, and thinking. Emphasis is placed on the representation of knowledge in infancy and early childhood. (Credit may not be received for both PSYC 136 and COGS 113.) **Prerequisite:** PSYC 101 or PSYC 105.

137. Social Cognition (4)

Social cognition blends cognitive and social psychology to show how people make sense of the social world. Social perception, inference, memory, motivation, and affect, understanding of the self, stereotypes, and cultural cognition. **Prerequisite:** upper-division standing.

138. Sound and Music Perception (4)

Topics include the physiology of the auditory system, perception and pitch, loudness and timbre, localization

of sound in space, perception of melodic and temporal patterns, handedness correlates, and musical illusions and paradoxes. There will be a substantial number of sound demonstrations. **Prerequisites:** upper-division standing and consent of instructor.

139. Social Psychology of Sports (4)

This course focuses on the applications of social psychological principles and finding to the understanding of sports. Topics include the role of motivation, level of aspiration, competition, cooperation, social comparison, and optimal arousal, spectators' perspective, motivation and perceptions of success, streaks, etc. **Prerequisite:** upper-division standing or consent of instructor.

140. Lab/Human Behavior (4)

Laboratory on the principles of human behavior, including choice behavior, self-control, and reasoning. **Prerequisites:** 120 (may be taken concurrently); upper-division standing.

141. Evolution and Human Nature (4)

Can important aspects of human behavior be explained as a result of natural selection? Focus on sex differences, selfishness and altruism, homicide and violence, and context effects in human reasoning. **Prerequisites:** upper-division standing and consent of instructor.

142. Psychology of Consciousness (4)

This course will survey research on consciousness from an experimental psychology perspective. Special emphasis will be placed on cognitive, neuroimaging, and clinical/psychiatric investigative techniques, and on the scientific assessment of the mind-body problem. **Prerequisite:** upper-division standing.

143. Control and Analysis of Human Behavior (4)

An overview of the behavioral approach including basic principles, self-control, clinical applications, and the design of cultures. **Prerequisite:** upper-division psychology majors.

144. Memory and Amnesia (4)

This course will review basic research into the nature of memory. It begins with an examination of historical milestones in the study of memory and then considers research concerned with contemporary models of memory and amnesia. **Prerequisite:** upper-division standing.

145. Psychology of Language (4)

Introduction to research on language comprehension and production. Focus on brain basis of language, language origin and universal structure, language disorders (aphasia, dyslexia), animal language, linguistic community differences, and the mental processes underlying normal language processing. **Prerequisite:** a course in language, cognition, or philosophy of mind recommended.

146. Language and Conceptual Development (4)

Introduction to research on language acquisition and how it relates to conceptual development. Focus on theoretical foundations (e.g., learning mechanisms, universal grammar, theories of concepts) and empirical case studies, including word learning, syntax and semantics, and language and thought. Recommend course in language/linguistics, cognition, or cognitive development. **Prerequisite:** upper-division standing or consent of instructor.

147. Gender (4)

This interactive undergraduate seminar will examine biological approaches to gender differences and sexuality. Do the biosciences further our understanding of these issues? How are biological claims embraced or rebutted by other disciplines? Students will read primary scientific literature and criticism. **Prerequisite:** upper-division standing.

148. Psychology of Judgment and Decision (4)

Broadly defined, the field of judgment and decision making examines preferences and subjective probability, and how they are combined to arrive at decisions. The course will cover history and current topics.

149. Social Psychology of Theater (4)

Exploration of the relationship between social psychology and drama, focusing on the use of psychological principles in plays (by playwrights) and their performance (by directors, actors, and choreographers). **Prerequisite:**

upper-division standing, major in psychology or theater, or consent of instructor.

150. Cognitive Neuroscience of Vision (4)

Cognitive neuroscience is an interdisciplinary field of research dedicated to understanding how the brain supports different cognitive abilities. This course will focus on the neural basis of visual experience, or how our brain creates what we see in the world around us. **Prerequisite:** Psychology 102 or Psychology 108.

151. Tests and Measurement (4)

This course provides an introduction to psychological testing presented in three components: 1) psychometrics and statistical methods of test construction; 2) application of psychological tests in industry, clinical practice, and other applied settings; and 3) controversies in the application of psychological tests. **Prerequisite:** Psychology 60.

152. Concepts of Intelligence (4)

This course will examine the concept of intelligence from several perspectives: its historical development, its measure in terms of IQ test, and its role in practical affairs. Also included will be its role in comparative psychology and attempts to analyze intelligence in terms of more fundamental cognitive processes. **Prerequisite:** Psychology 60 or consent of instructor.

153. Psychology of Emotion (4)

Past and current findings and theories on emotion. Facial expressions of emotions, psychophysiology, evolutionary perspectives, and specific emotions: anger, fear, and jealousy. **Prerequisite:** upper-division standing or consent of instructor.

154. Behavior Modification (4)

Extension of learning principles to human behavior, methods of applied behavior analysis, and applications of behavioral principles to clinical disorders and to normal behavior in various settings. **Prerequisite:** upper-division standing.

155. Social Psychology and Medicine (4)

Explores areas of health, illness, treatment, and delivery of treatment, and social psychological perspectives in the medical area. **Prerequisites:** Psychology 60 or equivalent and 104.

156. Cognitive Development in Infancy (4)

Examines perception and cognition in the first year of life. Different theories of cognitive change in infancy will be evaluated. **Prerequisite:** Psychology 60 and either Psychology 101 or HDP 1.

157. Happiness (4)

This course will address the psychology of happiness. The discussions and readings, consisting largely of original research articles. Will explore such questions as: what is happiness? How do we measure it, and how do we tell who has it? What is the biology of happiness and what is its evolutionary significance? What makes people happy—youth, fortune, marriage, chocolate? Is the pursuit of happiness pointless? **Prerequisite:** upper-division standing.

158. Interpersonal Relationships (4)

Seminar-style course to examine theories and empirical work pertaining to interpersonal relationships; attraction, jealousy, attachments, love. **Prerequisite:** upper-division standing.

159. Physiological Basis of Perception (4)

A survey of sensory and perceptual phenomena and the physiological mechanisms underlying them. **Prerequisite:** Psychology 102 or consent of instructor.

160. Groups (4)

Causes and consequences of gregariousness, stress, validating attitudes, improving efficiency, consolidating power, permitting loafing, rejecting deviates, and insulating group members from unpleasant outside influence. **Prerequisite:** upper-division standing.

161. Introduction to Engineering Psychology (4)

Surveys human perceptual and cognitive limitations and abilities important in designing "user-friendly" computers and devices, improving aviation and traffic safety, and other engineering challenges. Topics include human vision as it bears on display design (including virtual-reality),

short-term memory limitations, learning and practice, effects of noise and stress, causes of human error and their minimization. **Prerequisite:** upper-division standing.

162. Psychology and the Law (4)

Research dealing with psychological factors in the legal system will be surveyed. Particular emphasis will be placed on applying psychological theory and methods to the criminal justice system in an attempt to understand the behavior of its participants. **Prerequisite:** Psychology 60 and 104.

163. Abnormal Psychology (4)

Surveys origins, characteristics and causes of abnormal behavior and the biological and environmental causes of abnormality. **Prerequisite:** upper-division standing.

164. Criminology (4)

Focus is on the scientific study of law making and societal reaction to breaking of laws; major theories that account for criminal behavior; the relationship between drugs and crime; the effects penalties have on recidivism; and psychological effects of incarceration. **Note:** Students may not enroll in Psychology 164 after receiving credit for Psychology 193 Criminology. **Prerequisite:** department stamp.

166. History of Psychology (4)

Survey of the major trends and personalities in the development of psychological thought. Emphasis given to such selected topics as mind-body problem, nativism vs. empiricism, and genesis of behaviorism. Open to psychology majors with senior standing only.

168. Psychological Disorders of Childhood (4)

Explores different forms of psychological deviance in children (psychosis, neurosis, mental retardation, language disorders and other behavior problems). Emphasis on symptomatology, assessment, etiological factors, and various treatment modalities. **Prerequisite:** upper-division standing.

169. Brain Damage and Mental Functions (4)

Studies neural mechanisms underlying perception, memory, language, and other mental capacities. What happens to these capacities when different parts of the brain are damaged? What can we learn about the normal brain by studying patients? **Prerequisite:** upper-division standing.

170. Introduction to Cognitive Neuropsychology (4)

What are the neural mechanisms underlying mental phenomena such as perception, attention, and memory? The two disciplines, neuropsychology and psychology, both have a long history but until recently there has been very little interaction between them. This course will take students to the interface between these two fields and we will discuss a wide range of topics that are of current interest. **Prerequisite:** upper-division standing.

171. Neurobiology of Learning and Memory (4)

Studies the neurobiology of learning and memory, from cognitive to molecular neuroscience, including human, animal, and cellular; and molecular studies of memory. Topics include amnesia, mental retardation, exceptional intelligence, aging, and Alzheimer's disease. **Prerequisites:** Psychology 2 or 106 or 181, upper-division standing or consent of instructor.

172. The Psychology of Human Sexuality (4)

Important issues in human sexuality including sex and gender, sexual orientation, reproductive technology, and sexual dysfunction. **Prerequisite:** upper-division standing.

173. Psychology of Food and Behavior (4)

Reviews the psychology of food and behavior. Topics will include biological, psychological, and social influences; taste preferences and aversions and how they are learned; how culture influences food selection; and food-related behaviors across the lifespan. **Prerequisite:** upper-division standing or consent of instructor.

175. Psychology and the Arts (4)

An interdisciplinary course focusing on theoretical ideas and empirical research that relate contemporary psychology (social and cognitive, psychophysiology, motivation and emotion) to issues in various aesthetic and artistic domains, as visual arts, music, literature, criticism, and the performance arts. **Prerequisites:** upper-division standing;

major in psychology, music, visual arts, communication, theatre and dance, or literature, or consent of instructor.

176. Creativity (4)

The focus is on enhancing creativity in individuals, small groups, and organizations. Topics include how changes to individuals (e.g., gaining expertise, accepting more risk) and their environment (e.g., more diverse colleagues, more time for exploring) increase creativity. **Prerequisite:** upper-division standing.

178. Organizational Psychology (4)

Examines human behavior in industrial, business, and organizational settings; and psychological principles as applied to selection, placement, management, and training. The effectiveness of individuals and groups within organizations, including leadership and control, conflict and cooperation, motivation, and organizational structure and design, is examined. **Prerequisite:** upper-division standing.

179. Drugs, Addiction, and Mental Disorders (4)

Considers the use, abuse, liability, and psycho-therapeutic effects of drugs in humans. Lectures are supplemented by guest lecturers from clinical experts in psychology and psychiatry. **Prerequisite:** one lower-division psychology course (1, 2, 3, or 4) or upper-division standing.

180. Adolescence (4)

This course will adopt a multidisciplinary approach toward understanding the period of human adolescence. A strong focus on the neurobiological aspects of adolescence will be combined with psychological, anthropological, and sociological considerations. **Prerequisite:** upper-division standing.

181. Drugs and Behavior (4)

Develops basic principles in psychopharmacology while exploring the behavioral effects of psychoactive drugs and mechanisms of action of drugs. **Prerequisite:** psychology major or minor, or biology major or minor.

182. Illusions and the Brain (4)

This course explores the bases of illusions in terms of perceptual and cognitive principles, and the underlying brain mechanisms; extensive demonstrations are included. **Prerequisite:** upper-division standing.

184. Choice and Self-Control (4)

Experimental analysis of choice behavior, with an emphasis on the types of choice involved in self-control. Focus on conditions under which decision-making is optimal. **Prerequisite:** upper-division students in psychology, biology, economics, or consent of instructor.

185. Applied Developmental Psychology (4)

This seminar course deals with how developmental psychologists conduct scientific studies that have direct practical implications for children's well-being. Major issues to be discussed are: child witnesses, literacy, school violence, impact of media on child development, and developmental psychopathology. **Prerequisites:** upper-division standing and Psychology 101.

187. Development of Social Cognition (4)

This course will examine reasoning about people from a developmental perspective. Topics will include emotional understanding, achievement motivation, peer relations, social categories, and culture. **Prerequisite:** Psychology 101.

188. Impulse Control Disorders (4)

Problems of impulse control are important features of major psychiatric disorders but also of atypical impulse control disorder such as: pathological gambling, compulsive sex, eating, exercise, shopping. Focus: development, major common features, treatment, and neurobiological basis of impulse control disorders. **Prerequisite:** upper-division standing.

189. Brain, Behavior, and Evolution (4)

A survey of natural behaviors, including birdsong, prey capture, localization, electro-reception, and echo-location, and the neural systems that control them, emphasizing broad fundamental relationships between brain and behavior across species. **Prerequisites:** Psychology 103 and 106, or permission of instructor.

190. Parenting (4)

This course adopts an interdisciplinary approach to the complex construct of parenting. Parenting is explored with respect to history, culture, development, psychology, biology, etc. Controversial issues such as the influence of the media, family structure, and discipline strategies are analyzed. **Prerequisite:** upper-division standing.

191. Psychology of Sleep (4)

Topics include basic psychology, evolutionary models of the purpose of sleep, the role of sleep in learning/creativity, dreams, and sleep disorders. **Prerequisite:** upper-division standing.

193. Topics in Psychology (4)

Selected topics in the field of psychology. May be repeated for credit as topics vary. **Prerequisites:** upper-division standing and consent of instructor.

194A-B-C. Honors Thesis (4-4-4)

Students will take part in a weekly research seminar. In addition, they will plan and carry out a three-quarter research project under the guidance of a faculty member. The project will form the basis of the senior honors thesis. **Prerequisites:** acceptance to the Honors Program in the junior year (110A-B) (GPA 3.3), in addition one laboratory course (114-127) or two 199s which culminate in a research paper (by petition only) and Psychology 110, 111A-B and consent of instructor.

195. Instruction in Psychology (4)

Introduction to teaching a class section in a lower-division psychology course, hold office hours, assist with examinations and grading (P/NP grades only). This course counts only once towards the major. **Prerequisites:** junior or senior psychology major with GPA of 3.0 or an A in the course and consent of instructor.

196A-B-C. Research Seminar (4-4-4)

Weekly research seminar, three quarter research project under faculty guidance which culminates in a thesis. **Prerequisites:** one laboratory course, 3.3 GPA, and/or consent of instructor.

199. Independent Study (2 or 4)

Independent study or research under direction of a member of the faculty. **Prerequisites:** GPA 2.5 and ninety units completed. (P/NP grades only.) Not counted for credit toward the major. See section on 199 information.

GRADUATE**201A-B-C. Quantitative Methods in Psychology (4-4-4)**

An intensive course in statistical methods and the mathematical treatment of data, with special reference to research in psychology. **Prerequisite:** restricted to graduate students in psychology.

204. Neurobiology of Social Development (4)

The goal of this class is to acquaint students with research on the neurological underpinnings of social and social cognitive development. Students will be expected to become familiar with the existing research in the area, and to understand the neural structures that comprise the limbic system, and their developmental timecourse. Students will be expected to form hypotheses about the neural correlates of aspects of social development based upon an understanding of the development of structures involved in social behavior.

205. Emotion (4)

This seminar provides a selective overview of the scientific study of emotion. We will discuss various theoretical perspectives on emotion and will focus on specific topics such as emotion regulation, affect in social interactions, individual differences, and particular emotions (e.g., embarrassment, envy, and jealousy). **Prerequisite:** graduate standing.

206. Mathematical Modeling (4)

This course is designed to teach the basics of mathematical modeling. Topics include when, why, and how to use signal detection theory (an essential theory for anyone interested in attention, perception, memory, or decision making), how to analyze reaction time distributions (instead of simply

measuring mean RT), how to engage in the fine art of model comparison, and how to avoid creating models that are more complex than the data they seek to explain.

209. Topics in Judgment and Decision Making (3)

This seminar examines issues in the psychology of judgment and decision making. Topics include the heuristics and biases approach, over confidence, framing effects, intertemporal choice, and rationality.

210. Skill Acquisition and Development of Expertise (4)

The course examines the transition from novice to highly skilled performance and the transfer of that skill to novel problems and contexts. Emphasis will be on information processing accounts of learning and performance for relatively simple cognitive tasks.

211. The Development of Social Cognition (3)

This seminar will cover the development of concepts about people. Topics include emotional understanding, "theory of mind," trait thinking, social categories, psychological essentialism, achievement motivation, and social and cultural influences on person perception. **Prerequisite:** graduate standing.

212. Current Topics in Visual Science (3)

Each year a different topic in visual science is selected for in-depth review and discussion based on current readings. **Prerequisite:** consent of instructor.

213. Professional Procedures and Survival in Psychology (3)

This course provides a forum for presentation and discussion of the basic issues associated with surviving in a professional (particularly, academic) psychology environment. It covers such issues as: 1) how to get a job; 2) how to keep a job; 3) general issues in professional survival. The course will include the presence of a number of the psychology faculty in topic specific areas (e.g., journal editors from our faculty; faculty sitting on grant review panels, etc.). The issue of ethics will be examined and discussed relative to each topic raised.

214. Applied Developmental Psychology (4)

This seminar deals with how developmental psychologists conduct scientific studies that have direct practical implications for children's well-being. Major issues to be discussed are: child witnesses, literacy, school violence, impact of media on child development, and developmental psychopathology.

217A. Proseminar in Developmental Psychology I (3)

The course examines cognitive development through the school-age period. It begins with an examination of early neurological, sensory, motor, and perceptual functions and then focuses on issues in linguistic and cognitive development.

217B. Proseminar in Developmental Psychology II (3)

The course examines social and personality development from infancy through early adolescence. The class will first discuss general developmental theory and methods and then topics such as attachment, temperament, self-concept, aggression, family relations, play, and peers.

218A-B. Cognitive Psychology (3-3)

A two-quarter survey of basic principles and concepts of cognitive psychology. This course is intended to serve as the basic introduction for first-year students. Basic areas include knowledge, memory, thought, perception, and performance. The areas are taught by faculty members who work within the specialty. **Prerequisite:** graduate status in psychology or consent of instructor.

219. Proseminar in Learning and Motivation (3)

An overview of the experimental and applied analysis of behavior including topics such as the principles of operant and classical conditioning, stimulus control, choice, conditioned reinforcement, aversive control, biological and economic contexts, verbal behavior, and the modification of human behavior in a variety of applied settings.

220. Proseminar in Social Psychology (3)

An introduction to social psychology. Psychology and the law, health psychology, attitudes, emotions, person perception and aggression are some of the topics to be covered.

221. Proseminar in Sensation and Perception (3)

Fundamentals of vision, audition, and other senses. Emphasis will be upon psychophysical approaches to the study of these sensory modalities, as well as some essential aspects of their neurophysiological bases.

222. Biological Psychology (3)

A survey of the functional neuroanatomical, neurodevelopmental, neurophysiological, and pharmacological correlates of psychological phenomena.

223. Advanced Topics in Vision (4)

An in-depth analysis of empirical and theoretical issues in a specialized area of vision or visual perception. Emphasis most likely will be on a topic of ongoing vision research at UCSD. **Prerequisite:** Psychology 212 or special consent of instructor.

229. Happiness (4)

This course will address the psychology of happiness. The discussions and readings, consisting largely of original research articles, will explore such questions as: What is happiness? How do we measure it, and how do we tell who has it? What is the biology of happiness and what is its evolutionary significance? What makes people happy—youth, fortune, marriage, chocolate? Is the pursuit of happiness pointless?

230. Comparative Social Cognition (4)

This seminar will address the following questions: What do nonhuman animals know about the identity and characteristics of nonspecifics? How do they use this information to guide their actions? How do animals modify their behavior in relation to social context? What kinds of information are culturally transmitted? What are the brain mechanisms for social cognition in nonhumans, and how do they compare to ours? **Prerequisite:** graduate standing or consent of instructor.

231. Experimentation and Data Analysis Using Matlab (4)

Lecture and exercises will demonstrate the use of Matlab, its extensions in running psychological experiments and in analyzing experimental data. No prior programming knowledge assumed. Experimental topics include writing scripts to generate well-controlled visual or acoustic stimuli. Analytical topics include data plotting and statistics. **Prerequisite:** graduate standing or consent of instructor.

233A. Topics in Learning and Motivation (3)

Advanced topics in learning and motivation, with special emphasis on current research. **Prerequisite:** Psychology 210.

236. Substance Abuse (3)

Theory and research on the development, progression, and resolution of substance use and abuse will be reviewed and evaluated. Normal and abnormal patterns of substance involvement will be contrasted across the life span.

237. Human Rationality (4)

The traditional view of rationality is based upon abstract, content-independent rules for behavior. People sometimes violate these rules in a laboratory setting, but the violations are often systematic and appear to reflect adaptation to the environment outside the laboratory. Such findings raise questions about what it means to be rational. Readings will be empirically oriented and cover the areas of deductive reasoning, inductive reasoning, and choice.

240. The Primate Brain (4)

This course will explore the neural basis of perception, action and cognition in primate cortex. Drawing on recent findings in neuroscience, we will discuss the role of cortex in a range of topics including decision making, object perception and recognition, memory and communication. **Prerequisite:** graduate standing or consent of instructor.

242A-B-C. Research Topics in Developmental Psychology (4-4-4)

Advanced seminar concentrating on methods of research and current experimental literature. May be taken by undergraduate senior majors concurrently enrolled in Psychology 194. **Prerequisite:** consent of instructor. (S/U grades permitted.)

243. Sound and Music Perception (3)

This course will deal with anatomy and physiology of the ear, central auditory pathways, and neurological disorders of sound and music perception.

244. Special Topics in Psycholinguistics (4)

Discussion of the psychological reality of grammatical models, competence versus performance, learnability and innateness in theories of language acquisition, and questions of autonomy of "modularity" of grammatical versus semantic processing. In addition, graduate students are required to give oral presentations on articles. **Prerequisites:** Psychology 145, upper-division standing, or consent of instructor.

246. Emotion and Cognition (4)

This seminar focuses on the interplay between emotion and cognition. We will consider how emotion influences perception, reasoning, memory, and judgment, and how cognitive processes can have emotional consequences. We will also discuss physiological and neural underpinnings of an affective influence and debate more general issues such as emotion and rationality. **Prerequisite:** graduate standing or consent of instructor.

247. Neuroendocrinology of Social Variation (4)

Students will read and discuss primary literature on the general topic of how steroid and peptide hormones contribute to the production of social variation and diversity. This diversity includes seasonal variation, intersexual variation, and divergence between species in patterns of sociality and space use, pair-bonding and mating tactics, aggression, and use of communication signals.

249A-B-C. Advanced Topics in Applied Behavior Analysis (3-3-3)

Research and discussion on selected topics in applied behavior analysis.

250. Sleep, Learning and Thought (4)

The role of time and sleep in learning, memory, and thought will be covered. Topics include human procedural memory, declarative memory, inference, creativity, and problem solving. **Prerequisite:** graduate standing or consent of instructor.

251. Advanced Topics in Learning and Motivation (3)

Weekly meetings for graduate students actively engaged in research on conditioning. **Prerequisite:** consent of instructor.

252. Seminar on Cognitive Neuroscience (3)

This is a series of weekly seminars on current trends in neuropsychology. The seminars will deal with the concept of "localization" of function in different parts of the brain and the effects of damage to these parts on cognitive functions such as perception, memory and language. Active student participation will be encouraged in preparing these seminars.

253. Cognitive Psychology and Cognitive Neuroimaging (4)

This seminar in cognitive neuroscience focuses on modern approaches to cognitive psychology as revealed through cognitive neuroimaging. A major goal of the course is to evaluate what (if anything) neuroimaging evidence has added to classic cognitive models/evidence in major areas of cognition (working memory, categorization, executive processes, decision-making, emotion, and memory).

255A-B-C. Advanced Topics in Biological Psychology (3-3-3)

Research and discussion on selected topics in biological psychology.

256. Impulsivity (4)

This seminar will cover the following topics in relation to impulsivity: varieties of the construct; operationalization via behavioral tasks in nonhuman animals and humans; translation from genes through phenotypes; neuropsychiatric disorders; neuropharmacology; behavioral treatments; and implications for jurisprudence. **Prerequisite:** graduate standing or consent of instructor.

258. Delay of Gratification (3)

This course will review the research on delay of gratification. We will cover what makes it in general so tough, what

situations make it possible, who can do it, and what the implications of this ability are. We will draw from research in social, personality, and animal psychology as well as economics.

259. Social Psychology/Psycho-aesthetics (3)

This course will be an intensive examination of social psychology (legal decision-making, emotion, aggressive behavior) and the psychology of visual art and music (psycho-aesthetics).

261. Proseminar in History of Psychology (3)

This course will consider the intellectual context in the nineteenth century from which psychology developed as an independent discipline. Emphasis will be on early German psychology and evolutionary theory. The second part of the course will consider the histories of different areas of psychology (e.g., behavioral, cognitive).

262. Functional Construction of the Vertebrate Brain's Social Behavior Network (4)

The vertebrate brain contains a network of strongly interconnected structures that play essential roles in the regulation of social behavior. In this seminar we will read and discuss primary literature that details the structure and behavioral functions of this network.

264A-B-C. Advanced Topics in Language Processes (4-4-4)

Research and discussion on selected topics in language processes.

266. Psychology of Reading (4)

This seminar will cover aspects of reading, emphasizing cognitive processes involved in skilled reading. However, learning to read and methods to teach reading will also be discussed. Other topics include: eye movements and reading, word recognition, inner speech, context effects, discourse processing, sentence parsing, and dyslexia.

267A-B-C. Advanced Topics in Behavior Medicine (3-3-3)

Research and discussion on selected topics in behavior medicine.

269A-B-C. Advanced Topics in Sound and Music Perception (3-3-3)

Research and discussion on selected topics in sound and music perception.

270A-B-C. Introduction to Laboratory Experimentation (1-4)

A basic laboratory course, designed to introduce first-year graduate students to experimental methods in psychology. The student will select a research topic, do a thorough literature review of the area, design and carry out new, original studies of problems in the selected area, and prepare a final formal report of the study at the end of the spring quarter. This course is required of all first-year graduate students in the department. **Prerequisite:** first-year psychology graduate students only.

271. Neurobiology of Learning and Memory (4)

This seminar will span the study of learning and memory from an interdisciplinary neuroscience perspective: the goal will be to gain a broad perspective on memory. The course will also touch on dysfunctions of learning and memory such as in amnesia, mental retardation, aging, and Alzheimer's disease. The course will end with exciting developments in the field, including the possibility of genetic and pharmacological enhancement of memory and intelligence.

272. Selected Topics in Cognitive Psychology (3)

An in-depth analysis of selected empirical and theoretical topics in cognitive psychology. The course will focus on areas where notable progress appears to be taking place in contemporary research.

273. Selected Topics in Quantitative Methods in Psychology (4)

An in-depth analysis and discussion of selected advanced topics in quantitative methods in psychology.

280. Seminar in Communication and Information Processing (1)

(S/U grades only.)

282. Advanced Topics in Auditory Neuroscience (4)

An in-depth analysis of current theoretical and empirical issues in the neurobiological study of auditory perception and cognition. Example topics include auditory stream segregation, localization, natural stimulus coding, pattern recognition and communication in multiple species.

285. Consciousness, Computation, and Incompleteness (4)

This seminar will examine conceptual and empirical problems in the scientific study of consciousness. Recent models of consciousness from cognitive psychology and neuroscience will be reviewed, in the light of limits on self-knowledge established in mathematical logic and computation theory. **Prerequisite:** graduate standing or consent of instructor.

296. Research Practicum (1-12)

Research in psychology under supervision of individual staff members. (S/U grades only.) (F,W,S)

298. Library Research (1-12)

Reports and surveys of the literature on selected topics. **Prerequisite:** graduate students in psychology. (S/U grades only.) (F,W,S)

299. Independent Research (1-12)

Independent research and thesis research. (S/U grades only.) (F,W,S)

500. Apprentice Teaching (4)

Required teaching practicum for students enrolled in graduate program in psychology. One four-unit course per year for four years. (S/U grades only.)

Public Health

THE JOINT DOCTORAL PROGRAM (JDP) IN EPIDEMIOLOGY

OFFICE: Stein Clinical Research Building, Room 349
Mail Code 0607

UCSD—<http://epidemiology.ucsd.edu/>

SDSU—<http://publichealth.sdsu.edu/phdmain.php>

The doctoral program in public health (epidemiology) was developed as a joint program in 1990 between the Department of Family and Preventive Medicine in the School of Medicine at the University of California, San Diego (UCSD), and the Graduate School of Public Health at San Diego State University (SDSU). Students in the program complete course work and conduct research at both institutions. Faculty from each campus serve on advisory and dissertation committees, providing students with extensive exposure to experts whose research interests represent the interdisciplinary nature of modern public health. Dr. Deborah Wingard (UCSD) and Dr. Richard Shaffer (SDSU) codirect the program.

Requirements for the joint doctoral degree include:

1. successful completion of required course work
2. passing written preliminary examinations in epidemiology and biostatistics
3. passing written and oral qualifying examinations
4. demonstrating proficiency in two computer-based statistical software packages
5. demonstrating proficiency in teaching
6. completion and successful formal defense of a dissertation

Typical areas of emphasis include infectious disease epidemiology, chronic disease epidemiology, cancer epidemiology, behavioral epidemiology, community-based trials, physical activity/exercise/nutrition and health. San Diego is ideally located in a large and ethnically diverse metropolitan center bordering Mexico and the Pacific Rim, enabling students to carry out population-based multicultural and multinational studies of health problems.

Time Limits

The goal of this policy is to encourage Ph.D. completion in a timely manner.

Pre-candidacy limit. Maximum registered time to advance to Ph.D. candidacy: 4 years

Support limit. Maximum registered time doctoral student is eligible for support: 6 years

Total time limit. Maximum registered time to complete all Ph.D. requirements: 7 years

Degree and contact information may be found on our Web site <http://publichealth.sdsu.edu/phdmain.php>. Admission requirements and application material can be found at <http://publichealth.sdsu.edu/phdapplication.php>.

THE JOINT DOCTORAL PROGRAM (JDP) IN GLOBAL HEALTH

OFFICE: Ash Building, Room 109
Mail Code 0622

Since 2007, a Ph.D. in public health with a concentration in global health has been offered by multidisciplinary faculty in UCSD's School of Medicine and the Graduate School of Public Health at San Diego State University. Global health relates to health issues and concerns that transcend national borders, class, race, ethnicity, and culture, stresses the commonality of health issues, and calls for collective, partnership-based action to resolve these issues. Accordingly, emphasis is on preparing graduates with the fundamental knowledge, understanding, and specific skills necessary to become public health researchers and professional leaders in global health settings. Proximity to the U.S./Mexico border and expertise of many current faculty support and encourage a focus on infectious diseases (e.g., HIV, TB, STDs) and health of migrant populations, although students are expected to develop other areas of specialization within the global health concentration. These may be content areas, such as chronic/infectious disease surveillance and prevention, environmental health, health policy, and substance abuse, or methodological areas such as quantitative, qualitative, and spatial research methodologies that are applied to address health problems of global health significance. Dr. Steffanie Strathdee (UCSD) and Dr. Jenny Quintana (SDSU) direct the program.

Requirements for the joint doctoral degree include:

1. Successful completion of required course work
2. Passing written and oral qualifying examinations
3. Demonstrated proficiency in teaching
4. Demonstrated cultural competence appropriate to dissertation area
5. Completion and successful formal defense of a dissertation

THE JOINT DOCTORAL PROGRAM (JDP) IN HEALTH BEHAVIOR

OFFICE: Moores UCSD Cancer Center, Room 3063
Mail Code 0901

UCSD—<http://famprevmed.ucsd.edu/educational.html>

SDSU—<http://publichealth.sdsu.edu>

A Ph.D. in public health with a concentration in health behavior is offered by the joint faculties of the Department of Family and Preventive Medicine in the School of Medicine at UC San Diego and the Graduate School of Public Health at San Diego State University (SDSU). Students in the program complete course work and conduct research at both institutions. Faculty from each campus serve on advisory and dissertation committees, providing students with extensive exposure to experts whose research interests represent the interdisciplinary nature of modern public health. Dr. John P. Pierce (UCSD) and Dr. Joni Mayer (SDSU) codirect the program.

Emphasis is on producing graduates with a mastery of the central concepts and analytic processes of health behavior. Graduates of the program are expected to establish advanced skills in applied behavioral analysis for population application; to establish expertise in advanced qualitative and quantitative research methods; to establish advanced skills in the application of interventions and research methods to health behavior in disenfranchised populations; and to establish skills necessary to understand and change health policy. Graduates of the program are competitive for a variety of research, teaching, and community service positions in areas such as academic institutions, local and state health departments, federal and international agencies, and both private and public-sponsored research institutions.

Areas of specialization currently include physical activity, tobacco control, skin-cancer prevention, nutrition and obesity, and HIV/AIDS and tuberculosis prevention and control. An additional emphasis will be placed on methodologies, such as measurement and related research issues; and ecological approaches to understanding health behavior. San Diego is ideally located in a large and ethnically diverse metropolitan center bordering Mexico and the Pacific Rim, enabling students to carry out community-based multicultural and multinational studies of health problems.

Time Limits

The goal of this policy is to encourage Ph.D. completion in a timely manner.

Pre-candidacy limit. Maximum registered time to advance to Ph.D. candidacy: 4 years

Support limit. Maximum registered time doctoral student is eligible for support: 6 years

Total time limit. Maximum registered time to complete all Ph.D. requirements: 7 years

Information regarding admission is found in the current edition of the *Bulletin of the Graduate Division of San Diego State University*. To receive an application for admission, contact SDSU/UCSD Joint Doctoral Program in Public Health, San Diego State University, 5500 Campanile Drive, San Diego 92182-4162, (619) 594-2743.

For more information, please contact UCSD Graduate Coordinator, 3855 Health Sciences Drive, Room 3063, La Jolla, CA 92093-0901, (858) 822-2382.

Public Service Minor

TMC Administration Building, or visit the Web site at
<http://publicsvminor.ucsd.edu>.

Office: Office of the Provost
Thurgood Marshall College
Administration Building

AFFILIATED FACULTY AND STAFF

Amy Binder, *Associate Professor, Sociology, Director of
Public Service Minor*

Tricia Taylor-Oliveira, *Director, Academic Internship
Program*

Kerry Shannon, *Public Service Internship Specialist*

SPECIALIZATION CHAIRS

Aurora Zepeda, M.P.A., *Education Studies—Education*

Steven P. Erie, Ph.D., *Political Science—Government*

Lawrence A. Palinkas, Ph.D., *Family and Preventive
Medicine, School of Medicine—Health*

Joel Robbins, Ph.D., *Anthropology—Social Issues*

The public service minor at UCSD encourages students to understand the history and practices of public service and to participate in the development of civic skills. Those skills and practices are essential cornerstones of participation in a democratic society regardless of one's chosen profession.

The course work for the minor emphasizes the history and emergence of the non-profit sector as a national institution distinct from the private and public sectors. The practicum aspects of the minor coupled with the traditional academic work encourage students to see the connection between the deeds of charitable service and the historic worth of citizen participation in the common public franchise, regardless of professional interests or gain.

The minor in public service is open to all UCSD students in good standing. Students first complete TMC 15, Public Service in America, and must choose one area of specialization from education, government, social issues, or health. A list of specific courses appropriate for these specializations is available through the Marshall College Provost's Office. Approval of the minor is based on completion of TMC 15 and two of the three upper-division specialization courses with a 2.0 GPA or better, and a cumulative GPA of 2.5 on ninety units. Students approved to complete the minor are placed into specific internships in public service through the Academic Internship Program.

The following twenty-eight units comprise the public service minor:

- TMC 15, Public Service in America
- Three upper-division specialization courses (education, government, social issues, or health)
- Three upper-division academic internships in public service
- Capstone seminar in public service

For more information regarding the requirements for the minor, see the Office of the Provost, or Academic Advising, Thurgood Marshall College,

Religion, Study of

Program Director: Richard S. Cohen

FACULTY

John Blanco, *Associate Professor, Literature*
Nancy Caciola, *Associate Professor, History*
Suzanne Cahill, *Adjunct Professor, History*
Steven Cassidy, *Professor, Literature*
Alain J.-J. Cohen, *Professor, Literature*
Richard S. Cohen, *Associate Professor, Literature*
Stephen D. Cox, *Professor, Literature*
Thomas J. Csordas, *Professor, Anthropology*
Page A. duBois, *Professor, Literature*
John H. Evans, *Associate Professor, Sociology*
Amelia Glaser, *Assistant Professor, Literature*
David Goodblatt, *Professor, History*
Jack Greenstein, *Associate Professor, Visual Arts*
Marcel Hénaff, *Professor, Literature*
Matthew T. Herbst, *Lecturer with Security of Employment, Roosevelt College*
Deborah Hertz, *Professor, History*
Alan Houston, *Professor, Political Science*
Stephanie Jed, *Associate Professor, Literature*
David K. Jordan, *Professor Emeritus, Anthropology*
Benetta W. Jules-Rosette, *Professor, Sociology*
Dayna Kalleres, *Assistant Professor, Literature*
Hasan Kayali, *Associate Professor, History*
Lisa Lampert-Weissig, *Associate Professor, Literature*
Richard P. Madsen, *Professor, Sociology*
John A. Marino, *Professor, History*
Keith McNeal, *Assistant Professor, Anthropology*
Dana K. Nelkin, *Associate Professor, Philosophy*
Elizabeth Newsome, *Associate Professor, Visual Arts*
Kwai Ng, *Assistant Professor, Sociology*
Sheldon A. Nodelman, *Professor, Visual Arts*
Esra Özyürek, *Associate Professor, Anthropology*
Steven M. Parish, *Professor, Anthropology*
Michael Parrish, *Professor, History*
Patrick Patterson, *Assistant Professor, History*
William H. Propp, *Professor, History*
Babak Rahimi, *Assistant Professor, Literature*
Fred V. Randel, *Associate Professor Emeritus, Literature*
Joel Robbins, *Professor, Anthropology*
Natalia Roudakova, *Assistant Professor, Communication*
Gershon Shafir, *Professor, Sociology*
Kuiyi Shen, *Professor, Visual Arts*
Susan Smith, *Associate Professor, Visual Arts*
Teri Sowell, *Lecturer, Visual Arts*
Melford E. Spiro, *Professor Emeritus, Anthropology*
Tracy B. Strong, *Professor, Political Science*
Christena Turner, *Associate Professor, Sociology*
Eric Watkins, *Professor, Philosophy*
Robert Westman, *Professor, History*
Oumelbanine Zhiri, *Professor, Literature*

Office: Literature Building, First Floor, Room 139
(858) 534-8849

E-mail: religion@ucsd.edu
<http://religion.ucsd.edu/>

PROGRAM DESCRIPTION

The program engages in the academic study of religious phenomena in many regions of the world and within many different religious cultures and traditions; and it studies literature, history, and society in relation to religion. Faculty and students associated with the program give primacy to humanistic and social scientific methods of study that have become established in the academic community during the nineteenth and twentieth centuries.

The location of the program in the Division of Arts and Humanities and its use of courses from a variety of departments and divisions imply that neither the study of religion nor its data are the privileged possession of a single discipline. The hallmark of the program is its interdisciplinary and interdepartmental structure. At UC San Diego, faculty from the Departments of Anthropology, History, Literature, Philosophy, Political Science, Sociology, and Visual Arts provide students with the opportunity to examine religious artifacts, texts, institutions, and communities within a particular cultural and historical context and in the context of comparable manifestations within the general history of religions.

A concentration in the Study of Religion aims at fostering a student's understanding of religion as one of the primary expressions of the human condition and as an historically powerful force in the shaping of human cultures; and it aims to foster an understanding of multiple religious traditions. It seeks to develop a student's appreciation of the difficulties and possibilities inherent in undertaking a critical, disciplined, cross-cultural study of religion.

Since the program endorses an interdisciplinary and comparative approach to the study of religion, lower-division preparation should be wide and varied. Lower-division courses in which religion figures prominently (e.g., Introduction to Religion, The Making of the Modern World, or the Revelle College Humanities Program), as well as courses which focus on textual and contextual analysis and employ the analytical tools and conceptual categories of the human sciences, would all be useful in preparing the student for a major in the Study of Religion. The program strongly encourages foreign language study. The ability to read the languages of original sources and of modern scholarship is highly recommended, especially for students planning to attend graduate school in religion.

MAJOR

The major in the Study of Religion consists of twelve upper-division courses, achieving a balance between courses which focus on a single religious tradition or issue and those which explore various traditions and methodologies. These courses should include the following:

- Three required courses in the Study of Religion, (1) RELI 110A or B and (2) RELI 111 or 112 or 113 and (3) RELI 189, or one other seminar approved by the program director.
- Nine courses from the approved course list to be selected in consultation with the program director. Students should see the program coordinator for further details.

DOUBLE MAJOR

Students may choose to pursue the Study of Religion as their second major. In such cases, it may be possible for up to two courses to overlap with the other major. Students should consult the program coordinator for further information.

HONORS IN THE STUDY OF RELIGION

The program for the Study of Religion offers an Honors Program for students who demonstrate excellence in the major. The minimum eligibility requirements for the Honors Program are stated below. In most cases students are completing their last two quarters (winter and spring) when they enroll in the Honors Program.

Minimum Eligibility Requirements

- RELI 110A or 110B completed prior to honors project
- Junior or senior standing (completion of at least 90 units)
- GPA of 3.3 overall and a 3.5 in the major to enter or remain in the Honors Program
- Eight units of RELI 196H taken over two quarters (typically winter and spring)
- Research paper (at least twenty pages; most students write between thirty and fifty pages)

Students interested in the Honors Program should consult with the program coordinator for a detailed list of requirements and an application. Participation in the Honors Program is contingent upon the prior approval of the Honors Thesis research topic by the director. Honors proposals are due at the program office by the tenth week of the quarter (usually fall quarter of the senior year) prior to being enrolled. Final approval must take place before the first day of the quarter in which the student plans to enroll in RELI 196H.

The Honors student's faculty director must certify by the end of the first term that the student is making timely progress toward the completion of his or her project.

The notations "distinction," "high distinction," and "highest distinction" will be determined on the following basis: major GPA, the grade for the research paper, and the grade for the public presentation.

MINOR

The minor in the Study of Religion consists of seven courses, of which five must be upper-division. These seven courses must include two required courses in the Study of Religion as delineated under the major:

1. RELI 110A or 110B, and
2. RELI 111 or 112 or 113.

Some students may apply two lower-division college requirements to the minor (e.g., Revelle students may apply HUM 1 and HUM 2, and ERC students may apply MMW 2 and MMW 3).

Student Advising

All students are assigned a faculty advisor and are encouraged to meet with their advisor at least once

a quarter to develop their course of study. Additional advising information may be obtained from the program coordinator, Literature Building, First Floor, Room 139.

Study Abroad

Students are encouraged to investigate the University of California Education Abroad Program (EAP) and other options for foreign study through the Opportunities Abroad Program (OAP). By petition, credits earned through EAP/OAP can fulfill major and minor requirements. More information about studying abroad can be obtained in the Education Abroad section of the catalog.

Career Opportunities and Preparation for Graduate Study

Among its many aims, the major in the Study of Religion is designed to develop fundamental skills in critical thinking, comparative analysis, research, and written expression. As such, the B.A. degree is appropriate for careers in education, government, business, and non-profit agencies. It is also an excellent preparation for graduate study in a variety of fields and disciplines.

Students interested in earning a California teaching credential from UCSD should contact the Teacher Education Program for further information.

Students are encouraged to consult the program director for further information about career opportunities and graduate study. Information is also available on the program's Web site.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

RELI 1. Introduction to Religion (4)

An introduction to key topics in the study of religion through a comparative reading of religious texts and/or artifacts. The intent is to develop basic strategies of interpretation for undertaking a critical, disciplined study of religion.

RELI 110A. The Modern Study of Religion: Religion in Modernity (4)

This class examines the history of the term "religion," focusing upon the development of religion's contemporary significance within the Reformation and Enlightenment, and questioning what it means to be "modern." Topics change yearly. Special attention to contemporary culture and politics.

RELI 110B. The Modern Study of Religion: Social and Cultural Theories of Religion (4)

An introduction to basic strategies of interpretation in the study of religion, including issues of category formation, theory, and method. Special attention paid to prominent voices of the nineteenth and twentieth centuries, including Marx, Freud, Durkheim, Eliade, etc.

RELI 111. Texts and Contexts: The Holy Book in Judaism and Christianity (4)

This class examines the development of sacred scripture in Judaism and Christianity. Topics include the variety and use of texts in religious communities; the process of canonization; the formation and transformation of textual communities. **Prerequisite:** upper-division standing or department stamp.

RELI 112. Texts and Contexts: The Holy Book in Islam (4)

An overview of the history and thematic issues in the study of Quran. It will focus on historical events, issues, and various interpretive practices in the development of Quran as a sacred text. **Prerequisite:** upper-division standing or department stamp.

RELI 113. Texts and Contexts: Textual Communities in South Asia (4)

This class considers important texts belonging to one or more of the following South Asian Traditions: Hinduism, Buddhism, Jainism, or Sikhism. It introduces students to the ways in which religious identities are formed and contested within a pluralistic society.

RELI 130. Religion, Science, and Magic (4)

Religion, science, and magic provide scholars with a set of analytic categories for the comparative study of cultural forms and modes of thinking. What are the ideological underpinnings and political implications of these categories? This class addresses this question using comparative avenues involving literary sources. **Prerequisite:** upper-division standing or consent of instructor.

RELI 131. Topics in Religion and Sexuality (4)

How does religiosity as a significant cultural component help mold gender and sexuality identities? The class offers topical investigations into this question. **Prerequisite:** upper-division standing or consent of instructor.

RELI 132. Topics in Orthodoxy and Heterodoxy (4)

Religious dogmas often develop in dialogue with alternative viewpoints that ultimately are rejected by heterodox by the dominant group. This class presents case studies in the interpretation of such ideological and sociological pairings using scriptural, literary, and analytic sources. **Prerequisite:** upper-division standing or consent of instructor.

RELI 134. Topics in American Religion (4)

Topical studies in the history of religion in American society, ranging from the Puritans to the New Age. **Prerequisite:** upper-division standing or consent of instructor.

RELI 140. Death and Religion (4)

This interdisciplinary course uses literary sources to explore the relationship between death and religion on a historical and global scale; the relationship between political religious rituals and symbolism of rebirth; examination of carnival, death pollution, and symbolism of gender. **Prerequisite:** upper-division standing or consent of instructor.

RELI 141. Public Sphere and Religion (4)

This interdisciplinary course will explore the historical and theoretical relationship between public sphere and religion, particularly focusing on the manifestation of religious power, public ritual, and sacred theatricality in everyday spaces of life. **Prerequisite:** upper-division standing or consent of instructor.

RELI 142. Secularization and Religion (4)

Surveys the relationship between religion and modernity, in particular the problematic of the secularization theory; covers cases such as Catholic liberation theology and Islamic fundamentalism, with particular focus on the "deprivatization of modern religion." **Prerequisite:** upper-division standing or consent of instructor.

RELI 143. Topics in Performing Religion (4)

This course explores religion as a system of bodily practices, rather than one of tenets or beliefs. How do day-to-day activities as well as significant rituals express and inform people's religious lives? Why is doctrine an insufficient basis for understanding religion? May be taken up to three times as topics vary. **Prerequisite:** upper-division standing or consent of instructor.

RELI 188. Special Topics in Religion (4)

Students in this lecture will investigate important problems in the study of religion or the history of particular religions. May be repeated for credit up to three times when topics vary. **Prerequisite:** upper-division standing.

RELI 189. Seminar in Religion (4)

This seminar requires the intensive analysis of critical problems in the study of religion or the history of particular

religions. May be repeated for credit up to three times when topics vary. **Prerequisites:** upper-division standing; RELI 110A or 110B or consent of instructor.

RELI 196H. Honors Thesis Research (4)

Honors thesis research for students accepted into the Honors Program. Research is conducted under the supervision of a program faculty member. **Prerequisite:** program approval into the Honors Program.

RELI 197. Directed Advanced Readings (4)

A faculty member will direct a student in advanced readings on a topic not generally included in the Program for the Study of Religion's curriculum. Students must make arrangements with the program and individual faculty. May be repeated for credit up to three times for credit. **Prerequisites:** upper-division standing; RELI 110A or 110B; overall GPA of 2.5.

RELI 199. Independent Research Study for Undergraduates (2–4)

Independent research in religion under the supervision of a faculty member affiliated with the Program for the Study of Religion. This course may be repeated three times with program approval. (P/NP grades only.) **Prerequisites:** upper-division standing, with 2.5 GPA (overall); program stamp.

APPROVED ELECTIVE COURSES

The following lower- and upper-division courses are offered on a regular basis, although not every course is available every year. Please contact the program coordinator for approved courses in any given quarter or visit the program's Web site, <http://religion.ucsd.edu>. Students may petition other courses, including independent study and Education Abroad Program courses when appropriate.

LOWER-DIVISION

ANTH 1. Introduction to Culture

HUM 1. The Foundations of Western Civilization: Israel and Greece

HUM 2. Rome, Christianity, and the Middle Ages

MMW 2. The Great Classical Traditions

MMW 3. The Medieval Heritage

PHIL 14. Introduction to Philosophy: Metaphysics

PHIL 31. History of Philosophy: Ancient Philosophy

RELI 1. Introduction to Religion

SOCI 1A, B. The Study of Society

UPPER-DIVISION

METHODOLOGICAL

ANSC 120. Anthropology of Religion

ANSC 167. Rituals and Celebrations

RELI 110A. The Modern Study of Religion: Religion in Modernity

RELI 110B. The Modern Study of Religion: Social and Cultural Theories of Religion

RELI 143. Topics in Performing Religion

RELI 189. Seminar in Religion

SOCI 100. Classical Sociological Theory

SOCI 156. Sociology of Religion

GENERAL COMPARATIVE

ANSC 104. Anthropology of Fantasy

ANSC 134. Global Islam
 ANSC 160. Nature, Culture, and Environmentalism
 LTWL 100. Mythology
 RELI 130. Religion, Science, and Magic
 RELI 131. Topics in Religion and Sexuality
 RELI 132. Topics in Orthodoxy and Heterodoxy
 RELI 134. Topics in American Religion
 RELI 140. Death and Religion
 RELI 188. Special Topics in Religion
 RELI 196H. Honors Thesis Research
 RELI 197. Directed Advanced Readings
 VIS 117I. Western and Non-Western Rituals and Ceremonies

RELIGION IN HISTORICAL CONTEXT

ANAR 142. The Rise and Fall of Ancient Israel
 ANAR 143. Archaeology, Anthropology, and the Bible
 ANAR 154. Aztecs and their Ancestor
 ANSC 130. Hinduism
 ANSC 137. Chinese Popular Religion
 ETHN 161. Black Politics and Protest Since 1941
 ETHN 188. African Americans, Religion, and the City
 HIEA 120. Classical Chinese Philosophy and Culture
 HIEA 121. Medieval Chinese Culture and Society
 HIEA 126. The Silk Road in Chinese and Japanese History
 HIEA 136. History of Thought and Religion in China: Daoism
 HIEA 168. Topics in Classical and Medieval Chinese History (when topic covers religion)
 HIEU 101. Greece in the Classical Age
 HIEU 105. The Early Christian Church
 HIEU 113. Rule, Conflict, and Dissent in the Middle Ages
 HIEU 115. The Pursuit of the Millennium
 HIEU 132. Germany from Luther to Bismark
 HIEU 147. Women and Gender in Early Modern Europe
 HIEU 158. Why Hitler? How Auschwitz?
 HIEU 159. Three Centuries of Zionism, 1648–1948
 HIEU 163. Special Topics in Medieval History (when topic covers religion)
 HIEU 171. Special Topics in Twentieth-Century Europe (when topic covers religion)
 HINE 102. The Jews in Their Homeland in Antiquity
 HINE 103. The Jewish Diaspora in Antiquity
 HINE 106S. Apocalyptic Judaism
 HINE 107. Ancient Egypt: History and Culture
 HINE 108. The Middle East Before Islam
 HINE 112A. Great Stories from the Hebrew Bible
 HINE 114. The History of the Islamic Middle East
 HINE 115. Islamic Civilization
 HINE 116. The Middle East in the Age of European Empires (1798–1914)
 HINE 119. U.S. Mid-East Policy Post WWII
 HINE 161. Seminar in the Hebrew Bible

HINE 170. Special Topics in Jewish History
 HINE 181. Problems in the Study of the Hebrew Manuscripts
 HINE 186. Special Topics in Middle Eastern History (when topic covers religion)
 HISC 166. The Galileo Affair
 HITO 102. East Asian Religious Traditions
 HITO 103S. Gnosis and Gnosticism
 HITO 104. Jews and Judaism in the Ancient and Medieval Worlds
 HITO 105. Jews and Judaism in the Modern World
 HITO 106. How Jewish Women Lived in Modern Times
 HITO 115S. Myth, History, and Archaeology
 HIUS 155A/B. Religion and Law in American Society
 JUDA 110. Introduction to Judaism
 LTWL 139. Gnosticism: The Religious Underground from Late Antiquity to the New Age
 LTWL 142. Islam: The Origin and Spread of a World Religion

RELIGION AND SOCIETY

ANSC 100. Special Topics in Socio-Cultural Anthropology (when topic covers religion)
 ANSC 132. Modernity in Brazil
 ANSC 133. Peoples and Cultures of the Middle East
 ANSC 136. Traditional Chinese Society
 ANSC 189. The Anthropology of the End of the World
 ETHN 110. Cultural World Views of Native Americans
 ETHN 189. Special Topics in Ethnic Studies (when topic covers religion)
 HIAF 124. Islam in Contemporary African Societies
 HIEA 119. Religion and Popular Culture in East Asia (SOCB 162R)
 HIEA 120. Classical Chinese Philosophy and Culture
 HIEA 135. History of Thought and Religion in China: Buddhism
 HIEA 137. Women and Family in Chinese History
 HIEU 110. The Rise of Europe
 HIEU 111. Europe in the Middle Ages
 HIEU 125. Reformation Europe
 HIEU 163. Topics in Medieval History
 HINE 118. The Middle East in the Twentieth Century
 HINE 122. Politicization of Religion in Middle East
 HINE 166. Nationalism in the Middle East
 HISC 101B. Medieval Science in the Latin West, ca. 500–1500
 JUDA 111. Topics in Judaism
 LTWL 141. Islam and Modernity
 POLI 110A. Citizens and Saints: Political Thought from Plato to Augustine
 POLI 110B. Sovereign Subjects in the Modern State: Machiavelli to Rousseau
 POLI 110C. Revolution and Reaction: Political Thought from Kant to Nietzsche
 POLI 121. Government and Politics of the Middle East
 POLI 121B. Politics of Israel
 RELI 141. Public Sphere and Religion

RELI 142. Secularization and Religion
 SOCI 154. Religious Institutions in America
 SOCI 157. Religion in Contemporary Society
 SOCI 158. Islam in the Modern World
 SOCI 160. Sociology of Culture
 SOCI 162R. Religion and Popular Culture in East Asia (HIEA 119)
 SOCI 177. International Terrorism
 SOCI 188E. Community and Social Change in Africa
 SOCI 188F. Modern Jewish Societies and Israeli Society
 SOCI 188G. Chinese Society
 SOCI 189. Special Topics in Comparative-Historical Sociology (when topic covers religion)

RELIGION AND LITERATURE

HINE 160. Special Topics in the Bible and Ancient Near East
 JUDA 100. Introduction to the Hebrew Bible
 LTEN 118. Milton
 LTEN 125B. First-Generation Romantic Poets: Wordsworth, Rousseau, and Burke
 LTEN 149. Themes in English and American Literature (when topic covers religion)
 LTEU 105. Medieval Studies: Dante
 LTEU 158. Single Author in Russian Literature (when topic covers religion)
 LTGK 120. New Testament Greek
 LTWL 106. The Classical Tradition (when topic covers religion)
 LTWL 129. Wisdom: A Literature of Authority
 LTWL 135. The Buddhist Imaginary
 LTWL 138. Critical Religion Studies
 LTWL 145. South Asian Religious Literature: Selected Topics
 LTWL 147. Readings in Mahayana Buddhism
 LTWL 153. Literature, Religion, and Culture in Iran
 LTWL 158A. Topics in the New Testament
 LTWL 158B. Topics in Early Christian Texts and Cultures
 LTWL 158C. Topics in Other Christianities
 LTWL 172. Special Topics in Literature (when topic covers religion)
 RELI 111. Texts and Contexts: The Holy Book in Judaism and Christianity
 RELI 112. Texts and Contexts: The Holy Book in Islam
 RELI 113. Texts and Contexts: Textual Communities in South Asia

RELIGION AND PHILOSOPHY

HISC 168. The Extraterrestrial Life Question
 PHIL 104. The Rationalists
 PHIL 130. Metaphysics (when topic covers religion)
 PHIL 131. Topics in Metaphysics (when topic covers religion)
 PHIL 185. Philosophy of Religion

RELIGION AND THE ARTS

VIS 117A. Narrative Structures

VIS 120A. Greek Art

VIS 120B. Roman Art

VIS 120C. Late Antique Art

VIS 121B. Castles, Cathedrals, and Cities

**VIS 121D. The Illuminated Manuscript
in the Middle Ages**

VIS 122AN. Renaissance Art

VIS 122D. Michelangelo

**VIS 123AN. Between Spirit and Flesh:
Northern Art of the Early Renaissance**

VIS 124BN. Art & the Enlightenment

**VIS 126BN. The Art and Civilization
of the Ancient Maya**

**VIS 128A. Topics in Pre-Modern Art
History (when topic covers religion)**

**VIS 128B. Topics in Early Modern Art
History (when topic covers religion)**

Revelle College

OFFICE: Office of the Provost, Revelle College
<http://revelle.ucsd.edu>

HUMANITIES/WRITING PROGRAM

OFFICE: Galbraith Hall 180, Revelle College
See [Humanities](#).

REVELLE HONORS PROGRAM

OFFICE: Office of the Provost, Revelle College

Particularly well-prepared students are invited to join a freshman honors program, which includes weekly participation in small faculty seminars (Revelle 20). Acceptance into the Honors Program at admission is automatic for Regents and National Merit Scholars as well as those students entering with a high school GPA of 3.8 or higher and verbal and math SAT scores of 700 or higher. Admission to the program winter quarter is offered to those who achieve a 3.7 GPA in at least twelve graded units taken at UC San Diego during the fall quarter. A variety of other prerequisites are also awarded. Outstanding students are individually advised to participate in small honors classes in chemistry, mathematics, physics, and social science.

Outstanding seniors are selected for participation in honors seminars, Revelle 100 and 110. At least five outstanding graduating seniors are honored at graduation each year with a monetary honorarium.

An honors banquet is given for the top 200 students (from all class levels) in Revelle each spring.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Revelle 20. Revelle Honors Seminar (0)

Weekly seminars with a faculty member (chosen each year by the provost to match the interests of participating students). This seminar will acquaint students with the scholarship and research being conducted by faculty and instill in students a sense of participation in the scholarly life at UCSD. **Prerequisite:** by invitation only. Pass/Not Pass grades only. (F,W,S)

Revelle 100. Senior Honors Seminar: Science and Civilization (4)

Beginning with the distinction between science and technology, the course will trace their evolution from earliest times, culminating in an examination of their impact on modern society and of the social concerns about their future course. **Prerequisites:** senior standing, 3.5 overall GPA, science major, consent of instructor, Revelle students only. Pass/Not Pass grades only.

Revelle 110. Senior Honors Seminar: Thinking About Science (4)

A seminar for honors students concerning the nature of science and its place in our society. The course will consist of readings and discussions concerning a range of historical, philosophical, and sociological perspectives on science. **Prerequisite:** Revelle College senior honors students.

REVELLE SEMINARS

OFFICE: Office of the Provost, Revelle College

Revelle Seminars 90 (1.0 unit credit) are sponsored by Revelle College to promote student/ faculty interaction in a small group setting.

Revelle 90. Undergraduate Seminar (1)

A seminar intended for exposing undergraduate students, especially freshmen and sophomores, to exciting research programs conducted by the faculty. **Prerequisite:** none. Pass/Not Pass grades only. (F,W,S)

Revelle 91. Art, Book, and Life (1)

This interdisciplinary seminar will look at some selective relationships between visual arts and literature generally building chronologically and culminating with slide-illustrated visits to the world's great museums. Short student presentations. **Prerequisite:** Humanities or consent of instructor.

Russian and Soviet Studies

FACULTY

Steven Cassedy, Ph.D., *Professor in Literature*
Frantisek Deak, Ph.D., *Professor Emeritus in Theatre and Dance*

Robert Edelman, Ph.D., *Professor in History*
Amelia Glaser, Ph.D., *Assistant Professor in Literature*
Philip Roeder, Ph.D., *Professor in Political Science*
Rebecca Wells, *Lecturer in Literature*

OFFICE:

History Undergraduate Advising
Humanities and Social Sciences Building, Fifth Floor
Muir College
<http://history.ucsd.edu/programs/caesar-programs/russiansoviet-stud/>

Russian and Soviet Studies is an interdisciplinary program that provides a broad range of courses in the history, language, literature, and social and political life of Russia (before, during, and after the Soviet period). It is designed for students who do not wish to restrict their Russian studies to literature.

THE MINOR

The minor consists of seven courses, at least four of which must be upper-division. In addition, there must be at least one course each from two of the three following areas: literature, history, and social science. No more than three of the seven courses may be language courses. Knowledge of the language is not a requirement for the minor, but it is strongly recommended.

THE MAJOR

The major requires a study of Russian language. It consists of LTRU 1A-B-C (First-Year Russian), LTRU 2A-B-C (Second-Year Russian), or their equivalent, and a minimum of twelve upper-division courses. All students are required to take LTRU 104A-B-C (Advanced Practicum in Russian), HIEU 134 (History of Russia, Ninth Century to 1855), HIEU 156 (History of Russia, 1855 to the Present), and LTRU 110A-B-C (Survey of Russian Literature in Translation). In addition, students will take four electives, of which at least two must be from the social sciences (sociology or political science).

Students in the major are encouraged to participate in the Education Abroad Program (EAP) in Russia and to investigate other options for foreign study through the Opportunities Abroad Program (OAP). By petition, credits earned through EAP/OAP can fulfill UC San Diego degree and major requirements. Please visit the Web site at <http://history.ucsd.edu/programs/caesar-programs/russiansoviet-stud/> for further details.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LITERATURE

LTRU 1A-B-C. First-year Russian (4-4-4)

LTRU 2A-B-C. Second-year Russian (4-4-4)

LTRU 104A-B-C. Advanced Practicum in Russian (4-4-4)

LTRU 110A-B-C. Survey of Russian and Soviet Literature in Translation (4-4-4)

110A. 1800–1860

110B. 1860–1917

110C. 1917–Present

LTRU 123. Single Author in Russian Literature in Translation (4)

LTRU 150. Russian Culture (4)

LTRU 198. Directed Group Study (4)

LTRU 199. Special Studies (2 or 4)

HISTORY

HIEU 134. The Formation of the Russian Empire, 800–1855 (4)

HIEU 156. History of the Soviet Union, 1905–1991 (4)

HIEU 157. Religion and the Law in Modern European History (4)

HIEU 178. Soviet History (4)

SOCIOLOGY

Course offerings vary by quarter.

POLITICAL SCIENCE

POLI 130AA. The Soviet Successor States (4)

POLI 130B. The Soviet State and Society (4)

POLI 130AC. Seminar: Post-Soviet Politics (4)

Science Studies

Program Director, Robert S. Westman

PROFESSORS

William Bechtel, Ph.D., *Philosophy*
Craig Callender, Ph.D., *Philosophy*
Lisa Cartwright, Ph.D., *Communication*
Nancy Cartwright, Ph.D., *Philosophy*
Paul M. Churchland, Ph.D., *Philosophy*
Gerald D. Doppelt, Ph.D., *Philosophy*
Chandra Mukerji, Ph.D., *Communication*
Naomi Oreskes, Ph.D., *History*
Andrew Scull, Ph.D., *Sociology*
Eric Watkins, Ph.D., *Philosophy*
Robert S. Westman, Ph.D., *History*

PROFESSOR EMERITUS

Martin J.S. Rudwick, Ph.D., *History*

ASSOCIATE PROFESSORS

Tal Golan, Ph.D., *History*
Martha Lampland, Ph.D., *Sociology*
David Serlin, Ph.D., *Communication*
Charles Thorpe, Ph.D., *Sociology*

ASSISTANT PROFESSORS

Morana Alac, Ph.D., *Communication*
Kelly Gates, Ph.D., *Communication*
Cathy Gere, Ph.D., *History*
Christian Wuthrich, Ph.D., *Philosophy*

AFFILIATED FACULTY/RESEARCHERS

Karen Baker, M.D., *Scripps Institution of Oceanography*
Roddey Reid, Ph.D., *Literature*
Linda Strauss, Ph.D., *Sixth College*

OFFICE: 5045 Humanities and Social Sciences Building, Muir College
<http://sciencestudies.ucsd.edu/>

The Science Studies Program at UC San Diego is an interdisciplinary Ph.D. program committed to working toward a deeper understanding of scientific knowledge and technological change, past and present. The program offers students an opportunity to integrate the perspectives developed in communication studies and the history, sociology, and philosophy of science, while receiving a thorough training at a professional level in one of the component disciplines. Students enrolled in the program choose one of the four disciplines for their major field of specialist studies and are required to complete minor field requirements in the others. Students are also required to take the Introduction to Science Studies, Advanced Approaches to Science Studies, and two interdisciplinary, topical "core" seminars, and to attend the program colloquium. Science studies students are encouraged to select dissertation topics that offer scope for a cross-disciplinary approach. The Ph.D. will be awarded in Communication (Science Studies), History (Science Studies), Sociology (Science Studies), or Philosophy

(Science Studies). In special circumstances, students may be permitted to work for the M.A. degree.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

GRADUATE

COGR 225A, HIGR 238, PHIL 209A, SOCG 255A. Introduction to Science Studies (4)

Study and discussion of classic work in history of science, sociology of science, and philosophy of science, and of work that attempts to develop a unified science studies approach. Required for all students in the Science Studies Program. **Prerequisite:** enrollment in Science Studies Program.

COGR 225B, HIGR 239, PHIL 209B, SOCG 255B. Seminar in Science Studies (4)

Study and discussion of selected topics in the science studies field. Required for all students in the Science Studies Program. The topic varies from year to year, and students may, therefore, repeat the course for credit. **Prerequisite:** enrollment in Science Studies Program.

COGR 225C, HIGR 240, PHIL 209C, SOCG 255C. Colloquium in Science Studies (4)

A forum for the presentation and discussion of research in progress in science studies, by graduate students, faculty, and visitors. Required for all students in the Science Studies Program. **Prerequisite:** enrollment in the Science Studies Program.

COGR 225D, HIGR 241, PHIL 209D, SOCG 255D. Advanced Approaches to Science Studies (4)

Contemporary themes and problems in Science Studies. Focus on recent literature in the history, philosophy and sociology of science, technology, and medicine. Required of all students in the Science Studies Program. **Prerequisites:** completion of COGR 225A, HIGR 238, PHIL 209A, or SOCG 255A; enrollment in Science Studies Program; or instructor's permission.

HIGR 235. Science, Empire, and Exploration (4)

Examines links between scientific work, particularly expeditions and exploration, and political programs of empire in the seventeenth to twentieth centuries. Topics: collecting expeditions as expressions of empire; role of colonial administrative networks in facilitating field-based investigations; relation between European and non-European knowledge systems. **Prerequisite:** graduate standing or consent of instructor.

HIGR 236A-B. Seminar in History of Science (4-4)

A two-quarter research seminar, comprising intensive study of a specific topic in the history of science. The first quarter will be devoted to readings and discussions; the second chiefly to the writing of individual research papers. The topic varies from year to year, and students may repeat the course for credit. (IP grade to be awarded the first quarter; final grade will be given at the end of the second quarter.) **Prerequisite:** graduate standing.

HIGR 242. Topics in the History of Earth and Life Sciences (4)

Intensive study of specific problems in the history of the life sciences and earth sciences, ranging in period from the Renaissance to the twenty-first century. May be repeated for credit as topics will vary annually. **Prerequisite:** graduate standing.

HIGR 243. Historical Scholarship in Technology (4)

An introduction to the historiography of technology. This reading seminar provides an overview of scholarly approaches to the history of technology by critically examining classic and contemporary works in the field. **Prerequisite:** graduate standing or consent of instructor.

HIGR 244. Introduction to Sound Studies (4)

Study and discussion of classic and recent scholarship on sound production and cultures of listening. Emphasizes historical literature but also includes works in literary studies, art history, music, and other fields.

HISC 160. Historical Approaches to the Study of Science (4)

This colloquium course will introduce students to the rich variety of ways in which the scientific enterprise is currently being studied historically. Major recent publications on specific topics in the history of science selected to illustrate this diversity will be discussed and analyzed; the topics will range in period from the seventeenth century to the late twentieth, and will deal with all major branches of natural science. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students may be expected to submit a more substantial piece of work. **Prerequisites:** consent of instructor; department stamp required.

HISC 163/263. History, Science, and Politics of Climate Change (4)

The complex historical development of human understanding of global climate change, including key scientific work, and the cultural dimensions of proof and persuasion. Special emphasis on the differential political acceptance of the scientific evidence in the U.S. and the world. Graduate students are required to submit an additional paper. **Prerequisite:** upper-division or graduate standing; department stamp required.

HISC 164/264. Topics in the History of the Physical Sciences (4)

Intensive study of specific problems in the physical (including chemical and mathematical) sciences, ranging in period from the Renaissance to the twentieth century. Topics vary from year to year, and students may therefore repeat the course for credit. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students may be expected to submit a more substantial piece of work. **Prerequisites:** consent of instructor; department stamp required.

HISC 165. Topics in Twentieth-Century Science and Culture (4)

This is a seminar open to advanced undergraduate and graduate students that explores topics at the interface of science, technology, and culture, from the late nineteenth century to the present. Topics change yearly; may be repeated for credit with instructor's consent. Requirements vary for undergraduates, M.A., and Ph.D. students. Graduate students are required to submit a more substantial piece of work. **Prerequisites:** upper-division standing or consent of instructor; department stamp required.

HISC 166/266. The Galileo Affair (4)

Galileo's condemnation by the Catholic Church in 1633 is a well-known but misunderstood episode. Was Galileo punished for holding dangerous scientific views? Personal arrogance? Disobedience? Religious transgressions? Readings in original sources, recent historical interpretations. Graduate students will be expected to submit a more substantial piece of work. **Prerequisites:** upper-division standing or consent of instructor.

HISC 167/267. Gender and Science (4)

Why have women been traditionally excluded from science? How has this affected scientific knowledge? How have scientists constructed gendered representations not only of women, but also of science and nature? We will address these questions from perspectives including history, philosophy, and psychoanalytic theory. **Prerequisite:** upper-division standing or consent of instructor.

HISC 168/268. The Extraterrestrial Life Question (4)

The changing fortunes of the belief in the existence of life beyond the Earth (pluralism) from 1750–present as it evolved from a marginal speculation to a central scientific question with wide-ranging consequences for traditional religious belief systems. **Prerequisite:** upper-division standing or graduate standing or consent of instructor. Graduate students will be expected to submit a more substantial piece of work.

HISC 170/270. Topics in the History of Science and Technology (4)

This seminar explores topics at the interface of science, technology, and society, ranging from the seventeenth century to the twentieth. Requirements will vary for undergraduate, M.A., and Ph.D. students. Graduate students are required to submit an additional paper. **Prerequisite:** upper-division standing or consent of instructor; department stamp required.

HISC 172/272. Building America: Technology, Culture, and the Built Environment in the United States (4)

The history of the built environment in the United States, from skyscrapers to suburbs, canals and railroads to factories and department stores. The technological history of structures and infrastructures, and the social and cultural values that have been "built into" our material environment. Graduate students are required to submit an additional paper. **Prerequisite:** upper-division standing or consent of instructor; department stamp required.

Phil. 204A. Core Course in Philosophy of Science (4)

An introduction to one or more central problems in the philosophy of science, or in the philosophy of one of the particular sciences, such as the nature of confirmation and explanation, the nature of scientific knowledge, reductionism, the unity of science, or realism and antirealism. May be taken for credit three times with changed content.

Phil. 245. Philosophy of Science (4)

This seminar will cover current books and theoretical issues in the philosophy of science. May be taken for credit seven times with changed content.

Phil. 247. Philosophy of Biology (4)

Historical and contemporary perspectives on foundational issues about biology. May include questions about the nature of biological explanation, the relation of biology to chemistry and physics, the status of attributions of function, and the relation of biology to the social sciences. May be taken for credit six times with changed content.

Phil. 250A. Philosophy of the Cognitive Sciences (4)

Contemporary debates about the study of the mind-brain as studied in one or more of the empirical cognitive sciences. May include questions about the different strategies of explanation invoked, the conceptions of representation employed, the connections between theoretical models developed. May be taken for credit six times with changed content.

Phil. 280. Philosophy of Science

Topics and Methods (1-2)

This course meets weekly to discuss recent books or articles in philosophy of science. The reading is designed both for students doing active research in the field and for those seeking to gain some familiarity with it. Can be taken nine times for credit with changed content. **Prerequisite:** graduate standing or consent of instructor.

Soc/G 234. Intellectual Foundation of the Study of Science, Technology, and Medicine (4)

This course focuses on some classic methodological and theoretical resources upon which the sociology of science, technology, and medicine all draw. It gives special attention to relationships between knowledge and social order, and between knowledge and practice, that are common to science, technology, and medicine. **Prerequisites:** graduate standing.

Soc/G 247. Madness and Society (4)

An examination of the changing Western responses from the age of Bedlam to the age of Prozac. Topics include: the rise and decline of the total institution; the emergence of psychiatry; changing cultural meanings of madness; and the therapeutics of mental disorder. **Prerequisite:** graduate standing.

Soc/G 249. Technology and the Human (4)

This course explores the ethical and political implications of technological interventions into human life. Approaches from science studies, the sociology of the body, and philosophy. Topics include transformations in domains of life such as work, health, childhood, and death. **Prerequisite:** graduate standing.

Soc/G 283. The Making of Modern Medicine (4)

An examination of the intellectual, social, cultural, and political dimensions of the Transformation of Western medicine from 1750 to 1900, with a primary focus on Anglo-American developments. **Prerequisite:** graduate standing.

Soc/G 284. Contemporary Biomedicine (4)

Develops central themes in medical sociology in order to understand twentieth- and twenty-first-century medical practice and research. Topics include authority and expertise; health inequalities; managed care; health activism; biomedical knowledge production; and the construction of medical objects and subjects. **Prerequisite:** graduate standing.

Soc/G 288. Knowledge Capitalism (4)

This seminar examines the place of scientific knowledge and information and communication technology in the transformation of capitalist economy and society. The class explores new interactions between science studies and the social theory of advanced capitalism. **Prerequisite:** graduate standing.

Science, Technology, and Public Affairs

OFFICE: Galbraith Hall, Room 180, Revelle College

The program offers an opportunity to study the important social policy issues that lie at the intersection of science, technology, and decision making and to develop awareness of the social and political factors that condition technology on the social order. The program will be attractive to students anticipating careers in law, administrative sciences, science, engineering, business, and international affairs. The program will serve as a meeting place for those interested in approaching policy questions from the perspective of the physical and biological sciences and for those in the social sciences having an interest in the scientific and technological component of present social, political, and environment problems.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

35. Society and the Sea (4)

Introduction to the oceans and their relationship to humankind. Selected topics include ocean-related science, engineering, research, economics, and international relations (emphasizing countries of the Pacific Rim); living and nonliving resources; coastal zone management; military and social aspects; and the sea in weather and climate.

Prerequisite: none. (F)

UPPER-DIVISION

181. Essentials of Global Health (4)

Illustrates and explores ecologic settings and frameworks for study and understanding of global health and international health policy. Students acquire understanding of diverse determinants and trends of disease in various settings and inter-relationships between socio-cultural-economic development and health. **Prerequisite:** upper-division standing. (W)

199. Special Project (2 or 4)

Directed study on topics in science, technology, and public affairs; especially for Warren College students. (P/NP grades only.) **Prerequisite:** senior standing.

RELATED COURSES

Courses in other departments (change somewhat from year to year):

Economics 130

MAE 110B, 118A, 118B, 118C

Political Science 138D, 154, 160AA, 160AB

Scripps Institution of Oceanography

PROFESSORS

Duncan C. Agnew, Ph.D., *Geophysics*
Laurence Armi, Ph.D., *Oceanography*
Farooq Azam, Ph.D., *Marine Biology*
Jeffrey L. Bada, Ph.D., *Marine Chemistry*
Douglas H. Bartlett, Ph.D., *Marine Microbiology, and
Chair of the Department*
Kevin M. Brown, Ph.D., *Geology*
Michael J. Buckingham, Ph.D., *Oceanography*
Ronald S. Burton, Ph.D., *Marine Biology*
Steven C. Cande, Ph.D., *Marine Geophysics*
Paterno R. Castillo, Ph.D., *Geology*
Paola Cessi, Ph.D., *Oceanography*
Christopher D. Charles, Ph.D., *Oceanography*
David M. Checkley, Ph.D., *Oceanography*
Catherine G. Constable, Ph.D., *Geophysics*
Steven C. Constable, Ph.D., *Geophysics*
Paul K. Dayton, Ph.D., *Oceanography*
Andrew G. Dickson, Ph.D., *Marine Chemistry*
LeRoy M. Dorman, Ph.D., *Geophysics*
Neal W. Driscoll, Ph.D., *Geology*
Horst Felbeck, Dr. rer. nat., *Marine Biology*
William H. Fenical, Ph.D., *Chemistry*
Yuri Fialko, Ph.D., *Geophysics*
Peter J. S. Franks, Ph.D., *Oceanography*
Terry Gaasterland, Ph.D., *Computational Genomics*
Jeffrey S. Gee, Ph.D., *Geophysics*
William H. Gerwick, Ph.D., *Marine Chemistry*
Carl H. Gibson, Ph.D., *Engineering Physics and
Oceanography*
Sarah T. Gille, Ph.D., *Oceanography*
Robert T. Guza, Ph.D., *Oceanography*
Philip A. Hastings, Ph.D., *Marine Biology*
Anthony D.J. Haymet, Ph.D., *Chemistry, Vice
Chancellor of Marine Sciences and Director of
Scripps Institution of Oceanography*
Myrl C. Hendershott, Ph.D., *Oceanography*
John A. Hildebrand, Ph.D., *Geophysics*
David R. Hilton, Ph.D., *Geochemistry*
William S. Hodgkiss, Ph.D., *Electrical Engineering*
Nicholas D. Holland, Ph.D., *Marine Biology*
Glenn R. Ilerley, Ph.D., *Geophysics*
Jeremy B.C. Jackson, Ph.D., *Marine Biology and
Geology*
Miriam Kastner, Ph.D., *Earth Sciences*
Ralph F. Keeling, Ph.D., *Geochemistry*
William A. Kuperman, Ph.D., *Oceanography*
Devendra Lal, Ph.D., *Nuclear Geophysics*
Michael R. Landry, Ph.D., *Oceanography*
Lisa A. Levin, Ph.D., *Oceanography*
Peter F. Lonsdale, Ph.D., *Oceanography*
T. Guy Masters, Ph.D., *Geophysics*
W. Kendall Melville, Ph.D., *Oceanography*
Jean-Bernard H. Minster, Ph.D., *Geophysics*
Mario J. Molina, Ph.D., *Atmospheric Chemistry*
Bradley S. Moore, Ph.D., *Marine Biochemistry*
Richard D. Norris, Ph.D., *Paleobiology*
Mark D. Ohman, Ph.D., *Biological Oceanography*
John A. Orcutt, Ph.D., *Geophysics*

Brian Palenik, Ph.D., *Marine Biology*
Robert Pinkel, Ph.D., *Oceanography*
Kimberly A. Prather, Ph.D., *Atmospheric Chemistry*
Veerabhadran Ramanathan, Ph.D., *Climate and
Atmospheric Sciences*
Dean H. Roemmich, Ph.D., *Oceanography*
Gregory Rouse, Ph.D., *Zoology*
Daniel L. Rudnick, Ph.D., *Oceanography*
Lynn M. Russell, Ph.D., *Atmospheric Chemistry*
David T. Sandwell, Ph.D., *Geophysics*
John G. Sclater, Ph.D., *Marine Geophysics*
Uwe Send, Ph.D., *Oceanography*
Jeffrey P. Severinghaus, Ph.D., *Geochemistry*
Peter M. Shearer, Ph.D., *Geophysics*
Dariusz Stramski, Ph.D., *Oceanography*
George Sugihara, Ph.D., *Mathematical Ecology*
Lynne D. Talley, Ph.D., *Oceanography*
Lisa Tauxe, Ph.D., *Geophysics*
Ray F. Weiss, Ph.D., *Geochemistry*
Bradley T. Werner, Ph.D., *Oceanography*
Clinton D. Winant, Ph.D., *Oceanography*
William R. Young, Ph.D., *Oceanography*

PROFESSORS EMERITI

Gustaf Arrhenius, Ph.D., *Oceanography*
George E. Backus, Ph.D., *Geophysics*
Andrew A. Benson, Ph.D., *Biology*
Wolfgang H. Berger, Ph.D., *Oceanography*
Charles S. Cox, Ph.D., *Oceanography*
Paul J. Crutzen, Ph.D., *Atmospheric Chemistry*
Joseph R. Curray, Ph.D., *Geology*
Edward A. Frieman, Ph.D., *Physics, Director*
Joris M. T. M. Gieskes, Ph.D., *Oceanography*
J. Freeman Gilbert, Ph.D., *Geophysics*
Richard A. Haubrich, Ph.D., *Geophysics*
James W. Hawkins, Ph.D., *Geology*
Francis T. Haxo, Ph.D., *Biology*
Margo G. Haygood, Ph.D., *Marine Biology*
Robert R. Hessler, Ph.D., *Biological Oceanography*
Douglas L. Inman, Ph.D., *Oceanography*
Charles F. Kennel, Ph.D., *Physics*
Gerald L. Kooyman, Ph.D., *Biology*
J. Douglas Macdougall, Ph.D., *Earth Sciences*
John A. McGowan, Ph.D., *Oceanography*
Walter H. Munk, Ph.D., *Oceanography*
William Newman, Ph.D., *Zoology*
Pearn P. Niiler, Ph.D., *Oceanography*
Robert L. Parker, Ph.D., *Geophysics*
Joseph L. Reid, M.S., *Oceanography*
Richard H. Rosenblatt, Ph.D., *Marine Biology*
Richard L. Salmon, Ph.D., *Oceanography*
Robert Shadwick, Ph.D., *Zoology/Biomechanics*
George N. Somero, Ph.D., *Biology*
Richard C.J. Somerville, Ph.D., *Meteorology*
Bradley M. Tebo, Ph.D., *Marine Biology*
Victor D. Vacquier, Ph.D., *Marine Biology*
Martin Wahlen, Ph.D., *Geochemistry*
Kenneth M. Watson, Ph.D., *Physical Oceanography*
Edward L. Winterer, Ph.D., *Geology*
A. Aristides Yayanos, Ph.D., *Biology*

ACTING ASSOCIATE PROFESSOR

Jennifer A. MacKinnon, Ph.D., *Oceanography*

ASSOCIATE PROFESSORS

Lihini I. Aluwihare, Ph.D., *Marine Chemistry*
Katherine A. Barbeau, Ph.D., *Marine Chemistry*

Helen Fricker, Ph.D., *Glaciology*
James J. Leichter, Ph.D., *Oceanography*
Joel R. Norris, Ph.D., *Climate and Atmospheric Sciences*

ASSISTANT PROFESSORS

Eric E. Allen, Ph.D., *Marine Biology*
Amro Hamdoun, Ph.D., *Physiology*
Todd R. Martz, Ph.D., *Analytical Chemistry*
Jennifer E. Smith, Ph.D., *Botany and Ecology, Evolution
and Conservation Biology*
David Stegman, Ph.D., *Geophysics*

ADJUNCT PROFESSORS

Lisa T. Ballance, Ph.D., *Biological Oceanography*
Jay P. Barlow, Ph.D., *Biological Oceanography*
Exequiel Ezcurra, Ph.D., *Ecology*
Paul Falkowski, Ph.D., *Biology*
Konstantine P. Georgakakos, Sc.D., *Hydrology*
Catherine L. Johnson, Ph.D., *Geophysics*
Nancy Knowlton, Ph.D., *Marine Biology*
Stefan G. Llewellyn Smith, Ph.D., *Applied Mathematics*
Tadeusz F. Molinski, Ph.D., *Organic Chemistry*
Phillip Morin, Ph.D., *Population Genetics*
Naomi Oreskes, Ph.D., *Graduate Special Program in
Geological Research and History of Science*
William F. Perrin, Ph.D., *Marine Biology*
Paul E. Smith, Ph.D., *Biological Oceanography*
Detlef Stammer, Ph.D., *Oceanography*

ASSOCIATE ADJUNCT PROFESSOR

Andrew E. Allen, Ph.D., *Ecology*

ASSISTANT ADJUNCT PROFESSOR

Shannon J. Williamson, Ph.D., *Marine Science*

SENIOR LECTURERS

Donna K. Blackman, Ph.D., *Research Geophysicist*
Yehuda Bock, Ph.D., *Research Geodesist*
George Carnevale, Ph.D., *Research Oceanographer*
Daniel R. Cayan, Ph.D., *Research Meteorologist*
Teresa K. Chereskin, Ph.D., *Research Oceanographer*
Bruce D. Cornuelle, Ph.D., *Research Oceanographer*
Grant B. Deane, Ph.D., *Research Oceanographer*
Peter Gerstoft, Ph.D., *Research Scientist*
Jeffrey B. Graham, Ph.D., *Research Biologist*
Alistair J. Harding, Ph.D., *Research Geophysicist*
Michael A.H. Hedlin, Ph.D., *Research Geophysicist*
Sam Iacobellis, Ph.D., *Specialist*
Jules S. Jaffe, Ph.D., *Research Oceanographer*
Graham M. Kent, Ph.D., *Research Geophysicist*
J. Anthony Koslow, Ph.D., *Research Oceanographer/
Director, CalCOFI*
Michael I. Latz, Ph.D., *Research Biologist*
Dan Lubin, Ph.D., *Research Physicist*
Arthur J. Miller, Ph.D., *Research Oceanographer*
B. Gregory Mitchell, Ph.D., *Research Oceanographer*
Jerome A. Smith, Ph.D., *Research Oceanographer*
Kenneth L. Smith, Jr., Ph.D., *Research Biologist*
Hubert Staudigel, Ph.D., *Research Geologist*
James H. Swift, Ph.D., *Research Oceanographer*
Frank L. Vernon, Ph.D., *Research Geophysicist*
Kraig Winters, Ph.D., *Research Oceanographer*
Peter F. Worcester, Ph.D., *Research Oceanographer*
Mark A. Zumberge, Ph.D., *Research Geophysicist*

LECTURERS

Bianca M. Brahmsha, Ph.D., *Associate Research Biotechnologist*
C. David Chadwell, Ph.D., *Associate Research Geophysicist*
Gerald L. D'Spain, Ph.D., *Associate Research Scientist*
Peter Dutton, Ph.D., *Researcher*
Falk Feddersen, Ph.D., *Assistant Research Oceanographer*
Lena Gerwick, Ph.D., *Assistant Research Scientist*
Mark Hildebrand, Ph.D., *Research Biologist*
Paul Jensen, Ph.D., *Assistant Research Scientist*
Kerry Key, Ph.D., *Assistant Research Scientist*
M. Gabriele Laske, Ph.D., *Associate Research Geophysicist*
Cheryl Peach, Ph.D., *Academic Coordinator*
Stuart Sandin, Ph.D., *Assistant Project Scientist*
Eric Simms, Ph.D., *Academic Coordinator*
Hee Chun Song, Ph.D., *Associate Research Scientist*
Janet Sprintall, Ph.D., *Associate Research Oceanographer*
Jane Teranes, Ph.D., *Associate Director, Undergraduate Program*
Eric Terrill, Ph.D., *Director, CORDC*
Aaron Thode, Ph.D., *Associate Research Scientist*

AFFILIATED FACULTY

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UNDERGRADUATE EDUCATION OFFICE:
Galbraith Hall 188
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INTRODUCTION

Scripps Institution of Oceanography is one of the oldest, largest, and most important centers for marine science research, education, and public service in the world. Its preeminence in the marine sciences is reflective of its excellent programs, distinguished faculty and research scientists, and outstanding facilities. Scripps Institution was founded in 1903 as an independent biological research laboratory, which became an integral part of the University of California in 1912. At that time, the laboratory was given the Scripps name in recognition of donors Ellen Browning Scripps and E. W. Scripps. Research and education at Scripps encompasses physical, chemical, biological, geological, and geophysical studies of the oceans. Among the hundreds of research programs that may be under way at any one time are studies of air-sea interaction, climate prediction, earthquakes, the physiology of marine organisms, the geological history of the ocean basins, and multidisciplinary aspects of global change and the environment.

THE UNDERGRADUATE PROGRAM

The Scripps Institution of Oceanography Department offers over forty-five undergraduate courses covering a wide breadth of earth and marine sciences on several different levels. There are several introductory classes for non-majors, and upper-division courses intended for a wide range of students in natural science majors. For students interested in careers in earth sciences, the Scripps Institution of Oceanography offers a B.S. degree and a contiguous B.S./M.S. degree in earth sciences. In addition, students may follow a chemistry/earth sciences major, a physics major with a specialization in earth sciences, or an environmental systems/earth sciences major (see the "Chemistry," "Physics," or "Environmental Systems" sections of the catalog for details). The program also offers an academic minor in earth sciences.

For students interested in broadening their understanding of and opportunity in marine science and oceanography, the program offers an academic minor in marine science. The marine science minor is designed to complement the strong disciplinary training of UC San Diego basic natural science and engineering majors (i.e., chemistry, physics, biological sciences, earth sciences, engineering, mathematics, etc.) by providing a broad interdisciplinary perspective with an applied environmental focus.

EARTH SCIENCES MAJOR

Earth sciences encompass broad scientific study of the origin and evolution of the earth system and its life forms. The earth sciences major embraces a wide range of topics, including the physical and chemical evolution of the planet, the evolution of life, the causes of earthquakes and volcanic eruptions, earth-surface processes, the origin and behavior of oceans and atmosphere, and the impact of humans on the environment. Earth science investigations are increasingly quantitative and experimental, and thus most upper-division courses require a strong foundation in chemistry, physics, and mathematics.

The earth sciences curriculum takes advantage of the unique opportunities offered by Scripps Institution of Oceanography. Classes beyond introductory level are usually small, permitting personalized instruction. Field trips are an important part of the instructional program. Earth sciences students are encouraged to consult with their instructors about incorporating appropriate courses and research opportunities at the Scripps Institution of Oceanography into their undergraduate curriculum.

A degree in earth sciences is an appropriate start for a broad range of career and graduate school opportunities in various areas, including research, government, state and federal survey jobs, environmental management, the petroleum and mining industries, consulting, ocean sciences, industrial institutions, elementary or secondary education, environmental policy, or environmental law. Program advisors and faculty can provide additional information on career and graduate school opportunities.

There are three specializations, each with slightly different course requirements, in the earth sciences

major: The *Earth Sciences/Geology* major, *Earth Sciences/Geochemistry* major, and *Earth Sciences/Geophysics* major.

It is strongly recommended that all earth science majors meet regularly with the earth sciences academic advising staff and a faculty advisor to discuss and update curriculum choices. The earth sciences academic staff are located in the Scripps office of Undergraduate Programs in Galbraith Hall, Room 188.

Lower-division requirements are designed to provide the foundations in mathematics, physics, chemistry, and biology that are essential in modern quantitative earth science disciplines. In addition, there are four upper-division courses introducing basic concepts, SIO 100, SIO 102, SIO 103, and SIO 104. SIO 100 and SIO 102 should be taken during the sophomore year to provide the appropriate background for other upper-division courses.

A grade-point average of 2.0 or higher in the upper-division major program is required for graduation. Students must receive a grade of C- or better in any course to be counted toward fulfillment of the major requirements. In exceptional cases, students with a grade-point average in the major of 2.5 or greater may petition to have one grade of D accepted. All courses (lower- and upper-division) required for the major must be taken for a letter grade.

Special Studies Courses

Special studies in the earth sciences are offered as the courses SIO 198 and SIO 199. These courses are subject to consent of the instructor and approval by the earth sciences faculty advisor. They are open to students who have accrued at least ninety quarter-units and have a GPA of at least 3.0. Two quarters of earth sciences special studies may be counted toward any earth sciences major.

EARTH SCIENCES/GEOLOGY

The earth sciences/geology major is designed to allow students maximum flexibility in tailoring the curriculum to their interests, within the constraints of obtaining the necessary background in physical, biological, and earth sciences. Compared to the earth sciences/geochemistry and earth sciences/geophysics tracks, it requires more earth science and fewer non-earth science courses.

Lower-Division Requirements

Math. 20A-B-C (may allow Math. 10A-B-C by petition) and Math. 20D

Phys. 2A-B-C (may allow Phys. 1A-B-C by petition)

Chem. 6A-B-C

BILD 3

SIO 50

Upper-Division Requirements

Earth Sciences Upper-Division Core Requirements

SIO 100. Introduction to Field Methods

SIO 102. Introduction to Geochemistry

SIO 103. Introduction to Geophysics

SIO 104/255. Paleobiology and History of Life

Upper-Division Earth Science Requirements

SIO 105. Sedimentology and Stratigraphy
 SIO 120. Mineralogy
 SIO 152. Petrology and Petrography
 SIO 160. Introduction to Tectonics
 SIO 162. Structural Geology
 SIO 182A. Environmental and Exploration Geophysics A
 SIO 182B. Environmental and Exploration Geophysics B

Upper-Division Restricted Electives, at least four courses from

Chem. 173. Atmospheric Chemistry
 SIO 101. California Coastal Oceanography
 SIO 110. Introduction to GIS and GPS for Scientists
 SIO 111/Phys. 111. Introduction to Waves and Tides
 SIO 112. Urban Landscapes
 SIO 115. Ice and the Climate System
 SIO 117. The Physical Basis of Global Warming
 SIO 135/236. Satellite Remote Sensing
 SIO 138. The Coral Reef Environment
 SIO 141/Chem. 174. Chemical Principles of Marine Systems
 SIO 144/252A. Introduction to Isotope Geochemistry
 SIO 148/248. Evolution of Earth's Biosphere
 SIO 154/254. Macroevolution
 SIO 155/251. Petrology and Geochemistry of the Solid Earth
 SIO 170. Introduction to Volcanology
 SIO 186. Interactions Between Humans and the Natural Environment
 SIO 195. Methods of Teaching Earth Sciences
 SIO 197. Earth Science Internship
 SIO 199. Independent Study
 SIO 210. Physical Oceanography
 SIO 226. Introduction to Marine Geophysics
 SIO 240. Marine Geology
 SIO 247. Rock Magnetism and Paleomagnetism
 SIO 260. Marine Chemistry
 SIO 280. Biological Oceanography

An example schedule is outlined below.

FALL	WINTER	SPRING
Freshman Year		
Math. 20A	Math. 20B	Math. 20C
Chem. 6A	Chem. 6B	Chem. 6C
SIO 50	Phys. 2A	Phys. 2B
Sophomore Year		
Math. 20D	SIO 102	SIO 105
Phys. 2C	SIO 162	
BILD 3	SIO 104	
Junior Year		
SIO 100	SIO 120	SIO 152
SIO 103	SIO 182A	SIO 182B
Senior Year		
SIO Elect.	SIO Elect.	SIO Elect.
	SIO Elect.	SIO 160

EARTH SCIENCES/GEOCHEMISTRY MAJOR

This specialization focuses on the Earth as a chemical system and on its evolution. Emphasis is placed on the fundamental observations that allow geoscientists to understand better the past history

of the planet, the energetics of its evolution, and the major "cycles" (e.g., water, carbon) that characterize and control planetary-scale changes on a broad range of time scales. The major is appropriate for students interested in modern geochemistry, in "global change" studies, and in global and local environmental problems, including biochemical and anthropogenic effects.

Lower-Division Requirements

Math. 20A-B-C-D
 Phys. 2A-B-C (2D recommended)
 Chem. 6A-B-C and Chem. 6BL
 BILD 3
 SIO 50

Upper-Division Requirements

Earth Sciences Upper-Division Core Requirements

SIO 100. Introduction to Field Methods
 SIO 102. Introduction to Geochemistry
 SIO 103. Introduction to Geophysics
 SIO 104/255. Paleobiology and History of Life

Upper-Division Earth Science Requirements

SIO 120. Mineralogy
 SIO 144/252A. Introduction to Isotope Geochemistry
 SIO 152. Petrology and Petrography

Upper-Division Chemistry Requirements

Chem. 120A. Inorganic Chemistry
 Chem. 131. Physical Chemistry or Chem. 127
 Chem. 140A. Organic Chemistry

Chemistry Restricted Electives, at least two courses from

Chem. 149A. Environmental Chemistry
 Chem. 149B. Environmental Chemistry
 Chem. 173. Atmospheric Chemistry

Upper-Division Restricted Electives, at least three courses from

SIO 101. California Coastal Oceanography
 SIO 105. Sedimentology and Stratigraphy
 SIO 110. Introduction to GIS and GPS for Scientists
 SIO 111/Phys. 111. Introduction to Waves and Tides
 SIO 112. Urban Landscapes
 SIO 115. Ice and the Climate System
 SIO 135/236. Satellite Remote Sensing
 SIO 138. The Coral Reef Environment
 SIO 141/Chem. 174. Chemical Principles of Marine Systems
 SIO 148/248. Evolution of Earth's Biosphere
 SIO 154/SIO 254. Macroevolution
 SIO 155/251. Petrology and Geochemistry of the Solid Earth
 SIO 160. Introduction to Tectonics
 SIO 162. Structural Geology
 SIO 170. Introduction to Volcanology
 SIO 182A. Environmental and Exploration Geophysics A

SIO 182B. Environmental and Exploration Geophysics B

SIO 186. Interactions Between Humans and the Natural Environment
 SIO 195. Methods of Teaching Earth Sciences
 SIO 197. Earth Science Internship
 SIO 199. Independent Study
 SIO 226. Introduction to Marine Geophysics
 SIO 240. Marine Geology
 SIO 247. Rock Magnetism and Paleomagnetism
 SIO 260. Marine Chemistry

An example schedule is outlined below.

FALL	WINTER	SPRING
Freshman Year		
Chem. 6A	Chem. 6B	Chem. 6C
Math. 20A		Math. 20C
SIO 50	Math. 20B	Chem. 6BL
Sophomore Year		
Phys. 2A	Phys. 2B	Phys. 2C
Math. 20D	SIO 102	BILD 3
SIO 100		
Junior Year		
SIO 103	SIO 120	Chem. 127 or 131
Chem. 140A	SIO 144	SIO 152
	SIO 104	
Senior Year		
Chem. 120A	SIO Elect.	SIO Elect.
Chem. Elect.	SIO Elect.	SIO Elect.

EARTH SCIENCES/GEOPHYSICS MAJOR

This specialization focuses on the mechanical, dynamical, and thermodynamical aspects of the Earth. Emphasis is placed on a solid background of fundamental physics, from mechanics and electromagnetism to continuum- and quantum mechanics, and on the necessary mathematical skills. The major introduces basic techniques used to investigate the internal structure of the Earth, from seismology to the study of potential fields, and space geodesy. Elementary geodynamics, including the physics of simple convective systems, introductory rock mechanics, and plate kinematics are among topics introduced. At the same time, a "hands-on" exposure to field problems and techniques will be accessible through an applied geophysics sequence.

Lower-Division Requirements

Math. 20A-B-C-D-E-F
 Phys. 4A-B-C-D or Phys. 2A-B-C (Phys. 4 sequence recommended)
 Chem. 6A-B-C
 BILD 3
 SIO 50

Upper-Division Requirements

Earth Sciences Upper-Division Core Requirements

SIO 100. Introduction to Field Methods
 SIO 102. Introduction to Geochemistry
 SIO 103. Introduction to Geophysics
 SIO 104/255. Paleobiology and History of Life

Upper-Division Earth Sciences Requirements

SIO 160. Introduction to Tectonics
SIO 182A. Environmental and Exploration Geophysics A
SIO 182B. Environmental and Exploration Geophysics B

Upper-Division Physics Requirements

Phys. 100A-B-C. Electromagnetism
Phys. 110A-B. Mechanics

Physics Restricted Electives, at least one course from

Phys. 105A. Mathematical and Computational Physics
Phys. 105A. Mathematical and Computational Physics
Phys. 121. Experimental Techniques
Phys. 140A-B. Statistical and Thermal Physics
MAE 131A. Solid Mechanics I
MAE 180A. Spacecraft Guidance I

Upper-Division Restricted Electives, at least two courses from

SIO 101. California Coastal Oceanography
SIO 105. Sedimentology and Stratigraphy
SIO 110. Introduction to GIS and GPS for Scientists
SIO 111/Phys. 111. Introduction to Waves and Tides
SIO 112. Urban Landscapes
SIO 115. Ice and the Climate System
SIO 117. The Physical Basis of Global Warming
SIO 120. Introduction to Mineralogy
SIO 135/236. Satellite Remote Sensing
SIO 138. The Coral Reef Environment
SIO 141/Chem. 174. Chemical Principles of Marine Systems
SIO 144/252A. Introduction to Isotope Chemistry
SIO 148/248. Evolution of Earth's Biosphere
SIO 152. Petrology and Petrography
SIO 154/254. Macroevolution
SIO 155. Petrology and Geochemistry of the Solid Earth
SIO 160. Introduction to Tectonics
SIO 162. Structural Geology
SIO 170. Introduction to Volcanology
SIO 186. Interactions Between Humans and the Natural Environment
SIO 195. Methods of Teaching Earth Sciences
SIO 197. Earth Science Internship
SIO 199. Independent Study
SIO 223. Geophysical Data Analysis
SIO 226. Introduction to Marine Geophysics
SIO 227A. Introduction to Seismology

An example schedule is outlined below.

FALL	WINTER	SPRING
Freshman Year		
Chem. 6A	Chem. 6B	Chem. 6C
Math. 20A	Math. 20B	Math. 20C
SIO 50	Phys. 4A	Phys. 4B
Sophomore Year		
Math. 20D	Math. 20E	Math. 20F
Phys. 4C	Phys. 4D	BILD 3
SIO 100	SIO 102	
Junior Year		
Phys. 100A	Phys. 100B	Phys. 100C
Phys. 110A	SIO 104	Phys. 110B
SIO 103	SIO 182A	SIO 182B
Senior Year		
SIO 130 or 160	Phys. Elect. SIO Elect.	SIO Elect.

HONORS PROGRAM

The Honors Program in Earth Sciences is offered for a limited number of students who have demonstrated excellence in the earth sciences major. Students are eligible for admission to the program when they have

Completed ninety units of courses including twelve units of earth sciences courses.

Achieved a GPA of 3.3 overall and 3.5 in earth science courses.

Submitted to the Earth Sciences Steering Committee, and had approved, an honors thesis research proposal.

Successful completion of the Honors Program requires

Maintenance of a GPA of 3.3 overall and 3.5 in earth sciences courses.

Completion, with a B grade or higher, of a minimum of eight units of SIO 196 related to the honors thesis research, distributed over at least two quarters. These units must be in addition to the ordinary major requirements. However, students who subsequently fail to complete the Honors Program may apply up to four of these 196 units to their major.

Acceptance of a written honors thesis report by a committee of not fewer than three faculty members.

Satisfactory presentation of an oral report on the thesis research, preferably at a public undergraduate research conference on campus, or at an earth sciences conference. Alternatively, the oral report may be given at a seminar involving honors students and at least three faculty members.

Students who successfully complete the Honors Program will graduate with "high distinction."

Students who are interested in the Honors Program should contact the program advisor in Galbraith Hall, Room 188, Revelle College.

(See Scripps Institution of Oceanography graduate program for information on the "Contiguous Bachelor's/Master's Earth Sciences Degree Program.")

EARTH SCIENCES MINOR

A minor in earth sciences consists of twenty-eight units of earth sciences courses, at least twenty of which must be upper-division, focused on geology, geochemistry, or geophysics. Courses required by a student's major may not be applied toward a minor and neither can SIO 198 nor SIO 199. Courses for the minor may be taken on a Pass/Not Pass basis if the

student's college permits. Students interested in the earth sciences minor should meet with the earth sciences academic advising staff to discuss their curriculum choices.

MARINE SCIENCE MINOR

The Scripps Institution of Oceanography offers an undergraduate minor program in marine science. The minor curriculum is designed to complement the strong disciplinary training of UCSD basic science majors by providing a broad interdisciplinary perspective with an environmental focus. Ocean-related science is relevant to many contemporary environmental issues and problems and central to understanding earth-system evolution, dynamics, climate, and sustainability. The minor consists of courses and research opportunities offered primarily through faculty and researchers at Scripps. The mix of these components can be tailored to reflect students' career interests through an "all courses" track or a "research" track. The "all courses" track offers a very flexible curriculum that serves students with a broad range of educational and career interests including environmental management and regulation, teaching, environmental law, economics and policy and a wide variety of graduate programs. The "research" track is designed for students interested in an undergraduate research experience at Scripps and serves as excellent preparation for graduate research studies.

The minor consists of twenty-eight units of course work, at least twenty of which must be upper-division. Courses required by a student's major may not be applied toward the minor. Up to two courses for the minor may be taken on a Pass/Not Pass basis (upper- or lower-division). Students must earn at least a letter grade of C- in the remaining five or more courses used for the minor. The marine science minor places a strong emphasis on a rigorous natural science foundation; thus, several of the upper-division courses related to the minor have significant prerequisites. Students planning the minor should check catalog course descriptions carefully and should meet with advising staff in the Scripps Institution of Oceanography Office of Undergraduate Programs, Galbraith Hall, Room 188.

Lower-Division Requirements

SIO 30. The Oceans

Any one of the following lower-division courses may be applied to the minor requirements

STPA 35. Society and the Sea

SIO 10. The Earth

SIO 12. History of the Earth and Evolution

SIO 20. The Atmosphere

SIO 35. Water

SIO 40. Life and Climate on Earth

SIO 50. Introduction to Earth and Environmental Sciences

Additionally, any math, chemistry, physics, or biology course that is a prerequisite for an upper-division elective for the marine science minor (ex., Math. 20 series; Chem. 6A, 6B, 6C; Phys. 2 series; BILD 1, 2, 3) may be applied, by petition, as a lower-division requirement for the minor's major.

Upper-Division Requirements

Option 1—All Courses Track

At least five courses from the list (below) of upper-division electives

Option 2—Research Track

At least five courses from the list (below) of upper-division electives, at least three of which must be courses satisfying Option #1 and at least two of which must be Independent Study (SIO 199; eight units total) Note: The Independent Study must be designed in mutual agreement and arrangement with an SIO faculty member. Students interested in the marine science minor "Research Track" must meet with a Scripps Undergraduate Program advisor for information and policies.

Upper-Division Electives

- SIO 101. California Coastal Oceanography
- SIO 102. Introduction to Geochemistry
- SIO 103. Introduction to Geophysics
- SIO 104/255. Paleobiology and History of Life
- SIO 105. Sedimentology and Stratigraphy
- SIO 110. Introduction to GIS and GPS for Scientists
- SIO 111/Phys. 111. Introduction to Ocean Waves and Tides
- SIO 115. Ice and the Climate System
- SIO 117. The Physical Basis of Global Warming
- SIO 138. The Coral Reef Environment
- BIMM 126. Marine Microbiology
- BIMM 127/SIO 288. Marine Microbiology Lab
- BIEB 132. Introduction to Marine Biology
- BIBC 130/SIO 281. Marine Biochemistry
- BIEB 134. Introduction to Biological Oceanography
- SIO 135/236. Satellite Remote Sensing
- SIO 141/ Chem. 174. Chemical Principles of Marine Systems
- SIO 148/248. Evolution of Earth's Biosphere
- SIO 154/254. Macroevolution
- SIO 160. Introduction to Tectonics
- SIO 180/292. Communicating Science to Informal Audiences
- SIO 198. Directed Group Study
- SIO 199. Independent Study
- ECE 156/MAE 149/SIO 238. Sensor Networks
- SIO 201. Geologic Record of Climate Change
- SIO 210. Physical Oceanography
- SIO 260. Marine Chemistry
- SIO 265. Chemical Ecology of Marine Organisms

Other SIO courses may be submitted by petition.

STUDY ABROAD

Study abroad through the Education Abroad Program (<http://programsabroad.ucsd.edu>) or Opportunities Abroad Program can enhance a student's major, particularly as an opportunity for diverse field experiences. However, careful planning is important to meet all major requirements. Please contact the Scripps Office of Undergraduate Programs as early as possible if you are an earth sciences major and planning to study abroad.

CAREERS IN EDUCATION

Students interested in a teaching career should be aware that the earth sciences major, because of its broad course requirements in the sciences, fulfills many of the subject requirements for obtaining a California Teaching Credential through UCSD's Educational Studies Program. The projected high demand over the next decade for well-trained teachers, particularly in the sciences, makes this an attractive option for many students. Students who wish to take advantage of this opportunity may wish to complete a minor in science education. Please contact the Education Studies office directly for further details

THE GRADUATE PROGRAM

GRADUATE EDUCATION OFFICE:
Old Scripps Building 22, Scripps Institution of Oceanography
<http://scrippseducation.ucsd.edu/>

The Department of Scripps Institution of Oceanography offers instruction leading to Ph.D. degrees in oceanography, marine biology, and earth sciences. Although students are not admitted specifically for an M.S. degree, it is possible to obtain an M.S. on the way to completing the Ph.D. degree. The Department of Scripps Institution of Oceanography is organized into three academic programs: Climate-Ocean-Atmosphere Program (COAP), Geosciences of the Earth, Oceans, and Planets (GEO), and Ocean Biosciences Program (OBP).

Each of these programs is responsible for all graduate educational activities in its area, including teaching, advising, and examining. The academic programs are umbrellas for curricular groups as follows.

Climate-Ocean-Atmosphere Program (COAP)

- Applied Ocean Science (AOS)
- Climate Sciences (CS)
- Physical Oceanography (PO)

Geosciences of the Earth, Oceans, and Planets (GEO)

- Geophysics (GP)
- Geosciences (GS)
- Marine Chemistry and Geochemistry (MCG)

Ocean Biosciences Program (OBP)

- Biological Oceanography (BO)
- Marine Biology (MB)

Climate-Ocean-Atmosphere Program (COAP)

Applied Ocean Science is a multidisciplinary program focused on the application of advanced technology to ocean exploration and observation. AOS students perform research in marine acoustics, optics, electromagnetics, geophysics, ecology, sediment transport, coastal processes, physical oceanography, and air-sea interaction. The emphasis is on the resolution of key scientific issues through novel technological development. The science focus of the

Scripps AOS program is complemented by parallel Applied Ocean Science programs in the Mechanical and Aerospace Engineering (MAE) and Electrical and Computer Engineering (ECE) departments. Students have access to professors, courses, and research facilities across all three departments.

Climate Sciences concerns the study of the climate system of the earth with emphasis on the physical, dynamical, and chemical interactions of the atmosphere, ocean, land, ice, and the terrestrial and marine biospheres. The program encompasses changes on seasonal to interannual time scales and those induced by human activities, as well as paleoclimatic changes on time scales from centuries to millions of years. Examples of current research activities include: interannual climate variability; physics and dynamics of El Niño; studies of present and future changes in the chemical composition of the atmosphere in relation to global warming and ozone depletion; effects of cloud and cloud feedbacks in the climate system; paleoclimate reconstructions from ice cores, banded corals, tree-rings, and deep-sea sediments; the origin of ice ages; air-sea interactions; climate theory; terrestrial and marine ecosystem response to global change.

Physical Oceanography is the field of study that deals with mechanisms of energy transfer through the sea and across its boundaries, and with the physical interactions of the sea with its surroundings, especially including the influence of the seas on the climate of the atmosphere. Research activities within this curricular group are both observational and theoretical and include: study of the general circulation of the oceans, including the relations of ocean currents to driving forces and constraints of the ocean basins; fluctuations of currents, and the transport of properties; the mechanisms of transport of energy, momentum, and physical substances within the sea and across its boundaries; properties of wind waves, internal waves, tsunami, and planetary waves; the thermodynamic description of the sea as a system not in equilibrium; optical and acoustic properties of the sea; and the influence of surf on near-shore currents and the transport of sediments.

Geosciences of the Earth, Oceans and Planets (GEO)

Geophysics emphasizes the application of general principles of mathematics and experimental physics to fundamental problems of the oceans, the oceanic and continental lithosphere, the cryosphere, and the crust and deep interior of the Earth. Research interests of the group include: observational and theoretical studies of electric and magnetic fields in the oceans and on the land; paleomagnetism; theoretical seismology with special emphasis on the structure of the Earth from free-oscillation and body wave studies; broadband observational seismology, including ocean bottom and multichannel seismology; earthquake source mechanisms; the measurements of slow crustal deformations using satellite and observatory methods on continents and in the oceans; marine geodynamics and tectonophysics; gravity measurements; geophysical inverse theory; observations of the ice sheets; magnetohydrodynamics of the core of the Earth; geophysical instrumentation for oceanic and

continental geophysical measurements; acoustic propagation in the oceans.

Geosciences emphasizes the application of general principles of geology, geochemistry, and geophysics to problems in the marine and terrestrial environments of the Earth. Graduate students routinely participate in expeditions at sea and on land and many doctoral theses evolve from these experiences.

Research areas in the geological sciences include: the origin and evolution of the ocean-atmosphere system and global climate; geology, geochemistry, and geophysics of oceanic crustal rocks and near-shore environments; tectonic and structural evolution of the oceans, plate margins, and back-arc basins; the role of fluids in the crust; chemistry of rare gases in active volcanoes; the use of natural nuclear processes for understanding physical and chemical processes in the Earth; paleomagnetic applications in geology and geophysics.

Marine Chemistry and Geochemistry concerns chemical and geochemical processes operating in a broad range of study areas: the oceans, the solid earth, the atmosphere, marine organisms, polar ice sheets, lakes, meteorites, and the solar system.

Areas of advanced study and research include the physical and inorganic chemistry of seawater; ocean circulation and mixing based on chemical and isotopic tracers; marine organic and natural products chemistry; marine bioinorganic chemistry; geochemical interactions of sediments with seawater and interstitial waters; geochemistries of volcanic and geothermal phenomena; chemical exchanges between the ocean and the atmosphere; geochemical cycles of carbon, oxygen, sulfur, nitrogen, and other elements; isotopic geochemistry of the solid earth and meteorites; atmospheric trace gas chemistry; paleoatmospheric composition recorded in polar ice cores, corals and sediments; and chemistry of lakes and other freshwater systems.

Studies are typically interdisciplinary and involve integration of chemical concepts with information about the physical, biological, or geological processes that influence natural systems. Students in the marine chemistry and geochemistry curricular group are encouraged to explore these links.

Ocean Biosciences Program (OBP)

Biological Oceanography is concerned with the interactions of populations of marine organisms with one another and with their physical and chemical environment. Because these interactions are frequently complex, and because the concepts and techniques used are drawn from many fields, biological oceanography is, of necessity, interdisciplinary. Therefore, studies in physical oceanography, marine chemistry, marine geology, and several biological areas are pertinent.

Research is conducted on space/time scales ranging from short-term interactions between individual organisms (mm., sec.) to interdecadal variation in widely dispersed populations. The techniques used in these investigations are diverse, and can include field observation and manipulations, experimentation in the laboratory, and mathematical modeling.

Research topics include primary and secondary productivity and nutrient regeneration, fishery biology and management, community ecology of

benthic and pelagic organisms, population dynamics, habitat changes and disruptions, systematics and biogeography, population genetics and evolution, and behavior as it affects distribution. Development and testing of new tools (molecular, optical, acoustic), design of sampling programs, and statistical/mathematical analyses of data also are significant activities.

Marine Biology is the study of marine organisms. It is concerned with evolutionary, organismic, genetic, genomic, physiological, and biochemical processes in these organisms, and the relationship between them and their biotic and physical environment. Marine biology encompasses several major areas of modern biology, and is interpreted by understanding the physical and chemical dynamics of the oceans. Faculty research focuses on microbiology, photobiology, invertebrate biology, vertebrate biology, high pressure biology, deep-sea biology, developmental biology, genetics, comparative biochemistry, eco-toxicology, physiology, behavior, ecology, biogeography, taxonomy, and evolution. Processes ranging from coral larvae recruitment to the role of bacteria in marine food web dynamics are under study in over twenty independent research laboratories.

REQUIREMENTS FOR ADMISSION

Candidates for admission should have a bachelor's or master's degree in one of the physical, biological, or earth sciences; degrees in mathematics or engineering science are also accepted. A scholastic average of B or better in upper-division courses, or prior graduate study, is required. The student's preparation should include

- mathematics through differential and integral calculus

- physics, one year with laboratory (the course should stress the fundamentals of mechanics, electricity, magnetism, optics, and thermodynamics, and should use calculus in its exposition)

- chemistry, one year with laboratory
- an additional year of physics, chemistry, or mathematics

All applicants are required to submit scores from the general test of the Graduate Record Examinations (GRE) given by the Educational Testing Service of Princeton, New Jersey. Applicants to the Ocean Biosciences Program, additionally, should take one GRE subject test of their own choice.

All international applicants whose native language is not English and whose undergraduate education was conducted in a language other than English must take the TOEFL and submit their test scores to the UC San Diego Office of Graduate Admissions.

Specific additional requirements for admission to the programs are as follows.

Climate-Ocean-Atmosphere Program (COAP)

Applied Ocean Science—Students are admissible with a strong background in physical science, engineering science, or mathematics. Three years of physics or applicable engineering and three years of mathematics at college level are expected.

Climate Sciences—Students are admissible if they satisfy the requirements of the physical oceanography, geophysics, or marine chemistry and geochemistry curricular programs. Biology and geology majors may also be admissible if the Scripps faculty feel that they have a sufficiently strong background in mathematics and physical science.

Physical Oceanography—A major in a physical science, including three years of physics and mathematics, is required.

Geosciences of the Earth, Oceans, and Planets (GEO)

Geophysics—A major in physics, mathematics, earth sciences, or equivalent training, is required.

Geosciences—A major in one of the earth sciences and undergraduate physical chemistry and calculus are required. Preparation beyond the minimum requirements in mathematics, physics, and chemistry is strongly recommended.

Marine Chemistry and Geochemistry—A major in chemistry, geology, biochemistry, or related field, is required.

Ocean Biosciences Program (OBP)

Biological Oceanography—Two years of chemistry, including general and organic chemistry, and a year of general biology are required. Physical chemistry requiring calculus may be substituted for physics requiring calculus where a more elementary physics course was taken. Zoology or botany may be substituted for general biology. Preparation should also include a course in general geology and at least one course in each of the following categories: systematics (e.g., invertebrate zoology), population biology (e.g., ecology), functional biology (e.g., physiology). In special cases, other advanced courses in mathematics or natural sciences may be substituted.

Marine Biology—A major in one of the biological sciences (or equivalent), with basic course work in botany, microbiology, or zoology; two years of chemistry, including organic chemistry, is required. Training in one or more of the following areas is strongly recommended: cellular biology, molecular biology, comparative physiology, genetics, developmental biology, ecology, evolutionary biology, vertebrate and invertebrate zoology, microbiology, and/or botany. Biochemistry and physical chemistry will be expected of students in experimental biology, although the student may, if necessary, enroll in these courses at UCSD after admission.

Special consideration occasionally can be given to candidates with outstanding records who do not meet all required preadmission criteria.

PROGRAMS OF STUDY

Programs of study vary widely among the curricular groups, but generally first-year students are expected to enroll in core courses that cover physical, geological, chemical, and biological oceanography. Each first-year student is assigned a guidance committee consisting of three faculty members. The guidance committee is charged with advising the student during the first year, until the departmental exam. The intention is to provide individualized guidance to students particularly

including advice about courses of study that may reach beyond a single curricular group.

By the end of the first year, students usually select a particular area of focus and choose an advisor. As students advance beyond the first year, they begin to function effectively as research assistants or, in some cases, as teaching assistants. During their third to fifth year they are working toward writing their dissertations.

Programs of study for the first year vary between the three programs.

Climate-Ocean-Atmosphere Program

Students admitted to COAP choose a curricular group by the end of the fall quarter. This choice is aided by the student's guidance committee, which includes a Curriculum Advisor from one of the COAP curricular groups. The guidance committee will help to arrange an individually tailored set of first-year courses for the student, and to ensure that the student has taken all necessary courses to prepare for the departmental exam. During the year, students may be supported in a variety of ways, but by the end of the spring quarter students must choose a research advisor. After the first year the guidance committee is dissolved, and the research advisor and dissertation committee provide guidance.

Applied Ocean Science—The AOS academic program is designed to provide both a broad background and a core technical base to support the diverse interests and activities of the students. Early participation in an ongoing research project is encouraged. However, specialization and focus on a specific thesis topic is not required until the second or third year of the program. Required courses include SIO 214A Introduction to Fluid Mechanics, and the two-quarter Wave Physics sequence SIO 202A–B. Two of the four SIO introductory courses (SIO 210, 240, 260, 280), must be completed during the first year, with the remaining two required prior to passing the doctoral qualifying exam at the end of the third year. In addition, the applied math sequence SIO 203 A–B or MAE 294 A–B is taken in either the first or second year of study. The AOS Seminar (SIO 208) serves as a communications bridge across the program; enrollment in this seminar is required during the student's entire period of study. Beyond these core classes, the majority of each student's academic program is tailored to individual interests. The AOS departmental examination, held at the end of the first year, is based on the core technical courses SIO 214A, SIO 202A–B, and two of the four introductory courses (chosen by the student). The exam has both oral and written components.

Climate Sciences—The emphasis of this curricular group is on education through interdisciplinary research. All students are responsible for the fundamental material in the following "core" courses: SIO 210, 217A–B–C, 260. Students are also expected to supplement their backgrounds with five to seven additional courses, including, for most Climate Sciences students, at least one additional quarter of fluid dynamics. These additional course(s) will be chosen in consultation with the students' advisors. It is recommended that students participate actively in at least two quarters of seminar courses designed to complement and stimulate individual research. Though the group stresses interactions across

disciplines, students will specialize in a particular subdiscipline or track that will be chosen by the student following discussions with a three-person faculty advisory committee soon after arrival. Examples of current tracks include: (1) atmospheric/ocean/climate dynamics and physics; (2) atmospheric chemistry (emphasizing climatic interactions); and (3) paleoclimate studies. Additional course requirements for these tracks will be tailored to the needs of the individual student.

Physical Oceanography—The physical oceanography curriculum combines a comprehensive program of course work with individually tailored specialization to meet student needs. Presently defined "tracks" in the curriculum are (i) Observational Physical Oceanography, (ii) Theoretical Physical Oceanography, and (iii) the Atmospheric/Ocean Climate System. All tracks are similar in the entry-year fall quarter, diverging as students become more familiar with the field and in their interests. A faculty Curriculum Advisory Committee meets with students to tailor tracks to individual needs, or to create new tracks as appropriate. Students in all subdisciplines of physical oceanography are required to take SIO 203A–B, 214A, 212A. In any track, students are required to take sixteen four-unit graduate courses, of which twelve are covered during the first year. As part of the overall requirement, tracks include a breadth component of two or more four-unit courses in other scientific disciplines. These might come from the SIO core courses in other oceanographic disciplines (SIO 240, 260, 280) or from related graduate-level courses taught at UCSD.

Any exception to the policy above requires written approval by the department chair in consultation with the curriculum advisor.

Physical oceanography students are required to take the departmental examination after completing one year of graduate work at UCSD. The examination covers the material in the four required courses and in eight additional first-year graduate courses chosen by the student in consultation with the curriculum advisor.

The Department of Scripps Institution of Oceanography offers regular seminars in several areas of current interest. After the departmental exam, students in residence are strongly encouraged to enroll for credit in at least one one-unit seminar each quarter.

Geosciences of the Earth, Oceans, and Planets

Students admitted to GEO are assigned an advisor, who is a member of the three-person guidance committee. Based on the student's interests and the major affiliation of the advisor, students are assigned to a curricular group on admission. Although students may change curricular groups in the course of the year, they must choose which departmental exam they will take. Departmental exams have similar structures among the curricular groups within GEO (a written exam at the end of spring quarter and an oral exam before the beginning of fall quarter). The material covered is quite different so students must begin preparing for the particular exam from the start. Student support for the first year comes from a variety of sources including departmental fellowships and research grants. Students are

encouraged to begin a research project from the beginning and typically do not hold teaching assistant positions during their first year. Students may change advisors during their first year, and they must find an advisor by the end of the first year.

Geophysics—There is no single course of study appropriate to the geophysics curriculum; instead, the individual interests of the student will permit, in consultation with the first-year guidance committee, a choice of course work in seismology, geomagnetism, etc. The content of certain core courses usually taken during the first year (SIO 223A,B, SIO 225, SIO 227A, SIO 229, SIO 234) forms the basis for the written departmental examination. Students are also encouraged to participate in the Special Topics seminars (SIO 239).

Geosciences—The geosciences curriculum consists of a series of core courses and a series of research focus courses. All students whether pursuing an earth sciences or an oceanography degree are responsible for material in the core courses: Marine Geology (SIO 240), Marine Chemistry (SIO 260), and Physical Oceanography (SIO 210) during their first year of study. The research courses are selected from three themes: geochemistry, paleoclimate and Earth history, and geology and geophysics. A total of four research courses are required during the first year of study, with at least one from each theme. Additional courses offered by other curricular programs (e.g., geophysics, marine chemistry, and geochemistry) can be selected and scheduled depending on the student's background and interests any time during the student's career at SIO. Each student is also encouraged to participate in the Special Topics seminars (SIO 249) every quarter during the first two years of graduate study. Students wishing to graduate with an oceanography degree are also responsible for the material in SIO 280 (Biological Oceanography).

Marine Chemistry and Geochemistry—In their first year at SIO, students in this curricular group are required to take SIO 210, 260, and either SIO 280 or SIO 240, as well as three additional elective courses. In their second year, students are required to take a further three elective courses. Although the exact choice of such courses will depend on the student's research interests, these required electives must be four-unit courses that are offered at the graduate level, and that have been approved by the curricular group as suitable electives. A list of approved courses is on file at the Department of Scripps Institution of Oceanography. If a student desires to take (as a required elective) a course that is not already on this list, he or she should consult with one of the curricular group advisors to get approval.

Ocean Biosciences Program

Students admitted to OBP are assigned an advisor, who is a member of the three-person guidance committee. Students are assigned to a curricular group based on their interests. Although students may change curricular groups near the beginning of the year, they must commit to a curricular group early on because this determines which departmental exam they will take. The BO departmental exam is an oral exam based on first year course work while the MB exam is a written report and an oral presentation based on first year research; both are

administered after or near the end of Spring Quarter. During the year, students may be supported in a variety of ways. After the first year, the guidance committee is dissolved and the research advisor, and eventually the dissertation committee, provide guidance.

Biological Oceanography—The student will be expected to be familiar with the material presented in the following courses: SIO 210, 240, 260, 270 or 270A, 275A or 277, 280, and at least one of SIO 271, 282, or 294. Other course work ordinarily will be recommended by the student's advisory committee, usually including SIO 278 (or equivalent participatory seminar) one quarter of each year, a course in introductory parametric statistics, and at least one advanced-level course in physical, chemical, or geological oceanography. Participation in an oceanographic cruise (minimum of two weeks' duration) and service as a teaching assistant (one quarter) are required.

Marine Biology—Marine Biology graduate students are expected to gain research experience in one or more laboratories during their first year. In the spring term of their first year at SIO, students will take a departmental exam consisting of a presentation of their first-year research in the form of a paper and short talk to the curricular group, followed by a meeting with their first-year advisory committee. In this exam they also will be expected to demonstrate competence in the material covered in the following courses: SIO 210, 260, 280, 290A-B as well as any other course work recommended by the advisory committee. After their first year students are expected to enroll and actively participate in at least one seminar course (SIO 278, 296, or equivalent) per year that will provide in-depth knowledge and reading in selected areas, as well as practice presenting scientific material. In addition to the seminar requirement discussed above, second-year students will present their research in a special Marine Biology mini-symposium, held in spring quarter; students in the third year and beyond are expected to participate in the research presentation class (SIO 291) each year. Marine Biology students provide annual spring quarter oral or poster presentations of their research through their fifth year.

For the [Marine Biodiversity and Conservation M.A.S. program](#), refer to the separate *UC San Diego General Catalog* listing.

LANGUAGE REQUIREMENTS

The department has no formal language requirements. All students must be proficient in English.

QUALIFYING EXAMINATIONS

When the student has passed the departmental examination (described above under each academic program) and has completed an appropriate period of additional study, the department will recommend appointment of a doctoral committee that will supervise the student's performance and reporting of his or her research. The doctoral committee must be formed before the student may proceed to the qualifying examination

The doctoral committee will determine the student's qualifications for independent research by means of a qualifying examination, which will

be administered no later than the end of the third year. The nature of the qualifying examination varies between curricular groups. In biological oceanography, marine biology, geosciences, physical oceanography, applied ocean science, and climate sciences the student will be expected to describe his or her proposed thesis research and satisfy the committee, in an oral examination, as to mastery of this and related topics. In marine chemistry and geochemistry the student, in an oral examination, is required to present and defend a single research proposition in his or her specialized area. The student also is required to provide a written summary of the research proposition, with references, prior to the examination. In geophysics, the student presents an original research problem, in the form of a written proposition, to the doctoral committee. The student's oral presentation and defense of this proposition completes the examination.

DISSERTATION

A requirement for the Ph.D. degree is the submission of a dissertation and a final examination in which the thesis is publicly defended. Students are encouraged to publish appropriate parts of their theses in the scientific literature. Individual chapters may be published as research articles prior to completion of the dissertation.

DEPARTMENTAL PH.D. TIME LIMIT POLICIES

Students must complete a qualifying examination by the end of three years, and must be advanced to candidacy for the Ph.D. Degree by the end of four years. Total university support may not exceed seven years and total registered time at UCSD may not exceed eight years.

SPECIAL FINANCIAL ASSISTANCE AND FELLOWSHIPS

In addition to teaching assistantships, and graduate student researcher positions, fellowships, traineeships, and other awards available on a campus-wide competitive basis, the department has available a certain number of fellowships and graduate student researcher positions supported from research grants and contracts, or from industrial contributions.

CONCURRENT PH.D./ M.B.A. PROGRAM

The Department of Scripps Institution of Oceanography offers a concurrent degree program allowing interested Ph.D. students to complete an M.B.A. at the Rady School of Management. Students who are admitted to Scripps may, with the consent of their academic advisor, apply to Rady, through the usual admissions process, to begin the M.B.A. program no earlier than after the completion of their departmental exam, and no later than the fall quarter following their advancement to candidacy, in line with specific plans developed with their Scripps faculty advisors. An extensive independent study, jointly supervised by Scripps and Rady faculty, enables the student to develop linkages between Scripps and Rady studies. Interested students are encouraged to consult early with Rady

M.B.A. Admissions and with their Scripps academic advisors.

CONTIGUOUS BACHELOR'S/MASTER'S EARTH SCIENCES DEGREE PROGRAM

The program leading to a bachelor of science and a master of science degree in earth sciences is offered to undergraduate students who are enrolled in the earth sciences major, and to qualified students who are completing a specialization or minor in earth sciences. It is open only to UCSD undergraduates, and entails participation in research in an area of the earth sciences to be determined jointly by the student and a committee of earth sciences faculty members from the Scripps Institution of Oceanography Department. Applications will only be accepted during the final quarter of the applicant's junior year, or the first or second quarter of the senior year. A minimum undergraduate GPA of 3.0 overall and 3.3 in upper-division earth sciences courses is required for admission. Applications must include a written statement of purpose, a summary of the research proposal, and a letter of support from the potential M.S. thesis advisor. Students must complete requirements for the B.S. degree before they are enrolled in the M.S. program, and are expected to meet the requirements for the M.S. degree within three consecutive academic quarters after obtaining the B.S. Students may be dropped from the program if breaks in enrollment occur. The Scripps Institution of Oceanography Department does not have financial aid available for students enrolled in the contiguous B.S./M.S. program. Please contact the undergraduate education program office in Galbraith Hall, room 188, for information.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

1. The Planets (4)

Space exploration has revealed an astonishing diversity among the planets and moons in our solar system. The planets and their histories will be compared to gain insight and a new perspective on planet Earth. **Prerequisite:** none. (W)

10. The Earth (4)

An introduction to structure of the Earth and the processes that form and modify it. Emphasizes material which is useful for understanding geological events as reported in the news and for making intelligent decisions regarding the future of our environment. **Prerequisite:** none. (W)

12. History of the Earth and Evolution (4)

Evolution of the Earth from its origin in the early solar system to formation of continents and ocean basins, and how the planet became habitable. It examines the geologic record of evolution, extinction, plate tectonics, and climate changes through time. **Prerequisite:** none. (S)

15. Natural Disasters (4)

Introduction to environmental perils and their impact on everyday life. Geological and meteorological processes, including earthquakes, volcanic activity, large storms, global climate change, mass extinctions throughout Earth's history, and human activity that causes and prevents natural disasters. **Prerequisite:** none. (F)

16. Geology of the National Parks (4)

An introduction to fundamental concepts of geology and environmental science through the lens of the national park system. Topics covered include the geologic time scale; plate tectonics; igneous, metamorphic, and sedimentary processes; geomorphology; climate change; and environmental degradation. **Prerequisite:** none. (S)

20. The Atmosphere (4)

Descriptive introduction to meteorology and climate studies. Topics include global and wind and precipitation patterns, weather forecasting, present climate and past climate changes (including droughts, El Niño events), "greenhouse" gas effects, ozone destruction, the "little ice age," acid rain. **Prerequisite:** none. (W)

25. Climate Change and Society (4)

Climate change is one of the most complex and critical issues affecting societies today. This course will present the scientific evidence for climate change and its impacts and consider governmental policy responses and possible adaptation strategies. **Prerequisite:** none. (W)

30. The Oceans (4)

Presents modern ideas and descriptions of the physical, chemical, biological, and geological aspects of oceanography, and considers the interactions between these aspects. Intended for students interested in the oceans, but who do not necessarily intend to become professional scientists. **Prerequisite:** none. (F)

35. Water (4)

This course will examine the properties of water that make it unique and vital to living things. Origin of water on Earth and neighboring planets will be explored. Socially relevant issues concerning water use and contamination will be covered. **Prerequisite:** none. (S)

40. Life and Climate on Earth (4)

Explores life on Earth and its relationship to the environment—past, present, and future. Topics include origins of life, earth history, elemental cycles, global climate variability and human impacts on our environment. **Prerequisite:** none. (F)

50. Introduction to Earth and Environmental Sciences (6)

This course is an introduction to how our planet works, focusing on the formation and evolution of the solid earth, and the processes affecting both its surface and interior. Laboratories and substantial field component complement and extend the lecture material. Program and/or material fee may apply. **Prerequisite:** none. (F)

87. Freshman Seminar (1)

The freshman seminar program is designed to provide the new students with the opportunity to explore and intellectual topic with a faculty member in a small setting. Topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen. (P/NP grades only). (F,W,S)

90. Undergraduate Seminar (1)

Provides an introduction to earth sciences. Faculty members from departments in natural sciences, geosciences, and marine sciences will offer perspectives in these areas. Formerly ERTH 90. (Students may earn up to three units of credit of SIO 90 and/or ERTH 90.) **Prerequisite:** none.

96. Frontiers in the Earth Sciences (2)

An introduction to current research in the earth sciences. Background in science not required, but may be useful for some topics. Areas covered vary from year to year. **Prerequisite:** none.

99. Independent Study (2 or 4)

Independent reading or research on a problem by special arrangement with a faculty member. **Prerequisite:** lower-division standing, completion of thirty units of UCSD undergraduate study, a minimum UCSD G.P.A. of 3.0, and a completed and approved Special Studies form, UCSD Application for Enrollment Special Studies Courses 97, 98, 99.

UPPER-DIVISION

100. Introduction to Field Methods (4)

Mapping and interpretation of geologic units. Field work is done locally and the data are analyzed in the laboratory. There will be one mandatory weekend field trip to Anza Borrego State Park. Program and/or material fee may apply. **Prerequisite:** SIO 50 or consent of instructor. (F)

101. California Coastal Oceanography (4)

This course emphasizes oceanographic connections between physical and climate forcing and marine ecosystem responses using examples from and activities in the California coastal environment. The approach is inquiry-based, combining classroom and experiential learning to build critical and quantitative thinking and research insights and abilities. **Prerequisite:** Chem. 6A or consent of instructor. (F)

102. Introduction to Geochemistry (4)

An introduction to the chemical composition and evolution of the Earth and solar system. Applications of chemical methods to elucidate the origin and geologic history of the Earth and the planets, evolution of oceans and atmosphere, and human environmental impacts. **Prerequisites:** SIO 50, Chem. 6A-B-C, or consent of instructor. (W)

103. Introduction to Geophysics (4)

An introduction to the structure and composition of the solid earth. Topics include seismology, the gravity and magnetic fields, high-pressure geophysics, and concepts in geodynamics. Emphasis is on global geophysics, i.e., on the structure and evolution of the planet. **Prerequisites:** Math. 20A-B-C-D and Phys. 2A-B-C, SIO 50, or consent of instructor. SIO 160 recommended. (F)

104/255. Paleobiology and History of Life (6)

An introduction to the major biological transitions in Earth history from the origins of metabolism and cells to the evolution of complex societies. The nature and limitations of the fossil record, patterns of adaptation and diversity, and the tempo and mode of biological evolution. Laboratories and substantial field component complement and extend the lecture material. Program and/or material fee may apply. **Prerequisites:** Undergraduate: BILD 3 or consent of instructor. Graduate: graduate-level standing or consent of instructor. Graduate students, additionally, will give oral presentation or research paper. (W)

105. Sedimentology and Stratigraphy (4)

This course will examine sedimentary environments from mountain tops to the deep sea across a variety of time scales. The focus is to develop the skills to interpret stratigraphy and read the history of the Earth that it records. Laboratories and substantial field component complement and extend lecture material. Program and/or course material fee may apply. **Prerequisite:** SIO 50 or consent of instructor. (S)

110. Introduction to GIS and GPS for Scientists (4)

A hands-on introduction to science applications of geographic information systems and global positioning system. Students acquire data through GPS field surveys, design and construct GIS using ESRI's ArcGIS software, analyze spatial data, and present the results in a Web-based environment. **Prerequisite:** upper-division standing or consent of instructor. (W)

111/Phys. 111. Introduction to Ocean Waves and Tides (4)

This course will cover a broad range of physical oceanography topics including: linear dynamics of surface gravity waves, dispersion relations, spectral descriptions, group velocity, shoaling waves, ray theory, edge waves, Coriolis force, the tide generating force, LaPlace's tide equations, Kelvin waves. **Prerequisites:** Math. 20A-E and Phys. 2A-C or consent of instructor. (W)

112. Urban Landscapes (4)

Introduction to scientific principles, such as conservation of mass and energy and pattern formation, that govern the development of urban centers as complex systems. Contrasts between natural and urban landscapes will be highlighted, with examples including water routing and disease transmission. **Prerequisite:** upper-division standing or consent of instructor. (S)

115. Ice and the Climate System (4)

This course examines the Earth's cryosphere, including glaciers, ice sheets, ice caps, sea ice, lake ice, river ice, snow, and permafrost. We cover the important role of the cryosphere in the climate systems and its response to climate change. **Prerequisite:** Math 20A-D and Physics 2A-C or consent of instructor. (F)

117. The Physical Basis of Global Warming (4)

Introduction to the processes behind global warming, including the physics of the greenhouse effect, controls on greenhouse gases, atmospheric and oceanic circulation, climate feedbacks, relationships to natural climate variability, and global environmental issues related to global warming. **Prerequisites:** Math. 20D and Phys. 2C or consent of instructor. (S)

120. Introduction to Mineralogy (4)

Application of mineralogical and x-ray crystallographic techniques in earth sciences. Topics include symmetry, crystal structure, chemical, and physical properties of minerals with special emphasis on the common rock-forming minerals. Laboratory component includes polarizing microscope and x-ray powder diffraction methods. **Prerequisites:** SIO 50, or consent of instructor. (W)

135/236. Satellite Remote Sensing (4)

Satellite remote sensing provides global observations of Earth to monitor environmental changes in land, oceans, and ice. Overview, physical principles of remote sensing including: orbits, electromagnetic radiation, diffraction, electro-optical, and microwave systems. Weekly labs explore remote sensing data sets. Graduate students will also be required to write a term paper and do an oral presentation. **Prerequisites:** Undergraduate: Phys. 2A-B or Phys. 4A-B-C or consent of instructor. Graduate: graduate-level standing or consent of instructor. (S)

138. The Coral Reef Environment (4)

Assessment of the physical, chemical, and biological interactions that define the coral reef system; essential geography and evolutionary history of reefs; natural and human perturbations to the coral reef ecosystem; aspects of reef management and sustainability. **Prerequisite:** BILD 3, Math. 10A, Chem. 6B, or consent of instructor.

141/Chem. 174. Chemical Principles of Marine Systems (4)

Introduction to the chemistry and distribution of the elements in seawater, emphasizing basic chemical principles such as electron structure, chemical bonding, and group and periodic properties and showing how these affect basic aqueous chemistry in marine systems. **Prerequisite:** Chem. 6C with a grade of C- or better or consent of instructor. (S)

144/252A. Introduction to Isotope Geochemistry (4)

Radioactive and stable isotope studies in geology and geochemistry, including geochronology, isotopes as tracers of magmatic processes, cosmic-ray produced isotopes as tracers in the crust and weathering cycle, isotopic evolution of the crust and mantle. **Prerequisites:** Undergraduate: SIO 50, SIO 102, and 120 or consent of instructor. Graduate: graduate-level standing or consent of instructor. Graduate level requires student presentation. (W) (Not offered 2010-11).

148/248. Evolution of Earth's Biosphere (6)

Paleoecological development of marine and terrestrial environments during Earth's evolution. Ecological and chemical evolution of the oceans, atmosphere, biogeochemical cycles, and environments with particular emphasis on the long-term history and climate of the Earth's surface. Field trips required. Program and /or course material fee may apply. Graduate level additionally requires (1) term research paper, (2) researched oral presentations during the field trips, and (3) analysis of weekly readings from the current literature. **Prerequisites:** Undergraduate: SIO 104 or consent of instructor. Graduate: graduate-level standing or consent of instructor. (W) (Not offered 2010-11.)

152. Petrology and Petrography (4)

Mineralogical, chemical, textural and structural properties of igneous, metamorphic, and sedimentary rocks; their origin and relations to evolution of the Earth's crust and mantle. Laboratory emphasizes hand specimens and microscopic

studies of rocks in thin sections. **Prerequisites:** SIO 50, SIO 102, and SIO 120 or consent of instructor. (S)

154/254. Macroevolution (4)

Tempo and mode of evolution with emphasis on the marine fossil record. Large-scale patterns and trends in diversity, speciation, and extinction. Innovation, disparity, and adaptive radiation. Evolutionary turnover and the role of the environment in macroevolution. Graduate students will also be required to write a term paper and do oral presentation. **Prerequisites:** Undergraduate: SIO 104 or BLEB 150 or consent of instructor. Graduate: graduate-level standing or consent of instructor. (S)

155/251. Petrology and Geochemistry of the Solid Earth (4)

A geochemical and petrogenetic overview of the Earth and planets. Topics include formation and differentiation of the Earth into core, mantle, crust, and atmosphere/hydrosphere, generation of magma, and isotope and trace element geochemistry of igneous and metamorphic rocks. **Prerequisites:** Undergraduate: SIO 152 or consent of instructor. Graduate: graduate-level standing or consent of instructor. Graduate students, additionally, must submit a term paper in one aspect of work discussed during the quarter to be presented orally in class. (W) (Not offered 2010–11.)

160. Introduction to Tectonics (4)

The theory of plate tectonics attempts to explain how forces within the Earth give rise to continents, ocean basins, mountain ranges, earthquake belts, and most volcanoes. In this course we will learn how plate tectonics works. **Prerequisite:** SIO 50 or consent of instructor. (S)

162. Structural Geology (4)

Principles of stratigraphy and structural geology applicable to field geologic studies. Discussion and laboratory exercises. Two to three field trips required. Program and/or material fee may apply. **Prerequisites:** SIO 50 and SIO 100, or consent of instructor. (W)

170. Introduction to Volcanology (6)

This course teaches fundamental aspects of physical and chemical volcanology with a major field study component on an active volcano on Hawaii (two weeks early September). Subjects are introduced in lectures and reinforced and expanded in field exercises. Students return to campus to attend regular lectures and to prepare final field report during fall quarter. Additional fees may be required. **Prerequisites:** SIO 50, SIO 100, and Chem. 6A, or consent of instructor. Department stamp required. (F)

180/292. Communicating Science to Informal Audiences (4)

Students develop fundamental science communication and instructional skills through the understanding and application of learning theory, interpretive techniques, and pedagogical practices, which occur in the context of communicating ocean science concepts to a diverse audience at Birch Aquarium at Scripps. Graduate science students will develop fundamental communication and instructional skills through the understanding and application of learning theory, interpretive techniques, and pedagogical practices, including the development of an education/outreach plan to support a competitive research proposal. **Prerequisites:** (graduate) graduate-level standing or consent of instructor; (undergraduate) Chem. 6A or SIO 50 or BILD 1 or consent of instructor. (F)

182A. Environmental and Exploration Geophysics A (4)

First of two-part sequence on theory and application of practical geophysics. Lectures are supplemented by the collection of gravity, magnetic, and seismic data and production of field reports. Includes an introduction to MATLAB for analysis and interpretation of data. SIO 103 recommended. **Prerequisites:** Math. 20D and Phys. 2C, or consent of instructor. (W)

182B. Environmental and Exploration Geophysics B (4)

Second of two-part sequence on theory and application of practical geophysics. Lectures are supplemented by the collection of electrical and ground penetrating radar data. Continued use of MATLAB for analysis and interpretation

of geophysical data. **Prerequisite:** SIO 182A or consent of instructor. (S)

186. Interactions Between Humans and the Natural Environment (4)

As human population and resource usage have increased, the character of human interactions with nonhuman natural systems on Earth's surface has changed dramatically. This course will survey tools for characterizing this change, its nature, and projections into the future. **Prerequisites:** upper-division standing or consent of instructor. (W)

190. Special Topics in Earth Sciences (4)

A seminar course designed to treat emerging or topical subjects in the earth sciences. Involves reading from the literature and student participation in discussion. Topics vary from year to year. Enrollment by permission of instructor. (Students may enroll in SIO 190 and/or EARTH 190 no more than two times for credit.) **Prerequisite:** upper-division standing, a minimum UCSD GPA of 3.0 or consent of instructor.

192. Senior Seminar in Scripps Institution of Oceanography (1)

The Senior Seminar Program is designed to allow SIO senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in SIO (at the upper division level). Topics will vary from quarter to quarter. Senior Seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors.

194. Research Seminar in Washington, D.C. (4)

Course attached to a six- to eight-unit internship taken by students participating in the UCDC Program. Involves weekly seminar meetings with faculty and teaching assistant and a substantial research paper. **Prerequisites:** departmental approval. Participation in the UCDC Program during quarter enrolled in seminar.

195. Methods of Teaching Earth Sciences (4)

Introduction to teaching earth sciences class section in a lower-division class, hold office hours, assist with examinations. This course counts only once towards the major. **Prerequisites:** junior or senior earth sciences major with GPA of 3.0 or an A in the course, overall GPA of 3.0 or higher, ninety units or more, and consent of instructor, plus department stamp.

196. Honors Thesis Research (4)

Independent research on a problem in earth sciences by special arrangement with a faculty member (letter grade only). Students may take EARTH 196 and/or SIO 196 two times for credit. **Prerequisites:** completed ninety units of courses including twelve units of EARTH and/or SIO courses. Achieved a GPA of 3.3 overall and 3.5 in SIO/ERTH courses. Submitted to EARTH Steering committee, and had approved, an honors thesis research proposal. Department stamp.

197. Earth Science Internship (2 or 4)

The earth science internship program is designed to complement the program's academic curriculum with practical field experience. **Prerequisites:** completion of ninety units with a GPA of 2.5, and a completed and approved Special Studies form, UCSD Application for Enrollment Special Studies Courses 197, 198, 199, and department stamp.

198. Directed Group Study (2–4)

This course covers a variety of directed group studies in areas not covered by formal SIO courses. (P/NP grades only.)

199. Independent Study for Undergraduates (4)

Independent reading or research on a problem. By special arrangement with a faculty member. (P/NP grades only.)

BS/MS COURSE

228. Research Seminar (2)

A three-quarter required sequence for B.S./M.S. earth sciences students to prepare students for thesis writing. **Prerequisites:** current earth sciences B.S./M.S. student. Department stamp required.

GRADUATE

200A. Computational Ocean Acoustics and Signal Processing I (4)

Overview of ocean acoustics. Acoustics Wave Equation with some analytic solution techniques. Ray Methods. Introduction to Spectral and Normal Modes methods. Introduction to beamforming including matched field processing. Computer programs will be constructed on all subjects covered. **Prerequisite:** graduate standing or consent of instructor. Kuperman (F)

200B. Computational Ocean Acoustics and Signal Processing II (4)

Continuation of SIO 200A. Range dependent propagation models including adiabatic and coupled mode models and parabolic equations. More advanced topics in matched field processing. **Prerequisites:** graduate standing and SIO 200A or consent of instructor. Kuperman (W)

200C. Computational Ocean Acoustics and Signal Processing III (4)

Continuation of SIO 200B. Modeling interference such as ambient noise. Time domain methods. Matched field tomography, nonlinear optimization methods, and geophysical inversion. **Prerequisites:** graduate standing and SIO 200B or consent of instructor. Kuperman (S)

201. Geological Record of Climate Change (4)

Introduction to geological archives; the tools for paleoclimate reconstruction and a sampling of important issues from the geological record, including the development of "greenhouse" and "icehouse" worlds, the origin and evolution of glacial cycles, and the origin of "millennial scale" climate variability. **Prerequisite:** chemistry and physics required for graduate admission to SIO, SIO 101 or equivalent, or consent of instructor. Charles (S)

202A–B. Fundamentals of Wave Physics (4–4)

This two-quarter sequence is designed to introduce a broad background of students to basic principles of wave physics, including generation, propagation, dispersion, refraction, diffraction, reflection, waveguides, etc. A variety of wave motions of environmental relevance, including acoustic, ocean surface and internal (SIO 202A), optical and seismic (SIO 202B) are used to illustrate these principles. In-class experiments, data collection, and analysis exercises are incorporated. **Prerequisites:** calculus and partial differential equations. Buckingham, Kuperman, Stramski, Melville, Hildebrand, Dorman (W,S)

203A. Introduction to Applied Mathematics I (4)

(Cross-listed with MAE 294A.) Review of exact methods for ordinary differential equations. Expansions about regular and irregular singular points. Introduction to asymptotic expansions. Approximate methods for nonlinear differential equations. Regular and singular perturbation theory. Additional topics depending upon the interests of the instructor. **Prerequisites:** Math. 110, Math. 120A, or consent of instructor.

203B. Introduction to Applied Mathematics II (4)

(Cross-listed with MAE 294B.) Asymptotic methods: method of steepest descent (if not covered in I) WKB, method of multiple scales, boundary layer theory. Elements of complex analysis. **Prerequisite:** MAE 294A or SIO 203A or consent of instructor.

203C. Introduction to Applied Mathematics III (4)

(Cross-listed with MAE 294C.) Partial differential equations: characteristics, similarity solutions, Green's functions, images, wave equation, diffusion equation, Laplace's equation. Applications to continuum mechanics, potential fields, and transport phenomena such as diffusion, linear and nonlinear waves, Burger's equation and shocks. Other topics according to the interests of the instructor. **Prerequisite:** MAE 294B or SIO 203B or consent of instructor.

204. Advanced Acoustics (4)

Theory of radiation, transmission, and scattering of sound with special application to ocean acoustics. Students who have taken SIO 204B for credit may not get credit for SIO 204. **Prerequisite:** graduate standing or consent of instructor. Buckingham (W)

206. Land Surface Hydrology (4)

Advanced introduction to natural processes that govern water occurrence and transport over the land surface. Principles of global hydrologic cycle and land-surface water balance, runoff and fluvial geomorphology, infiltration and subsurface water flow, evaporation and plant transpiration. **Prerequisite:** graduate standing or consent of instructor. Staff (S)

207A. Fundamentals of Digital Signal Processing (4)

Discussion of discrete-time signals and systems, Discrete-Time Fourier Transform (DFT) and window functions, Fast Fourier Transform (FFT), design of Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) digital filters and their implementations, finite word length effects, applications to data acquisition and analysis. **Prerequisite:** graduate standing or consent of instructor. Hodgkiss (F)

207B. Digital Signal Processing I (4)

Discrete random signals; conventional (FFT based) spectral estimation. Coherence and transfer function estimation; model-based spectral estimation; linear prediction and AR modeling, Levinson-Durbin algorithm and lattice filters, minimum variance spectrum estimation. Cross-listed with ECE 251A. (Recommended prerequisites: ECE 153 in addition to either ECE 161 or 161A and SIO 207A or equivalent background.) SIO 207A is intended for graduate students who have not had an undergraduate course in DSP. **Prerequisite:** graduate standing. Hodgkiss, Rao (W)

207C. Digital Signal Processing II (4)

Adaptive filter theory, estimation errors for recursive least squares and gradient algorithms, convergence and tracking analysis of LMS, RLS, and Kalman filtering algorithms, comparative performance of Wiener and adaptive filters, transversal and lattice filter implementations, performance analysis for equalization, noise canceling, and linear prediction applications. Cross-listed with ECE 251B. (Recommended prerequisite: ECE 251A or ECE 251AN.) **Prerequisites:** graduate standing, for ECE 251A (for ECE 251B; SIO 207B (for SIO 207C)). Hodgkiss (S)

207D. Array Processing (4)

The coherent processing of data collected from sensors distributed in space for signal enhancement and noise rejection purposes or wavefield directionality estimation. Conventional and adaptive beamforming. Matched field processing. Sparse array design and processing techniques. Applications to acoustics, geophysics, and electromagnetics. Cross-listed with ECE 251D. (Recommended prerequisite: ECE 251A or ECE 251AN.) **Prerequisites:** graduate standing; ECE 251C (for ECE 251D); SIO 207C (for SIO 207D). Hodgkiss (F)

208. Seminar in Applied Ocean Sciences (1)

Topics in applied ocean sciences. One-hour seminar. (S/U grades only). Staff (F,W,S)

209. Special Topics (1-4)

Within the next few years, lectures on various special subjects will be offered by members of the staff. The emphasis will be on topics that reveal the interdependence of the biological, chemical, geological, and physical processes operating in the oceans. (S/U grades permitted.) Staff (F,W,S)

210. Physical Oceanography (4)

Physical description of the sea; physical properties of seawater, methods and measurements, boundary processes, regional oceanography. **Prerequisite:** graduate standing or consent of instructor. Hendershott, Talley (F)

211A-B. Ocean Waves (4-4)

Propagation and dynamics of waves in the ocean including the effects of stratification, rotation, topography, wind, and nonlinearity. **Prerequisite:** graduate standing or consent of instructor. Hendershott, Guza, Winant (W,S)

212A. Geophysical Fluid Dynamics I (4)

The equations of motion for rotating stratified flow and their application to the atmospheric and oceanic dynamics; Ekman layer dynamics, potential vorticity dynamics, the quasigeostrophic approximation, theories of the wind-driven oceanic circulation, theories of the atmospheric Hadley circulation, geostrophic adjustment, and baroclinic instability. **Prerequisite:** graduate standing or consent of instructor. Cessi, MacKinnon, Young (W,S)

212B. Geophysical Fluid Dynamics II (5)

The equations of motion for rotating stratified flow and their application to the atmospheric and oceanic dynamics; Ekman layer dynamics, potential vorticity dynamics, the quasigeostrophic approximation, theories of the wind-driven oceanic circulation, theories of the atmospheric Hadley circulation, geostrophic adjustment, and baroclinic instability. **Prerequisites:** graduate standing or consent of instructor. Cessi, MacKinnon, Salmon, Young (W,S)

213. Turbulence and Mixing (4)

Mixing mechanisms, their identification, description, and modeling. Introduction to turbulence, semi-empirical theories, importance of coherent structures, effects of stratification and rotation on turbulent structure, entrainment and mixing. Cross-listed with MAE 216. (S/U grades permitted.) Armi (S)

214A. Introduction to Fluid Mechanics (4)

A survey of classical problems in fluid mechanics and approximate techniques of analysis. Topics include conservation equations, straight laminar flows, low and high Reynolds number laminar flow, stability of laminar flows, turbulent flow. **Prerequisite:** graduate standing or consent of instructor. Hendershott, Winant (F)

214B. Environmental Fluid Dynamics (4)

Single-layer flows with a free surface, two-layer flows including exchange flows in harbors, estuaries, seas, and buildings. Continuously stratified flows with meteorological and oceanographic applications. Topographic effects, plumes, jets, and thermals. Planetary boundary layers. **Prerequisite:** graduate standing or consent of instructor. Armi (S)

215A. Applied Mathematics for Oceanographers I (4)

Intended for first-year graduate students who seek a quantitative way to describe how the ocean works: vector analysis, complex quantities, Fourier and Laplace transforms, ordinary differential equations, non-homogeneous ordinary differential equations, initial and boundary value problems, Heat and Laplace equations. **Prerequisite:** graduate standing or consent of instructor. Hendershott, Lerley, Winant (F)

215B. Applied Mathematics for Oceanographers II (4)

An introduction to the mathematical description of waves, beginning with a description of the linear oscillator, and followed by normal modes, the flexible string, membranes, water waves, ray theory, method of characteristics, and basic linear algebra. **Prerequisites:** graduate standing and SIO 215A or consent of instructor. Hendershott, Lerley, Winant (W)

215C. Applied Mathematics for Oceanographers III (4)

An introduction to Perturbation theory, including regular and singular expansions, Poincaré's method, two-scale method, the WKB approximation and boundary layer theory. **Prerequisites:** graduate standing and SIO 215B or consent of instructor. Hendershott, Lerley, Winant. (S)

216. Introduction to the Physics of Complex Systems (4)

Emergent complex behavior in nonlinear, dissipative, open dynamical systems will be investigated by studying fundamental properties and their manifestation in examples drawn from the physical and biological sciences. Topics to include fractals, chaos, self-organization, artificial life, and neural networks. **Prerequisite:** graduate standing or consent of instructor. (S/U grades permitted.) Werner (W)

217A. Atmospheric and Climate Sciences I (4)

Thermodynamics and statics of dry and moist air, atmospheric composition, Earth radiation budget, vertical structure of the atmosphere, global energy balance, thermodynamic feedbacks in the climate system. **Prerequisite:** graduate standing or consent of instructor. (S/U grades permitted.) (F)

217B. Atmospheric and Climate Sciences II (4)

Structure of midlatitude synoptic systems; equations of motion, scale analysis, elementary applications and wave solutions; baroclinic instability theory; atmospheric general circulation and energetics; tropical dynamics; relationships between atmospheric dynamics, CO₂ clouds, precipitation, and other weather and climate phenomena. **Prerequisites:**

graduate standing and SIO 217A or equivalent background, or consent of instructor. J. Norris (W)

217C. Atmospheric and Climate Sciences III (4)

Physical and dynamical processes that determine climate and climate change; role of aerosols; water vapor; CO₂ and other greenhouse gases; cloud-radiative interactions; atmospheric general circulation; role of convection; tropical climate including El Niño. **Prerequisites:** graduate standing and SIO 217A and SIO 217B or equivalent background, or consent of instructor. Ramanathan (S)

217D. Atmospheric and Climate Sciences IV (4)

Atmospheric chemistry that impacts climate change, including photochemical reactions, ozone chemistry, and aerosol evolution in the troposphere and stratosphere. Atmospheric applications of catalytic cycles, heterogeneous chemistry, and microphysical processes will include the ozone hole, urban smog, and aerosol-cloud interactions. **Prerequisites:** undergraduate general physics, chemistry, and mathematics (including differential equations). Russell (S)

219. Special Topics in Physical Oceanography (1-4)

Example topics are case histories and methods in physical oceanography, theories of the ocean circulation, numerical methods in large-scale ocean and atmospheric models, and natural electromagnetic phenomena in the earth and the oceans. (S/U grades permitted.) Staff (F,W,S)

220. Observations of Large-Scale Ocean Circulation (4)

General circulation of the oceans; tropical, subtropical, and high-latitude current systems of the Atlantic, Indian, and Pacific Oceans and marginal seas; ocean heat flux and thermohaline circulations; observational basis of large-scale dynamics. **Prerequisite:** graduate standing or consent of instructor. (S/U grades permitted.) Roemmich (S)

221A. Analysis of Physical Oceanographic Data (A) (4)

Fundamental elements of analysis of geophysical and oceanographic time series, including sampling problems, least squares techniques, spectral analysis, interpretation of series, design of experiments. **Prerequisite:** consent of instructor. Pinkel (F)

221B. Analysis of Physical Oceanographic Data (B) (4)

Techniques for analysis of physical oceanographic data involving many simultaneous processes including probability densities, sampling errors, spectral analysis, empirical orthogonal functions, correlation, linear estimation, objective mapping. **Prerequisite:** graduate standing or consent of instructor. (S/U grades permitted.) Rudnick (W)

221C. Data Analysis Laboratory (4)

This course is to give students practical experience with analysis techniques. Students complete three projects. Topics include empirical orthogonal functions, objective mapping, complex demodulation, inference of geostrophic flow, minimization of CTD salinity spiking, isolation of wind-driven currents, wavelets. **Prerequisite:** graduate standing or consent of instructor. (S/U grades only.) Rudnick, Gille (F)

222. Underwater Bioacoustics (4)

Introductory course to familiarize a broad spectrum of participants to underwater sound and its relationship to underwater animals. Basic physics of sound propagation, use of sound to study underwater animals and, the sounds made by the animals themselves for echolocation and communication will be covered. **Prerequisite:** consent of instructor. (S/U grades permitted.) J. Hildebrand, Jaffe (W)

223A. Geophysical Data Analysis I (4)

Probability and statistics and their application to make inferences from geophysical data: point processes, distributions, maximum likelihood estimation, hypothesis testing and confidence intervals, least squares, density estimation, interpolation and smoothing. **Prerequisite:** graduate standing or consent of instructor. Agnew, C. Constable (W)

223B. Geophysical Data Analysis II (4)

Analysis of geophysical measurements, especially time series, Fourier theory digital signal processing, and spectral analysis. **Prerequisites:** graduate standing and SIO 223A or consent of instructor. Agnew, C. Constable (S)

224. Internal Constitution of the Earth (4)

An examination of current knowledge about the composition and state of the earth's interior revealed by geophysical observations. Seismic velocity and mass density distributions; equations of state; phase changes; energy balance and temperatures; constraints on composition from extraterrestrial samples and exposed rocks; spherical and aspherical variations of properties. **Prerequisites:** calculus and differential equations, basic chemistry and physics, or consent of instructor. Masters (S)

225. Physics of Earth Materials (4)

Mathematics and physics of continuous media, focusing on geophysical problems. Topics include deformation, stress, conservation laws, elasticity, attenuation, viscoelasticity, fracture mechanics, and porous media. **Prerequisite:** graduate standing or consent of instructor. Agnew, Fialko (W)

226. Introduction to Marine Geophysics (4)

Methods of exploration geophysics with emphasis on those useful at sea. Magnetic and gravitational potential field methods, multi-beam echo sounding reflection and refraction seismology will be covered. Recent papers from the literature will also be read and discussed. **Prerequisites:** differential equations; at least one geology course. (S/U grades permitted.) Dorman, Hildebrand (S)

227A. Introduction to Seismology (4)

Introduction to seismometers and seismograms; stress and strain; potentials and the wave equation; geometrical ray theory and travel times in layered media; representation of seismic sources; WKBJ and synthetic seismograms; seismic hazards and other applications of seismology. **Prerequisite:** consent of instructor. (S/U grades permitted.) Shearer (F)

227B. Advanced Seismology I (4)

Introduction to low-frequency digital data; continuum mechanics and the equations of motion; free oscillation solutions; construction of Earth models; excitation of free-oscillations and source mechanism retrieval; array processing of long-period data; modelling aspherical structure; surface waves. **Prerequisite:** consent of instructor. (S/U grades permitted.) Staff (W)

227C. Advanced Seismology II (4)

High-frequency wave propagation; methods for computing synthetic seismograms including WKBJ, reflectivity and finite differences; body-wave spectra; attenuation of body waves; source physics; reflection and refraction seismology; seismic tomography. **Prerequisite:** consent of instructor. (S/U grades permitted.) Staff (S)

229. Gravity and Geomagnetism (4)

Introduction to potential theory, with applications to gravity and geomagnetism. Topics include the geoid, spherical harmonics, Laplace's equation, the Dirichlet problem on a sphere, and Fourier methods. Gravity anomalies and geomagnetic field modeling and sources are discussed; also paleomagnetic observations. **Prerequisite:** graduate standing or consent of instructor. (S/U grades permitted.) C. Constable, Parker (S)

230. Introduction to Inverse Theory (4)

Solution of linear and nonlinear inverse problems in geophysics by optimization techniques such as norm minimization and linear programming. Construction of models by regularization; inference by bounding functionals. Illustrations from gravity, geomagnetism, and seismology. **Prerequisite:** graduate standing or consent of instructor. (S/U grades permitted.) (W)

231. Introduction to EM Methods in Geophysics (4)

Introduction to electromagnetic methods for both global geophysics and applied/exploration methods. Covers history of EM induction, conduction in rocks, binary mixing laws, self potential, induced polarization, DC resistivity, magnetotellurics, geomagnetic depth sounding, elementary inverse methods, global conductivity structure, and marine EM methods. **Prerequisite:** graduate standing or consent of instructor. (S/U grades permitted.) S. Constable (F)

233. Introduction to Computing at SIO (4)

Introduction to the SIO computing environment and common software tools in geophysics and other disciplines.

Topics include UNIX, Matlab, Postscript, GMT, LaTeX, HTML, and a scientific programming language such as C or Fortran90. **Prerequisite:** graduate standing or consent of instructor. (S/U grades permitted.) Agnew, Shearer (F)

234. Geodynamics (4)

A general course on the dynamics and kinematics of the solid earth based on the text of Turcotte and Schubert. Topics include plate tectonics, heat flow, lithospheric cooling, flexure, viscous flow, gravity, crustal dynamics, and other related topics. **Prerequisite:** graduate standing or consent of instructor. (S/U grades permitted.) Sandwell (W)

236. Satellite Remote Sensing (4)

Satellite remote sensing provides global observations of Earth to monitor environmental changes in land, oceans, and ice. Overview physical principles of remote sensing including: orbits, electromagnetic radiation, diffraction, electro-optical, and microwave systems. Weekly labs explore remote sensing data sets. Graduate students will also be required to write a term paper and do an oral presentation. Conjoined with SIO 135. **Prerequisite:** graduate standing or consent of instructor. Sandwell (S)

237A. Introduction to Ocean Optics (4)

Overview of ocean optics. Concepts in radiometry. Inherent and apparent optical properties. Radiative transfer equation. Light absorption and scattering by seawater constituents. Optics of air-water interface. Light fields within and leaving the ocean. Optics of marine particles. Measurement methods and instrumentation. **Prerequisites:** basic physics and differential calculus, or consent of instructor. Stramski (F)

237B. Ocean Color Remote Sensing (4)

Overview of ocean color satellite missions. Concepts in radiometry. Inherent and apparent optical properties. Radiative transfer equation. Solar radiation and elements of atmospheric optics. Propagation of light across the sea surface and within the ocean. Light absorption and scattering by seawater. Water-leaving radiance and remote-sensing reflectance. Ocean color algorithms and applications. **Prerequisites:** basic physics and differential calculus, or consent of instructor. (S/U grades permitted.) Stramski (F)

237C. Optical-Biological Interactions in the Ocean (2)

A discussion class with emphasis on the interaction of light with marine plankton. Topics will include light absorption, fluorescence, and scattering by phytoplankton and effects of growth conditions on phytoplankton optical properties. Classic and contemporary papers dealing with these topics will be discussed. **Prerequisites:** basic physics and biology, or consent of instructor. (S/U grades only.) Stramski (F)

238. Sensor Networks (4)

Characteristics of chemical, biological, seismic, and other physical sensors; signal processing techniques supporting distributed detection of salient events; wireless communication and networking protocols supporting formation of robust sensor fabrics; current experience with low power, low cost sensor deployments. Conjoined with MAE 149 and ECE 156. **Prerequisite:** upper-division standing and approval of instructor, or graduate student in science or engineering. (S/U grades permitted.) Hodgkiss (S)

239. Special Topics in Geophysics (1-4)

Special course offerings by staff and visiting scientists. Example topics are seismic source theory, geophysical prospecting methods, dislocation theory and seismic mechanisms, tectonic interpretation of geodetic data, and dynamo theory. (S/U grades permitted.) Staff (F,W,S)

240. Marine Geology (4)

Introduction to the geomorphology, sedimentation, stratigraphy, vulcanism, structural geology, tectonics, and geological history of the oceans. **Prerequisites:** the physics and chemistry required for admission to the graduate curriculum in SIO, and ES 101 or equivalent, or consent of instructor. Cande, Charles, Hilton (F)

242. Marine Biotechnology (4)

The class will contain lectures discussing current topics and new technologies in the marine sciences (biology, chemistry). Faculty that are part of the marine biotechnology training grant will lecture on their own research and techniques that are being used. The students will select and present a paper that is an application of topics discussed.

The areas of genomics, proteomics, expression analysts, mutagenesis, microbial diversity, etc., will be presented. Bartlett (F)

243. Marine Paleoecology (4)

Paleoecology of marine plankton, nekton, and benthos. Patterns and changes in marine communities and ecosystems over geological time in relation to changes in the physical, chemical, and geological environment and biotic interactions. The preservation filter and inference of ecological processes from fossils and biogeochemical proxies. Biotic interchanges, incumbency, escalation and trends, mass extinctions, and recovery. Lectures, seminar discussion, laboratory, and field trips. **Prerequisites:** bachelor's degree in science or consent of instructor; open to undergraduates with completion of SIO 104 and either BIEB 130 or BIEB 140, or equivalent. Jackson, Staff (S)

244. Shape and Structure of the Ocean Floor (4)

Description and explanation of the structural geomorphology of oceanic crust, and of the tectonic and volcanic processes responsible for it. Description and interpretation of deep-sea sedimentary landforms (e.g., deep-sea fans, drifts, bedforms) and of the bottom currents that shape them. Offered in alternate years. **Prerequisite:** any previous graduate/undergraduate earth science or geology course. Lonsdale (W)

245. Sedimentary Geochemistry for Chemical Paleoceanography (2)

Chemical paleoceanography will be the focus, emphasis on seawater and/or sediment chemical and isotopic records; discussions will concentrate on some of the following isotopic systems: Li, B, C, O, S, Sr, and Nd, and on select chemical tracers such as Cd and Ir; on the marine phases that most reliably record seawater chemical and isotope compositions; and on diagenetic problems, how to identify and deal with them. **Prerequisite:** SIO 260 and consent of instructor. (Offered in alternate years.) (S/U grades permitted.) Kastner (S)

246. Global Tectonics and Basin Formation (4)

Plate tectonics of the crust and upper mantle, examining a variety of environments from ridge crests to continental margins, including plate interiors, with an emphasis on basin formation in these tectonic settings. **Prerequisite:** graduate standing. Cande, Driscoll (W)

247. Rock Magnetism and Paleomagnetism (4)

Rock magnetism and acquisition of magnetic remanence in geological materials as well as laboratory procedures and data analysis (isolating remanence components and statistical approaches). The paleomagnetic literature will be used to illustrate applications in geological and geophysical problems. **Prerequisites:** one year each of college-level physics and geology; mathematics through calculus. (S/U grades permitted.) Tauxe (S)

248. Evolution of Earth's Biosphere (4)

Paleoecological development of marine and terrestrial environments during Earth's evolution. Ecological and chemical evolution of the oceans, atmosphere, biogeochemical cycles, and environments with particular emphasis on the long-term history and climate of the Earth's surface. Substantial field component (three weekend field trips in San Diego County) complement and extend the lecture material. Additionally, at graduate level oral presentation or research paper required. Conjoined with SIO 148. **Prerequisite:** graduate-level standing or consent of instructor. Jackson, R. Norris (S)

249. Special Topics in Marine Geology (1-4)

Special course offerings by staff and visiting scientists. (S/U grades only.) Staff (F,W,S)

251. Petrology and Geochemistry of the Solid Earth (4)

A geochemical and petrogenetic overview of the Earth and planets. Topics include formation and differentiation of the Earth into core, mantle, crust, and atmosphere/hydrosphere, generation of magma, and isotope and trace element geochemistry of igneous and metamorphic rocks. Graduate students, additionally, must submit a term paper in one aspect of work discussed during the quarter to be presented orally in class. Conjoined with SIO

155. **Prerequisite:** graduate-level standing or consent of instructor. Castillo (W)
- 252A. Introduction to Isotope Geochemistry (4)**
Radioactive and stable isotope studies in geology and geochemistry, including geochronology, isotopes as tracers of magmatic processes, cosmic-ray produced isotopes as tracers in the crust and weathering cycle, isotopic evolution of the crust and mantle. Graduate level requires student presentation. Conjoined with SIO 144. **Prerequisite:** graduate-level standing or consent of instructor. Hilton, Keeling, Lal (W)
- 252B. Advanced Isotope Geochemistry I (4)**
An advanced treatment of noble gas and stable isotope geochemistry. Offered in alternate years with SIO 252C. **Prerequisites:** SIO 252A/SIO 144. Hilton, Keeling, Lal (S)
- 252C. Advanced Isotope Geochemistry II (4)**
An advanced treatment of radiogenic and cosmogenic isotope geochemistry. Offered in alternate years with SIO 252B. **Prerequisites:** SIO 252A/SIO 144. Lal (S)
- 253. Interactions of Oceanic Plates and the California Margin (4)**
How the geology of Alta and Baja California has been shaped, especially in the past 30MYR, by changing patterns of ocean plates and microplates that have subducted beneath the North American Margin, slid obliquely past it, and captured continental crust. **Prerequisites:** graduate standing, or consent of instructor and any other earth science class for undergraduates. Lonsdale, Castillo (S)
- 254. Macroevolution (4)**
Tempo and mode of evolution with emphasis on the marine fossil record. Large-scale patterns and trends in diversity, speciation, and extinction. Innovation, disparity, and adaptive radiation. Evolutionary turnover and the role of the environment in macroevolution. Additionally, oral presentation or research paper required. Conjoined with SIO 154. **Prerequisite:** graduate-level standing or consent of instructor. Jackson, R. Norris (S)
- 255. Paleobiology and History of Life (6)**
An introduction to the major biological transitions in Earth history from the origins of metabolism and cells to the evolution of complex societies. The nature and limitations of the fossil record, patterns of adaptation and diversity, and the tempo and mode of biological evolution. Laboratories and substantial field component complement and extend lecture material. Program and/or material fee may apply. Graduate students, additionally, will give oral presentation or research paper. Conjoined with SIO 104. **Prerequisite:** graduate-level standing or consent of instructor. Jackson, R. Norris (S)
- 255A. Topics in Paleobiology and History of Life (3)**
Lecture topics on the major transitions in the evolutionary history of life including origin of metabolisms, microbes, major eukaryote radiations, ecosystems and societies. **Prerequisite:** graduate standing or consent of instructor. Jackson, R. Norris (S)
- 256A. Introduction to Field Geology (4)**
Principles of stratigraphy and structural geology applicable to field geologic studies. Discussion and laboratory exercises. **Prerequisites:** consent of instructor. Brown (W)
- 256L. Structural Geology (4)**
Principles of stratigraphy and structural geology applicable to field geologic studies. Discussion and laboratory exercises. Two to three field trips required. Graduate students will complete an in-depth literature-based focused study consisting of a written report and a forty-five-minute seminar on topics related to structural geology. **Prerequisite:** graduate-level standing or consent of instructor. (W)
- 257. Seminar in Petrology (4)**
Discussion of current research in petrology and mineralogy. (S/U grades permitted.) Castillo (W)
- 259. Atmospheric Geochemistry (4)**
Topics in this introductory course include: structure and composition of the atmosphere; chemistry and isotopes of natural and man-made carbon-, nitrogen-, and sulfur-bearing trace gases; ozone and hydroxyl radical; halogenated gases; air-sea exchange; aerosols; climatic effects. (S/U grades permitted.) Weiss (S)
- 260. Marine Chemistry (4)**
Chemical description of the sea; the distribution of chemical species in the world oceans, and their relationships to physical, biological, and geological processes. Aluwihare, Barbeau, R. Keeling (W)
- 261. Energetics and Kinetics in Marine Systems (4)**
This course teaches the physical chemical principles that control chemistry in marine systems. After a basic introduction to thermodynamics and its application to an understanding of the marine environment, the emphasis will be on the study of a variety of kinetic processes. **Prerequisite:** graduate standing or consent of instructor. Dickson (S)
- 262. Seminar in Marine Natural Products (1)**
Students will give seminars on current research topics in marine natural products chemistry. **Prerequisite:** graduate standing or consent of instructor. (S/U grades only.) Fenical, W. Gerwick, Moore (F,W,S)
- 263. Aqueous Chemistry (4)**
This course emphasizes the chemical principles that control basic aqueous chemistry in marine systems. The focus will be to show that the geochemistry of the various elements in sea water and biological systems can be understood as a consequence of basic general chemical concepts such as electron structure, chemical bonding, and group and periodic properties. **Prerequisite:** undergraduate chemistry equivalent to UCSD Chemistry 6 sequence. Dickson (F)
- 264. Special Topics in Marine Natural Products Chemistry (3)**
This course provides the foundation for advanced study in the field of marine natural products chemistry. Topics vary from the history of natural products to the organic chemistry of terpenes, alkaloids, acetogenins, and other natural product classes. Varying by topic quarterly, this class is given each quarter and may be repeated. **Prerequisite:** one year general organic chemistry. (S/U grades only.) Fenical, W. Gerwick, Moore (F,W,S)
- 267. Biogeochemistry (4)**
Examines quantitatively the impact of the biota on the chemistry of the atmosphere and ocean. Emphasis given to isotopes as tracers of biogeochemical processes. Attention given to paleoclimatic and paleoatmospheric data from ice cores to reveal mechanisms. **Prerequisite:** graduate standing or consent of instructor. Severinghaus, R. Keeling (S)
- 268. Seminar in Geochemistry and Marine Chemistry (1)**
Student seminars on topics related to geochemistry and the chemistry of the marine environment. (S/U grades only.) Dickson (S)
- 269. Special Topics in Marine Chemistry (1-4)**
Special course offerings by staff and visiting scientists. (S/U grades permitted.) Staff (F,W,S)
- 270. Pelagic Ecology (4)**
An analysis of the concepts and theories used to explain the biological events observed in the water column. Alternate years. **Prerequisites:** SIO 210, 280, or consent of instructor. Checkley, Ohman (S)
- 270A. Fisheries Oceanography (4)**
Aspects of marine ecology relevant to the reproduction, survival, and distribution of commercially important marine species. Alternate years only. **Prerequisite:** graduate standing or consent of instructor. Checkley (S)
- 271. Marine Zooplankton (5)**
Lectures and laboratories treating the morphological, behavioral, and life history variations of the principal phyla of planktonic invertebrates and heterotrophic protists. Constraints of life at low Reynolds numbers; principles of allometry; growth processes of heterotrophic organisms. **Prerequisite:** graduate standing or consent of instructor. (S/U grades permitted.) Ohman (S)
- 272. Biogeography (3)**
A lecture course concerning the origin, development, and perpetuation of distributional patterns with emphasis on benthic marine organisms. (W)
- 273A. Professional Ethics in Science (2)**
A seminar on the historical and contemporary ethics and ethos of scientific research, based on published documents. Given in alternate years. Dayton (W)
- 275A. Benthic Ecology (4)**
Evolution and maintenance of benthic communities from the terrestrial margins to the deep sea. Special emphasis will be placed on physical and biological scaling and processes determining patterns of distribution and abundance; interrelationships between community structure and population phenomena, including trophic relationships, reproductive and recruitment patterns, succession, and life history biology. Offered in alternate years with SIO 275B. **Prerequisite:** consent of instructor; open to undergraduates. (S/U grades permitted.) Levin, Dayton (W)
- 275B. Natural History of Coastal Habitats (6)**
Two three-hour lecture/laboratories per week, three week-long field trips to coastal habitats in the Southwest and northern Mexico. Several day field trips to local habitats. Offered in alternate years with SIO 275A. **Prerequisite:** consent of instructor. (S/U grades permitted.) Dayton, R. Norris (S)
- 276. Quantitative Theory of Populations and Communities (4)**
An introduction to the quantitative tools and conceptual issues underlying the study of the dynamics and structure of ecological systems. **Prerequisite:** calculus (three quarters) or consent of instructor. (S/U grades permitted.) Sugihara (F)
- 277. Deep-Sea Biology (4)**
The ecology, zoogeography, taxonomy, and evolution of deep-sea organisms, with emphasis on the benthos. Course includes one day cruise to the San Diego Trough to examine deep sea organisms (700-1200 meters) (two-hour steam from Point Loma). Offered alternate years. **Prerequisite:** graduate standing or consent of instructor. Levin (W)
- 278. Seminar in Ocean Biosciences (2)**
Presentations of reports, review of literature, and discussion of current research in the marine biological and oceanographic sciences. (S/U grades permitted.) Staff (F,W,S)
- 279. Special Topics in Biological Oceanography (1-4)**
(S/U grades permitted.) Staff (F,W,S)
- 280. Biological Oceanography (4)**
The biology and ecology of marine plankton, nekton, and benthos. Emphasis will be on processes regulating species, community, and ecosystem patterns and changes, including productivity, trophic relationships and species interactions with the physical, chemical, and geological environment. One or more field trips. **Prerequisite:** bachelor's degree in science or consent of instructor. Franks or Checkley, Levin (F)
- 281. Environmental Physiology and Biochemistry of Marine Organisms (4)**
Biochemical mechanisms of adaptation of organisms to the marine environment. Special emphasis is on the effects of pressure, temperature, salinity, oxygen, and light on the physiology and biochemistry. Conjoined with BIBC 130. **Prerequisite:** BIBC 102 or consent of instructor. Felbeck (F)
- 282. Phytoplankton Diversity (4)**
Molecular, biochemical, ecological, and evolutionary perspectives on the diversity of eukaryotic and prokaryotic phytoplankton. **Prerequisite:** consent of instructor. Palenik (W)
- 285. Physical-Biological Interactions (4)**
Physical and biological processes affecting growth and patchiness of plankton. Concepts and equations from physical oceanography will be presented and explored in a biological context. Ideas will be treated both theoretically and with examples from the literature. **Prerequisites:** introductory calculus and SIO 210, or consent of instructor. Franks (S)
- 286. Marine Science, Economics and Policy (4)**
This course investigates global issues in marine conservation and potential policy solutions. The approach is interdisciplinary, fast-paced, and discussion oriented. Students will become acquainted with sufficient background in

marine biology, ecology, marine and conservation economics, international law, and policy as preparation for participation in discussion on real-world issues in marine conservation. Topics and instructors change each quarter.

Prerequisite: graduate standing or consent of instructor. (S/U grades permitted) Staff (F,W)

287A. Marine Microbial Ecology (4)

Recent developments in the study of marine bacteria. Emphasis will be on biochemical and physiological adaptations of marine bacteria to the ocean environment. Bacterial metabolism, growth, and death will also be discussed in the context of trophic interactions and flows of material and energy in marine ecosystems. Molecular biology techniques used in the study of bacterial ecology will also be discussed. **Prerequisite:** consent of instructor. (S/U grades permitted.) Azam (W)

287B. Microbial Physiology (4)

Prokaryotic microbial physiology will be discussed primarily from a biochemical standpoint with emphasis on mechanism. Topics will vary from year to year but will include the following themes: Central Metabolism. Bioenergetics, Biosynthesis, Regulation, Differentiation. Prokaryotic Structure-Function Relationships. Conjoined with BIMM 130. **Prerequisites:** BIBC 100 or BIBC 102 or equivalent. Saier (S).

288. Marine Microbiology Laboratory (4)

Advanced techniques and theory in environmental microbiology. Students will perform experiments concerning (a) enrichment of diverse microbes (b) microbial enumeration and identification (c) metabolic and physiochemical adaptations, and (d) biotechnology, along with an independent project. **Prerequisite:** consent of instructors. Brahmsha, Palenik (S)

290. Marine Biology (4)

An introduction to the field of marine biology, especially to the diversity of marine organisms at all taxonomic levels and their adaptations to the marine environment. **Prerequisite:** graduate standing. N. Holland, Palenik (W)

291. Biology Graduate Research Presentations (1)

Graduate students in the biological sciences present their research in a seminar or poster format. Class participants and instructors provide written feedback on the presentations. Required of third-year and beyond marine biology curricular group students during spring quarter. Open to all SIO graduate students. (S/U grades only.) Latz (S)

292. Communicating Science to Informal Audiences (4)

Students develop fundamental science communication and instructional skills through the understanding and application of learning theory, interpretative techniques, and pedagogical practices, which occurs in the context of communicating ocean science concepts to a diverse audience at Birch Aquarium at Scripps. Graduate science students will develop fundamental communication, and instructional skills through the understanding and application of learning theory, interpretive techniques, and pedagogical practices, including the development of an education/outreach plan to support a competitive research proposal. Conjoined with SIO 180. **Prerequisite:** graduate standing or consent of instructor. (F)

294. Biology of Fishes (5)

The comparative evolution, morphology, physiology, and ecology of fishes. Special emphasis on local and deep-sea and pelagic forms in laboratory. **Prerequisite:** graduate standing or consent of instructor. Hastings (S)

295S. Introduction to Marine Biodiversity and Conservation—Seminar (8)

Lectures on ecological, economic, social, and legal issues related to marine biodiversity and case studies on socio-economic and legal issues. Students are expected to attend field trips at sea and to various sites around San Diego County as a part of the corequisite course. Students who have taken SIO 295 may not receive credit for SIO 295S. **Corequisite:** SIO 295LS. **Prerequisites:** MAS students only; consent of instructor. Jackson (Su)

295LS. Introduction to Marine Biodiversity and Conservation—Lab (8)

Laboratory work on major biological taxa, field trips on biodiversity in situ, computer labs for informatic tools. Students are expected to attend field trips at sea and to various sites around San Diego County as a part of the course. Students who have taken SIO 295L may not receive credit for SIO 295LS. **Corequisite:** SIO 295S. **Prerequisites:** MAS students only; consent of instructor. Jackson (Su)

296. Special Topics in Marine Biology (1-5)

Example topics are reproduction in marine animals, adaptation to marine environments, larval biology, marine fisheries, macromolecular evolution, physical chemical topics in physiology, philosophy of science. (S/U grades permitted.) Staff (F,W,S)

297. Marine Biology Seminar (1)

Lectures given by visiting scientists and resident staff and students. (S/U grades only.) Staff (F,W,S)

298. Special Studies in Marine Sciences (1-4)

Reading and laboratory study of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases. **Prerequisite:** graduate standing. (S/U grades permitted.) Staff (F,W,S)

299. Research (1-12)

(S/U grades only.) Staff (F,W,S)

Senior Seminar Program

Office of the Senior Vice Chancellor—Academic Affairs

Associate Vice Chancellor—Undergraduate Education

OFFICE: University Center, Room 104

(858) 822-5855

<http://ugseminars.ucsd.edu>

The Senior Seminar Program was launched in fall 2006 as an additional venue to enhance the undergraduate student experience at UC San Diego. By design, the small informal class setting promotes intellectual discussions with faculty, and fosters an ideal learning environment for polishing critical thinking and analytical skills.

Some twenty unique seminars are offered each quarter by faculty representing most UCSD academic departments. Senior seminars are designated by the course number 192 (e.g., POLI 192), are graded Pass/Not Pass, and carry one unit of credit. A department stamp is required prior to enrollment and is obtained by simply contacting the department or program offering the seminar. Prerequisites vary by seminar. Students are highly encouraged to incorporate senior seminars into their upper-division studies at UCSD.

Please visit the Senior Seminar Program Web site at <http://ugseminars.ucsd.edu> for a description of seminars currently offered. This site also contains useful information such as enrollment procedures and additional program details. Questions about a specific senior seminar should be directed to the department offering the seminar.

Sixth College

Provost, Naomi Oreskes
Pepper Canyon Hall, Second Floor
<http://sixth.ucsd.edu>

CULTURE, ART, AND TECHNOLOGY

See "[Culture, Art, and Technology](#)" core sequence.

SIXTH COLLEGE HONORS PROGRAM

OFFICE: Academic Advising

Pepper Canyon Hall, 2nd floor

Sixth College Honors Program nurtures academically high achieving students intellectually and socially, increases their awareness about opportunities of academic, social, and cultural engagement, and motivates them to become community leaders in Sixth College, at UC San Diego, and in communities outside the university.

- Through seminars, research, and social and cultural events, students are introduced to the academic, cultural, artistic, and social richness of the campus, provide information about resources, support students in finding extracurricular activities, and create opportunities to make connections to people, peers, faculty, staff, and campus community leaders.
- Through special advising by Sixth College provost and Sixth College associated faculty, honors students will receive mentoring and guidance.

FRESHMAN HONORS SEQUENCE

Students who have distinguished themselves academically in their high schools are invited to participate in the Freshman Honors Program. The qualifications are outstanding high school grade-point averages (3.8) and College Board Scholastic Aptitude Test scores (SAT math: 700 and above, and SAT reading and writing: 700 and above). In the fall quarter, freshmen are invited to enroll in SXTX 20—Freshmen Honors Seminar, which is noted on the UCSD transcript for zero units. Students who were not originally invited and who completed at least twelve graded units with a 3.7 cumulative GPA, will be invited to join the honors program. Students need to maintain a 3.5 cumulative GPA in order to remain in the honors program.

The weekly Freshman Honors seminars include cultural and social events such as lectures, hikes, dinners, plays, music events, and visits to museums are also an important component of the program.

SOPHOMORE HONORS SEQUENCE

Sixth College students who distinguish themselves academically during their freshman year and maintain a minimum cumulative GPA of 3.5 have two additional academic enrichment opportunities available to them:

- Second-year honors can participate in the Sixth College Honors Apprentice Research Program

by enrolling in SXTX 96 (2 units P/NP)—Honors Project. Second-year projects may extend for one to three quarters and may lead to the creation of a Practicum project. Students are encouraged to present their projects at the UCSD Undergraduate Research Conferences held each spring and summer.

- A second option is participation in SXTX 60 (1 unit)—Sophomore Honors Seminar, a series that deals with Technology and Society and the Arts issues.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

SXTX 20. Freshmen Honors Seminar (0)

Weekly seminars with faculty members from a variety of disciplines (chosen by the provost to match the interests of participating students). This seminar provides students with opportunities to learn more about research and scholarly activities being conducted by faculty and instill in students a sense of participation in the scholarly life at UCSD. **Prerequisite:** by invitation only. Pass/Not Pass grade only.

SXTX 60. Sophomores Honors Seminar (1)

This sophomore weekly seminar is the continuation of the Freshman Honors Seminar. This series will deal specifically with Culture, Art, and Technology issues/topics. **Prerequisite:** by invitation only. Pass/Not Pass grade only.

SXTX 96. Honors Project (2)

Individual project on a topic related to Culture, Art, and Technology done under the direction of a faculty member. College stamp required. Pass/Not Pass grade only.

Sociology

PROFESSORS

Harvey S. Goldman, Ph.D.
Jeffrey M. Haydu, Ph.D.
Bennetta W. Jules-Rosette, Ph.D.
Rebecca E. Klatch, Ph.D. *Academic Senate Distinguished Teaching Award*
Richard P. Madsen, Ph.D., Chair
David P. Phillips, Ph.D.
Andrew T. Scull, Ph.D., *Academic Senate Distinguished Teaching Award*
Gershon Shafir, Ph.D.
John D. Skrentny, Ph.D.
Carlos H. Waisman, Ph.D.

PROFESSORS EMERITI

Rae Lesser Blumberg, Ph.D.
Aaron V. Cicourel, Ph.D.
Jack D. Douglas, Ph.D.
Joseph R. Gusfield, Ph.D.
Hugh B. Mehan, Ph.D., *Academic Senate Distinguished Teaching Award*
Jacqueline P. Wiseman, Ph.D.

ASSOCIATE PROFESSORS

Richard G. Biernacki, Ph.D.
Amy J. Binder, Ph.D.
Mary F. Blair-Loy, Ph.D.
Ivan T. Evans, Ph.D.
John H. Evans, Ph.D.
David S. Fitzgerald, Ph.D.
Martha Lampland, Ph.D.
Isaac Martin, Ph.D.
Akos Rona-Tas, Ph.D.
Charles Thorpe, Ph.D.
Cihan Tugal, Ph.D.
Christena Turner, Ph.D.
Leon Zamosc, Ph.D.

ASSISTANT PROFESSORS

April Linton, Ph.D.
Thomas Medvetz, Ph.D.
Kwai Ng, Ph.D.

ADJUNCT PROFESSORS

Yen Espiritu, Ph.D.
Chandra Mukerji, Ph.D.
Mary L. Walshok, Ph.D.

OFFICE: Social Sciences Building, Room 401
<http://sociology.ucsd.edu>

SOCIOLOGY AT UC SAN DIEGO

Sociology studies societies and human groups: their composition, organization, culture, and development. It combines scientific and humanistic methods to investigate a subject that is both relevant and broad—ranging from social interaction in everyday life to social changes taking place on a global scale. The Department of Sociology at UC San Diego offers an innovative program that covers

the breadth of the discipline while giving students opportunities to specialize in areas of their choice, to conduct independent research, and to participate in an Honors Program. The department also encourages majors to study abroad and to take courses in other humanities and social science departments in order to expand their perspective on sociological topics.

Students at UCSD can explore a full range of sociological inquiry through courses in such established fields as Third World development, law, culture, social movements, religion, race and ethnic relations, gender roles, medicine, and mental illness. In addition, students have the opportunity to participate in courses found in few other sociology departments, such as the politics of language, ethnographic film, the Holocaust, comparative sex stratification, mass media, and revolutions. The faculty also teach an exceptional array of courses focusing on specific societies or world regions, including Africa, Japan, China, Latin America, eastern Europe, the former Soviet Union, and the United States.

Thus sociology is a valuable major for students who want to enter law, medicine, architecture, business, or politics. It also provides a solid liberal arts education for students who plan careers in such fields as criminal justice, public health, urban planning, social welfare, counseling, public administration, international relations, or market research. For students who wish to pursue graduate study in the social sciences for careers in teaching or scholarly research, an undergraduate degree from the Department of Sociology will provide a thorough grounding in recent theoretical and methodological advances in the discipline. A sociology major offers excellent preparation for teaching in the elementary schools. If you are interested in earning a California teaching credential from UCSD, contact the Teacher Education Program for information about the prerequisite and professional preparation requirements. It is recommended that you contact TEP as early as possible in your academic career. Whatever the career choice, the study of sociology can help the student cultivate a critical awareness of social life.

Students interested in majoring or minoring in sociology should stop by the Department of Sociology office, SSB 401, for program information and handouts. These clarify specific procedures and guidelines, and provide recommendations for areas of specialization within the major, as well as for graduate studies and careers in sociology.

THE UNDERGRADUATE PROGRAM

THE MAJOR

Students may choose to major in general sociology or in one of several concentrations, described below. Some basic requirements for the B.A. are common to all of these majors. All students must complete four lower-division and twelve upper-division courses in sociology.

A 2.0 GPA is required in the major, and students must earn at least a C- in each course used for the major. No courses taken to apply toward the major may be taken on a Pass/Not Pass basis except Sociology 199. Only one such special studies course (including internships) may be applied toward the major. Special studies courses must be applied for and

approved by the department before the beginning of the quarter in which the student wishes to enroll, and can only be taken on a Pass/Not Pass basis. See the staff undergraduate coordinator for the necessary application forms and deadlines.

Lower-Division

The four lower-division requirements for a major in sociology are

- Sociology 1, 2 and 60. (We strongly recommend you take Sociology 1 and 2 in sequence.)
- One course from the following: Sociology 10, 20, 30, 40 or 50

It is advisable that students complete these required lower-division courses (which should be taken during the freshman or sophomore year) before continuing with their upper-division work. Sociology 60 is a prerequisite for all upper-division methods courses.

Upper-Division

Twelve upper-division courses are needed for the major. Sociology 100 is required (students are strongly advised to complete this course by the end of their junior year), as well as one of the following methods courses:

- Sociology 103M
- Sociology 104
- Sociology 105
- Sociology 106
- Sociology 106M
- Sociology 108
- Sociology 109
- Sociology 110

Sociology 60 is a prerequisite for these methods courses.

Students are encouraged to complete their theory and methods courses early in their program, since theoretical perspectives and skills in methods will enhance their subsequent course work. Ten additional upper-division classes are required for the major. The specific choices will depend on the student's major concentration.

REQUIREMENTS FOR MAJOR IN GENERAL SOCIOLOGY

Students who seek a B.A. in General Sociology may complete any ten additional upper-division Sociology classes.

Requirements for Major Concentrations

Students may graduate with a B.A. in one of seven concentrations by choosing at least five upper-division classes from the course offerings in that concentration, as part of the ten upper-division courses for the major. Only one major concentration is allowed.

Concentration in International Studies

Students may graduate with a B.A. in Sociology/International Studies by completing at least five of the following courses as part of the ten

upper-division courses required for the major. This concentration would be especially appropriate for those interested in international business, foreign service, or international law.

SOCI 111E. Human Rights: Principles and Problems
SOCI 111F. Human Rights: Practices and Cases
SOCI 130. Population and Society
SOCI 145. Violence and Society
SOCI 148. Political Sociology
SOCI 151. Comparative Race and Ethnic Relations
SOCI 152. Urban Sociology
SOCI 157. Religion in Contemporary Society
SOCI 158. Islam in the Modern World
SOCI 162R. Religion and Popular Culture in East Asia
SOCI 169. Citizenship, Community, and Culture
SOCI 176. War and Society
SOCI 177. International Terrorism
SOCI 178. The Holocaust
SOCI 179. Social Change
SOCI 180. Social Movements and Social Protest
SOCI 181. Modern Western Society
SOCI 182. Ethnicity and Indigenous Peoples in Latin America
SOCI 183. Minorities and Nations
SOCI 185. Globalization and Social Development
SOCI 187. African Societies through Film
SOCI 188D. Latin America: Society and Politics
SOCI 188E. Community and Social Change in Africa
SOCI 188F. Modern Jewish Societies and Israeli Society
SOCI 188G. Chinese Society
SOCI 188J. Change in Modern South Africa
SOCI 189. Special Topics in Comparative-Historical Sociology

Note: Sociology SOCI 189 must be preapproved by undergraduate advisor.

It is recommended that students concentrating in this area take Sociology 20 as part of their lower-division requirements.

Concentration in American Studies

Students may graduate with a B.A. in Sociology/American Studies by completing at least five of the following courses as part of the ten upper-division courses required for the major. This concentration is especially appropriate for those interested in careers in American politics, education, and social work.

SOCI 115. Social Problems
SOCI 117. Language, Culture, and Education
SOCI 125. Sociology of Immigration
SOCI 127. Immigration, Race, and Ethnicity
SOCI 126. Social Organization of Education
SOCI 129. The Family
SOCI 148. Political Sociology
SOCI 151. Comparative Race and Ethnic Relations
SOCI 151M. Chicanos in American Society
SOCI 153. Urban Sociology
SOCI 154. Religious Institutions in America
SOCI 155. The City of San Diego
SOCI 157. Religion in Contemporary Society
SOCI 163. Migration and the Law
SOCI 180. Social Movements and Protest
SOCI 188K. American Society

It is recommended that students concentrating in this area take Sociology 10 as part of their lower-division requirements.

Concentration in Science and Medicine

Students may graduate with a B.A. in Sociology/Science and Medicine by completing at least five of the following courses as part of the ten upper-division courses required for the major. This concentration is especially appropriate for those interested in careers in the health professions or technology-related fields.

SOCI 113. Sociology of the AIDS Epidemic
SOCI 134E. The Making of Modern Medicine
SOCI 135. Medical Sociology
SOCI 136E. Sociology of Mental Illness: An Historical Approach
SOCI 136F. Sociology of Mental Illness in Contemporary Society
SOCI 138. Genetics and Society
SOCI 149. Sociology of the Environment
SOCI 167. Science and War
SOCI 168E. Sociology of Science
SOCI 168T. Sociology of Technology

It is recommended that students concentrating in this area take either Sociology 30 or 40 as part of their lower-division requirements.

Concentration in Culture and Communication

Students may graduate with a B.A. in Sociology/Culture and Communication by completing at least five of the following courses as part of the ten upper-division courses required for the major. This concentration is especially appropriate for those interested in careers related to education, the media, or marketing.

SOCI 116. Gender and Language in Society
SOCI 117. Language, Culture, and Education
SOCI 118. Sociology of Gender
SOCI 120T. Special Topics in Communication and Culture
SOCI 131. Sociology of Youth
SOCI 137. Sociology of Food
SOCI 156. Sociology of Religion
SOCI 157. Religion in Contemporary Society
SOCI 160. Sociology of Culture
SOCI 162. Popular Culture
SOCI 162R. Religion and Popular Culture in East Asia
SOCI 165A. American News Media
SOCI 166. Sociology of Knowledge
SOCI 172. Films and Society
SOCI 174. Sociology of Literature
SOCI 184. Gender and Film

Note: Sociology SOCI 120T must be preapproved by undergraduate advisor.

It is recommended that students concentrating in this area take Sociology 10 as part of their lower-division requirements.

Concentration in Social Inequality

Students may graduate with a B.A. in Sociology/Social Inequality by completing at least five of the following courses as part of the ten upper-division courses required for the major. This concentration is especially appropriate for those interested in social services and education.

SOCI 114. Culture and Ethnicity
SOCI 116. Gender and Language in Society
SOCI 117. Language, Culture, and Education
SOCI 118. Sociology of Gender

SOCI 119. Sociology of Sexuality and Sexual Identities

SOCI 126. Social Organization of Education
SOCI 127. Immigration, Race, and Ethnicity
SOCI 129. The Family
SOCI 132. Gender and Work
SOCI 139. Sociology Inequality: Class, Race, and Gender
SOCI 148. Political Sociology
SOCI 151. Comparative Race and Ethnic Relations
SOCI 151M. Chicanos in American Society
SOCI 153. Urban Sociology
SOCI 161. Sociology of the Life Course
SOCI 163. Migration and the Law
SOCI 180. Social Movements and Protest
SOCI 184. Gender and Film

It is recommended that students concentrating in this area take Sociology 10 or 20 as part of their lower-division requirements.

Concentration in Law and Society

Students may graduate with a B.A. in Sociology/Law and Society by completing at least five of the following courses as part of the ten upper-division courses required for the major. This concentration is especially appropriate for those interested in careers in law and criminology.

SOCI 111E. Human Rights: Principles and Problems
SOCI 111F. Human Rights: Practices and Cases
SOCI 140. Sociology of Law
SOCI 140F. Law and the Workplace
SOCI 141. Crime and Society
SOCI 142. Social Deviance
SOCI 146. Law Enforcement in America
SOCI 147. Organizations, Society, and Social Justice
SOCI 159. Special Topics in Social Organizations and Institutions
SOCI 160E. Law and Culture
SOCI 163. Migration and the Law
SOCI 173. Elite Crime

Note: Sociology SOCI 159 must be preapproved by undergraduate advisor.

It is recommended that students concentrating in this area take Sociology 50 as part of their lower-division requirements.

Concentration in Economy and Society

Students may graduate with a B.A. in Sociology/Economy and Society by completing at least five of the following courses as part of the ten upper-division courses required for the major. This concentration is especially appropriate for those interested in careers related to contemporary business.

SOCI 121. Economy and Society
SOCI 125. Sociology of Immigration
SOCI 137. Sociology of Food
SOCI 132. Gender and Work
SOCI 139. Social Inequality: Class, Race, and Gender
SOCI 140F. Law and the Workplace
SOCI 148E. Inequality and Jobs
SOCI 152. Social Inequality and Public Policy
SOCI 163. Migration and the Law
SOCI 167. Science and War
SOCI 185. Globalization and Social Development

It is recommended that students concentrating in this area take either Sociology 10 or 20 as part of their lower-division requirements.

Education Abroad Program

Students are encouraged to participate in the UC Education Abroad Program (EAP) or UCSD's Opportunities Abroad Program (OAP) while still making progress toward completing their major. Students considering this option should discuss their plans with the undergraduate advisor prior to going abroad, and courses taken abroad must be approved by the department. It may be possible to use some related courses outside of the discipline of sociology toward the major. For more information on EAP, see the section of this catalog on the Education Abroad Program. Interested students should contact the Programs Abroad Office in the International Center. To petition particular courses taken abroad, see the undergraduate advisor in the Department of Sociology.

RECOMMENDATIONS FOR TRANSFER STUDENTS

Students transferring from a community college or other university may petition for sociology credit for courses taken at their previous institution. For students transferring from the California Community College System, articulation agreements for many courses have been developed that facilitate the petition process.

Transferring Lower-Division Credit

The four lower-division requirements for a major in sociology are

- Sociology 1, 2, and 60: Articulations exist at most community colleges
- Sociology 10, 20, 30, 40, or 50: If your community college does not offer an already articulated course, please see the undergraduate coordinator for information about petitioning potential lower-division sociology transfer credit.

It is important to note that eight of the twelve upper-division courses in the undergraduate program must be taken in the Department of Sociology at UCSD, unless students obtain special acceptance of additional courses from the chair and the faculty undergraduate advisor.

THE MINOR

The minor consists of seven sociology courses: two lower-division and five upper-division. Unless colleges specify specific courses to be taken, the student may choose any two lower-division sociology courses (Soc. 1, 2, 10, 20, 30, 40, or 60) and any five upper-division courses (Soc. 100 to 190). Courses for the minor must be taken for a letter grade only. Special study courses or internships may not be applied toward the minor.

THE HONORS PROGRAM

The Department of Sociology offers an honors program to those students who have demonstrated excellence in the sociology major. Successful completion of the honors program enables the student to graduate "With Highest Distinction," "With High Distinction," or "With Distinction," depending upon performance in the program.

Eligibility

Students may apply to the honors program if they meet the following requirements:

1. junior standing (ninety units completed)
2. GPA of 3.5 or better in the major
3. recommendation of a faculty sponsor familiar with student's work
4. must have completed at least four upper-division sociology courses
5. overall GPA of 3.2 or better
6. must have completed SOCI 100 and one upper-division methods course prior to the fall quarter when the honors course begins; alternatively, the consent of the honors program director or the undergraduate advisor must be obtained

Interested students may pick up an application from the staff undergraduate coordinator in the Department of Sociology. Completed applications must be in the department office no later than week five of the spring quarter prior to the start of the honors program in the fall.

Students traveling abroad during their junior year should note that the deadline for applications still applies to them and should make arrangements accordingly.

Enrollment in the honors program is limited. Final decisions on acceptance into the program will be made by the presiding faculty member.

Course Requirement

The student must take Sociology 196A, Advanced Studies in Sociology, and Sociology 196B, Supervised Thesis Research, which will count as two of the twelve upper-division courses required for the major. Each student will choose a faculty advisor to help supervise the thesis research and writing with the honors program director.

Students whose GPA in the major falls below 3.5 or who do not earn at least an A- in the honors seminars will not graduate with distinction, but they may count the two honors courses among the twelve upper-division courses required for the major. Students must maintain a 3.5 GPA in the major and a 3.2 overall GPA until final graduation, in order to receive honors in the sociology honors program. To graduate "With Highest Distinction" the student must earn an A+; to graduate "With High Distinction" the student must earn an A; and to graduate "With Distinction" the grade must be an A-.

THE GRADUATE PROGRAM

The graduate program in sociology at the University of California, San Diego is organized on the basis of programs of specialization in comparative and historical sociology, the sociology of culture, social inequalities, and science, technology, and medicine. It is designed to prepare students for two main goals: to contribute to the increase of knowledge about societies and thereby advance the discipline of sociology; and to teach sociology at the graduate and undergraduate levels. The majority of graduates from the program find teaching and research positions in colleges and universities, although some also work in non-academic research

and social policy positions. The department offers a course of study leading to the doctor of philosophy degree. While the Master of Arts degree is awarded as a step toward the completion of the Ph.D., applicants seeking only an M.A. degree are not accepted.

Departmental Research and Teaching Members of the department are engaged in a wide variety of research and teaching activities that fall into four broad areas of concentration that correspond to our programs of specialization. Much of the research carried out by departmental students and faculty is distinguished by unique intersections of these areas.

Comparative and Historical Sociology

Many members of our faculty have research interests in the historical and/or comparative analysis of social institutions, structures, and processes, and social change in general. Using methods of comparative historical research and concepts drawn from social theory, individual faculty are engaged in research on, among other things: (1) political sociology, including revolution, social and political movements, and the evolution of the modern state, (2) economic transformation in contemporary societies (industrial countries, "emerging markets," and agrarian societies), including the labor process, stratification and the organization of work, and the development of market economies, (3) collective identities and social relations, including nationalism, class, gender, race, and ethnicity, and (4) social control and institutionalization. The department is among the most internationally oriented departments of sociology in the world, with specialists in most regions of the world, including Eastern and Western Europe, the former Soviet Union, Japan, China, southern Africa, Latin America, the Middle East, as well as the United States.

Sociology of Culture

A great number of the faculty have research and teaching interests in the sociology of culture broadly conceived. Sociology of culture involves topics such as: (1) the interpretation of the symbol systems that constitute meaningful resources for social action, (2) the analysis of the processes through which patterns of meaning are socially reproduced, and (3) the study of the interaction between culture change and social change. Many faculty have an interest in the comparative study of cultural traditions around the world. Others are interested in the relationship of culture to social movements and collective identities. And some see the sociology of culture not simply as a subdiscipline but as a general theoretical perspective on social experience. More specific substantive interests include sociology of knowledge and intellectuals, political culture, the culture of work, education and socialization, comparative moral cultures, the cultural dimensions of ethnicity, gender, sexuality, and popular culture.

Sociology of Social Inequalities

A large number of departmental faculty have expertise in the study of social inequalities, including those based on distinctions of gender, race, ethnicity, class, language, citizenship, and sexuality. Unique to our program are (1) focus on the processes by which social distinctions and identities

are themselves constructed, represented, and maintained over time, (2) comprehensive training in both qualitative and quantitative approaches to studying inequality, (3) emphasis on international and historical inequality research, and (4) expertise in social movements as products of and challenges to inequality. Many members of the department study inequalities in workplaces, schools, markets, states, families, politics, law, and medicine.

Sociology of Science, Technology, and Medicine

A substantial fraction of the faculty has research and teaching interests focused on the interrelationships between science, technology, and medicine and modern society. Drawing on a range of sociological and historical methodologies, individual faculty are engaged in research on science and social movements, scientists and the state, biomedicine, the social history of madness and psychiatry, the historical sociology of scientific knowledge and practice, and sociological approaches to the Scientific Revolution. (For information on the interdisciplinary Science Studies Program, see below "[Interdisciplinary Programs of Study](#).")

ADMISSION

Admission to the graduate program in sociology is open to students with excellent undergraduate records in any field. Some previous work in sociology or the social and behavioral sciences is advisable, but not required. New students are admitted in the fall quarter of each academic year. A bachelor's degree from an accredited college or university is a prerequisite for admission to the graduate program. Prospective applicants should submit the official online application for admission and awards (same form), one set of official transcripts from each institution attended after high school, official scores from the Graduate Record Examination, application fee, at least three letters of recommendation, and one or more samples of the applicant's own writing, such as a term paper. Additionally, foreign applicants must submit official scores from the Test of English as a Foreign Language (TOEFL) and the Test of Written English (TWE). Applicants are encouraged to contact and communicate with the department to talk with faculty and graduate students. The application deadline is January 4, of each year.

PROGRAM OF STUDY

The graduate programs in the University of California system work under the "normative time" standard. Normative time refers to the time period in which students, under normal circumstances, are expected to complete their requirements for the Ph.D. degree. Each department establishes a normative time for its doctoral program, and for the Department of Sociology, as for most graduate programs in the university, it is six years.

Course Requirements

Students are required to enroll as full-time graduate students, to carry a minimum enrollment of twelve units of graduate-level courses each quarter, and to maintain a grade-point average of 3.0 or better.

Theory and Methods Requirements

Students take almost all the courses on theory and methods in their first year in the program. They are required to take two courses in classical sociological theory (Sociology 201A/B) and one in contemporary theory (Sociology 202), two in quantitative methods (Sociology 205 and 206), and two in qualitative methods (from among Sociology 203, Field Methods; Sociology 204, Text and Discourse Analysis; or Sociology 207, Comparative-Historical Methods). In addition, students enroll in a two-credit introduction to the faculty and their research (Sociology 208). Note: Sociology 208 is in addition to other requirements.

The remaining theory and methods requirements are Sociology 252 and 253, a two-quarter practicum sequence, which will be taken in the fall quarters of the second and third year. In these courses, students will complete a piece of research they have started in a previous seminar, write a paper, and revise it for submission to a journal. The emphasis in the first quarter will be on the completion of the research for this project, and the second quarter will focus on the writing of the results and revision of drafts.

Core Seminars

These are survey courses in major substantive fields. Students must take three out of the following eight, which the department offers regularly: Sociology 264, Economic Sociology; Sociology 226, Political Sociology; Sociology 216, Sociology of Culture; Sociology 234, Intellectual Foundations of the Study of Science, Technology, and Medicine; Sociology 212, Social Stratification; Sociology 267, Sociology of Gender; Sociology 244, Sociology of Race and Ethnicity; and Sociology 222, Social Movements. These are major areas of sociology and fields in which several of the members of our faculty specialize. Moreover, several of these seminars serve as introductions to the programs of specialization on which the program is based (see below).

Remaining Courses

Beyond these requirements, students must take four seminars, at least two of which must be in the program of specialization selected by the student. In total, sixteen graduate courses, plus the introduction to the faculty, are required for advancing to candidacy.

The Programs of Specialization

The department currently offers specialized Ph.D. programs in comparative and historical sociology, sociology of culture, sociology of social inequalities, and the sociology of science, technology, and medicine. Affiliation to the clusters is voluntary and non-exclusive, and the department encourages multiple participation and joint activities among the groups. Students could qualify in more than one concentration, if they wish, and they will not be required to specialize in any one of them (although we are confident that most will find it advantageous to do so). The curriculum for each specialization is relatively light, in order to provide students with a solid common background in theory and methods, and allow for as much interface as possible between the programs. The requirements are: appropriate qualitative methods courses, one of the core seminars (see

above) in areas relevant for the concentration, two specialized seminars, pertinent specialties for the field examination, and the dissertation.

The qualitative methods requirement varies according to the program of specialization. Students who concentrate in comparative and historical sociology must take Sociology 207, Comparative-Historical Methods. For sociology of culture, Sociology 203, Field Methods, is required. Students specializing in social inequalities should take at least one of the following courses: Sociology 203, Field Methods; Sociology 204, Text and Discourse Analysis; or Sociology 207, Comparative-Historical Methods. Finally, students specializing in sociology of science, technology, and medicine must choose two of the following three courses in qualitative methods: Sociology 203, Field Methods; Sociology 204, Text and Discourse Analysis; and Sociology 207, Comparative-Historical Methods. The required core seminars are survey courses in major substantive fields. Students must take three out of the following eight, which the department offers regularly: Sociology 264, Economic Sociology; Sociology 226, Political Sociology; Sociology 216, Sociology of Culture; Sociology 234, Intellectual Foundations of the Study of Science, Technology, and Medicine; Sociology 212, Social Stratification; Sociology 267, Sociology of Gender; Sociology 244, Sociology of Race and Ethnicity; and Sociology 222, Social Movements. These are major areas of sociology and fields in which several of the members of our faculty specialize. Moreover, several of these seminars serve as introduction to the programs of specialization on which the program is based.

The core seminars required for each program of specialization are the following:
Sociology 264, Economic Sociology or Sociology 226, Political Sociology, for comparative and historical sociology
Sociology 216, Sociology of Culture, for sociology of culture
Sociology 212, Social Stratification or Sociology 244, Sociology of Race and Ethnicity or Sociology 267, Sociology of Gender, for social inequalities
Sociology 234, Intellectual Foundations of the Study of Science, Technology, and Medicine, for sociology of science, technology, and medicine

PROGRAM OVERVIEW

First-Year Evaluation

All students are evaluated by the department faculty toward the end of the academic year. At the end of the student's first year in the program, student performance is also evaluated by the Graduate Program Committee, including the director of Graduate Studies, the faculty teaching the core sequences, and by their faculty advisor. Students whose performance is satisfactory are allowed to continue the regular course of study; others may be asked to repeat some courses or to do additional course work; others may be asked to withdraw from the program. Evaluations are communicated to students in writing.

Second-Year Evaluation and the M.A. Degree

The master's degree is earned as one of the requirements of the Ph.D. and is based on the quality of the student's course work described below. At the end of the second year, students are evaluated by the Graduate Program Committee for the master's degree. At that time, the committee ascertains the student's suitability for doctoral work.

The fifteen core courses required to receive the M.A. degree are

Sociology 201A. Classical Sociological Theory I
Sociology 201B. Classical Sociological Theory II
Sociology 202. Contemporary Sociological Theory
Sociology 205. Quantitative Methods I
Sociology 206. Quantitative Methods II
Sociology 252. Research Practicum I

Two courses chosen from

Sociology 203. Field Methods
Sociology 204. Text and Discourse Analysis
Sociology 207. Comparative-Historical Methods

Three seminars from

Sociology 212. Social Stratification
Sociology 216. Sociology of Culture
Sociology 222. Social Movements
Sociology 226. Political Sociology
Sociology 234. Intellectual Foundation of the Study of Science, Technology, and Medicine
Sociology 244. Sociology of Race and Ethnicity
Sociology 264. Economic Sociology
Sociology 267. Sociology of Gender

Three elective sociology graduate seminars.

One may be outside the department and may be taken S/U.

At the beginning of the spring quarter of their second year in the program or at the beginning of the quarter in which they wish to be considered, students must submit to the committee for evaluation three papers they have written for seminars taught by different faculty. Reviewers assess the quality of the overall record and determine whether it indicates a potential for conducting doctoral research.

The final decision regarding the M.A. degree is based on the student's GPA, the three papers, and yearly faculty evaluations. The committee makes one of the following three recommendations: pass, M.A. only, and non-pass. Pass means that students may proceed toward the Ph.D. Those given M.A. only evaluations are granted the degree but may not continue toward the Ph.D. Students who received non-pass evaluations are asked to withdraw without a graduate degree.

Students admitted for a Ph.D. with a master's degree in sociology may not be candidates for a second master's degree.

The Field Examination

In the quarter in which students expect to finish the theory and methods requirements, the three core seminars, and the six elective seminars, students become eligible to take the field examination. This examination **must be completed** by the end of the student's third year in the program. The object of the field examination is to demonstrate mastery of two established, broad, and distinct fields

of sociological inquiry, selected from a list of fields provided by the department. The examination is carried out by a faculty committee composed of no fewer than four departmental faculty, one of whom serves as chair. The choice of fields and the composition of the committee **must be approved** by the Graduate Program Committee **before the student starts preparing for the exam**. Faculty from departments other than sociology may be added (or, if necessary, substituted) by petition to the Graduate Program Committee.

The demonstration of mastery has both written and oral components. The written part consists of two papers, one in each field, and a course syllabus for a course they would teach in one of the two fields in which they take their orals. In these papers, students are expected to demonstrate a grasp of key issues and debates, and of the broad, conceptual history of the field. These reviews are based on a bibliography drawn up by the student in consultation with relevant committee members and other faculty in each field. Students are expected to know the central arguments of all the books and papers in the bibliographies, regardless of the extent to which these books and articles have been used in the papers. Field papers **must** be a minimum of thirty and a maximum of fifty pages each, exclusive of notes and should include at least twenty to thirty books or article equivalents. The two bibliographies may not significantly overlap, either in literature surveyed or in specific titles. The papers, the bibliographies, and the syllabus **must** be submitted to the committee **at least two weeks before orals**, or the orals cannot go forward.

The oral part lasts two hours and covers both fields. It is given by the examining committee, sitting as a whole, and is based on the bibliographies, papers, and course syllabus submitted by the student. The exam does not focus on the papers, but on the students' knowledge of the fields. Following the oral examination, the committee evaluates the student on the basis of both the written and the oral components of the examination. Possible grades are high pass, pass, conditional pass, and no pass. High pass recognizes exceptional performance. Conditional pass indicates that the committee has passed the student pending the completion of additional work. Students receiving a grade of no pass will have an opportunity to retake the examination, should they so desire, no later than the end of the subsequent quarter. Students electing not to retake the examination or receiving a grade of no pass a second time will be asked to withdraw from the graduate program.

Students will have to constitute their field exam committee **two months** before the proposed date of the exam. Once the committee is constituted it can be changed only if a faculty member becomes unavailable. Students will have to submit one copy per member of a substantial draft of their field papers **one month in advance** to the graduate coordinator, who then distributes them to the committee members. Faculty, in turn will commit to read and comment on the papers in two weeks time.

All papers (as opposed to the drafts) and the syllabus must be submitted to the committee **two weeks before** the fields.

The Dissertation Prospectus and Hearing

The central intellectual activity leading to the award of the Ph.D. degree is the doctoral dissertation: an original contribution to knowledge, based on substantial, original research on a topic of intellectual significance within the field of sociology.

Following successful completion of the field examination, the student establishes a doctoral committee to supervise dissertation research. This is a five-person committee, including three faculty from within the department and two from other departments within the university. The committee should include the faculty members whose fields of expertise make them most appropriate for supervising the students' research. The student approaches the faculty member he or she would like to include, but the committee **must** be approved by the director of Graduate Studies and the department chair **before** the student starts working on the prospectus. The composition of the committee may or may not overlap with the committee that carried out the field examination. If the student elects to have a six member committee, the sixth member has all the same obligations as the other committee members.

By the end of the spring quarter of the fourth year in the department, the student must have a dissertation prospectus approved by his or her doctoral committee. The dissertation prospectus is a document that presents the research topic of the dissertation, places it in the context of the relevant literature, discusses its significance, specifies and justifies the methods the student intends to use, establishes the feasibility of the research, and indicates the anticipated steps leading to completion.

Following submission of the dissertation prospectus, the student must defend it at a hearing before the doctoral committee. The purpose of the hearing is to certify that the prospectus is significant and feasible, that the research design is appropriate, and that the student is prepared to carry it out successfully. Based on the written prospectus and the hearing, the committee may choose to approve the prospectus or to ask for revisions and resubmission. The prospectus hearing serves, in effect, as a qualifying examination, and approval of the dissertation prospectus is the final step to advancement to candidacy for the Ph.D. Degree

Students will have to constitute their dissertation committee **three months** before the proposed date of the exam. Once the committee is constituted it can be changed only if a faculty member becomes unavailable. Students will have to submit one copy per member of a substantial draft of their prospectus **one month in advance** to the graduate coordinator, who then distributes them to the committee members. Faculty in turn, will commit to read and comment on the papers in two weeks time.

The Doctoral Dissertation

Upon approval of the dissertation prospectus, the student proceeds with dissertation research. Students are expected to consult with committee members as the research progresses and to keep the committee chair advised of progress made.

Once the dissertation is substantially completed and committee members have had the opportunity to review drafts of the written work, the committee

meets at least one month before the defense takes place, with or without the student present, to consider the progress made and to identify concerns, changes to be made, or further work to be done. Once the committee members are substantially satisfied with the written work, the student, in consultation with the committee, schedules the oral defense of the dissertation. By university regulation, this defense is open to the public.

The final version of the dissertation must be approved by each member of the doctoral committee. All members of the committee **must** be present at the defense. Exceptions may be made **only** under very restrictive conditions. Further, the student **must** consult with the Office of Graduate Studies to be told of appropriate requirements for the thesis to be filed. Having obtained this approval and successfully defended the dissertation in oral examination, the student is eligible to receive the Ph.D. Degree. The final version of the dissertation is then filed with the university librarian via the Office of Graduate Studies. Acceptance of the dissertation by the university librarian is the final step in completing all requirements for the Ph.D.

Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of four years (PCTL—Precandidacy Time Limit). Normative time is six years. Total university financial support (SUTL—Support Time Limit) cannot exceed seven years. Total registered (TRTL—Total Registered Time Limit) time at UCSD cannot exceed eight years.

INTERDISCIPLINARY PROGRAMS OF STUDY

Sociology of Science, Technology, and Medicine and the Science Studies Program

Students interested in the interrelationships between science, technology, and medicine (STM) and the larger social order can opt for one of two specialized programs of study. The first of these is undertaken wholly within the department (see above). The second approach is to seek admission to the Science Studies Program, a joint doctoral program that brings together graduate students from the Departments of Sociology, History, Philosophy, and Communication. Students in the Program pursue a cross-disciplinary curriculum leading to dissertation research in the sociology of science, technology, or medicine, broadly conceived. Sociology faculty affiliated with this Program have research interests across the broad spectrum of science studies, from the philosophy and history of science to the organization of scientific discovery and the culture of specific work.

Students may seek admission to the Science Studies Program at the same time they apply for admission to the Department of Sociology, or may, in certain circumstances, request to be accepted into the Program at some point after entering the University of California, San Diego. The requirements of the Science Studies Program are similar to those of the standard graduate program. However, there are some distinct curricular requirements in the first two years of the Program, as well as some distinct

emphases in the qualifying examination. The core of the Program is a two-quarter team-taught seminar sequence taken in the first year, the first quarter being an interdisciplinary introduction to science studies and the second quarter (or core seminar) being devoted to special topics in science studies which vary from year to year.

For details on the Science Studies Program, including information about requirements, write to the University of California, San Diego, Coordinator, Science Studies Program, 9500 Gilman Drive # 0104, La Jolla, CA 92093-0104; or telephone the program coordinator at (858) 534-0491. Visit their Web site: <http://sciencestudies.ucsd.edu>.

Interdisciplinary Program in Sociology and Cognitive Science

This program allows students to earn a Ph.D. in sociology and cognitive science. Students must complete all the regular sociology requirements. In addition, they take six cognitive science seminars and select a dissertation committee composed of three Sociology and three Cognitive Science Program faculty. Admission to this program requires a separate application and is contingent on acceptance into the Department of Sociology. For more information, contact the coordinators in the Department of Sociology, (858) 534-4626, or the Cognitive Science Department, (858) 534-7141. Please view our Web site for application and department handbook information: <http://sociology.ucsd.edu>.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

SOCI 1. The Study of Society (4)

An introduction to the organizing themes and ideas, empirical concerns, and analytical approaches of the discipline of sociology. The course focuses on both classical and contemporary views of modern society, on the nature of community, and on inequality, with special attention to class, race, and gender. Materials include both theoretical statements and case studies. Will not receive credit for SOCI 1 and SOCL 1A.

SOCI 2. The Study of Society (4)

A continuation of Sociology/L 1A. The focus here is on socialization processes, culture, social reproduction and social control, and collective action. As in 1A, materials include both theoretical statements and case studies. While 1B may be taken as an independent course, it is recommended that students take 1A and 1B in sequence, as the latter builds on the former. Will not receive credit for SOCI 2 and SOCL 1B.

SOCI 10. American Society: Social Structure and Culture in the U.S. (4)

An introduction to American society in historical, comparative, and contemporary perspectives. Topics will include American cultural traditions; industrialization; class structure; the welfare state; ethnic, racial, and gender relations; the changing position of religion; social movements; and political trends. Will not receive credit for SOCI 10 and SOCL 10.

SOCI 20. Social Change in the Modern World (4)

A survey of the major economic, political, and social forces that have shaped the contemporary world. The course will provide an introduction to theories of social change, as well as prepare the student for upper-division work in

comparative-historical sociology. Will not receive credit for SOCI 20 and SOCL 20.

SOCI 30. Science, Technology, and Society (4)

A series of case studies of the relations between society and modern science, technology, and medicine. Global warming, reproductive medicine, AIDS, and other topical cases prompt students to view science-society interactions as problematic and complex. Will not receive credit for SOCI 30 and SOCL 30.

SOCI 40. Sociology of Health Care Issues (4)

Designed as a broad introduction to medicine as a social institution and its relationship to other institutions as well as its relation to society. It will make use of both micro and macro sociological work in this area and introduce students to sociological perspectives of contemporary health care issues. Will not receive credit for SOCI 40 and SOCL 40.

SOCI 50. Introduction to Law and Society (4)

Interrelationships between law and society, in the U.S. and other parts of the world. We examine law's norms, customs, culture, and institutions, and explain the proliferation of lawyers in the U.S. and the expansion of legal "rights" worldwide. Will not receive credit for SOCI 50 and SOCL 50.

SOCI 60. The Practice of Social Research (4)

This course introduces students to the fundamental principles of the design of social research. It examines the key varieties of evidence, sampling methods, logic of comparison, and causal reasoning researchers use in their study of social issues. Will not receive credit for SOCI 60 and SOCL 60.

SOCI 87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminar topics will vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

SOCI 98. Directed Group Study (4)

Small group study and research under the direction of an interested faculty member in an area not covered in regular sociology courses. (P/NP grades only.) **Prerequisites:** lower-division standing; completion of thirty units of UCSD undergraduate study; minimum UCSD GPA of 3.0; completion and approval of Special Studies form. Consent of instructor and department approval required.

SOCI 99. Independent Study (4)

Individual study and research under the direction of an interested faculty member. P/NP grades only. **Prerequisites:** lower-division standing; completion of thirty units of UCSD undergraduate study; minimum UCSD GPA of 3.0; completion and approval of Special Studies form. Consent of instructor and department approval required.

UPPER-DIVISION

SOCI 100. Classical Sociological Theory (4)

Major figures and schools in sociology from the early nineteenth century onwards, including Marx, Tocqueville, Durkheim, and Weber. The objective of the course is to provide students with a background in classical social theory, and to show its relevance to contemporary sociology. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 100 and SOCA 100.

SOCI 103M. Computer Applications to Data Management in Sociology (4)

Develop skills in computer management and analysis of sociological data. Practical experience with data produced by sociological research. Students will develop competency in the analysis of sociological data, by extensive acquaintance with computer software used for data analysis and management (e.g., SPSS). **Prerequisite:** SOCI 60.. Will not receive credit for SOCI 103M and SOCA 103M.

SOCI 104. Field Research: Methods of Participant Observation (4)

Relationship between sociological theory and field research. Strong emphasis on theory and methods of participant observation: consideration of problems of entry into field settings, recording observations, description/analysis

of field data, ethical problems in field work. Required paper using field methods. **Prerequisite:** SOCI 60; majors only. Will not receive credit for SOCI 104 and SOCA 104.

SOCI 104Q. Qualitative Interviewing (4)

This course provides students with tools to conduct original research using qualitative interviews. Students will learn how to prepare, conduct, and analyze qualitative interviews. Special emphasis will be placed on the presentation of research in written form. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 104Q and SOCA 104Q.

SOCI 105. Ethnographic Film: Media Methods (6)

(Conjoined with Soc/G 227.) Ethnographic recording of field data in written and audiovisual formats including film, video, and CD Rom applications. Critical assessment of ethnographies and audiovisual ethnographic videotape. **Prerequisite:** graduate standing or consent of instructor for Soc/G 227 and SOCI for SOCI 105. Will not receive credit for SOCI 105 and SOCA 105.

SOCI 106. Comparative and Historical Methods (4)

A broad-based consideration of the use of historical materials in sociological analysis, especially as this facilitates empirically oriented studies across different societies and through time, and their application in student research projects. **Prerequisite:** SOCI 60. Will not receive credit for SOCI 106 and SOCA 106.

SOCI 106M. Holocaust Diaries (4)

Methods for interpreting diaries, letters, and testaments written by victims and perpetrators of the Holocaust. Students use these sources for original research about life in hiding, ghettos, and death camps. Includes techniques for making comparisons and for generalizing from evidence. **Prerequisites:** SOCI 60 and SOCI 178 or the consent of instructor. Will not receive credit for SOCI 106M and SOCA 106M.

SOCI 107. Epidemiological Methods: Statistical Study of Disease (4)

Epidemiology is the statistical study of disease, and epidemiological methods are a powerful tool for understanding the causes of certain diseases, e.g., AIDS, scurvy, cholera, and lung cancer. These fundamental epidemiological methods will be taught. **Prerequisite:** SOCI 60. Will not receive credit for SOCI 107 and SOCA 107.

SOCI 108. Survey Research Design (4)

Translation of research goals into a research design, including probability sampling, questionnaire construction, data collection (including interviewing techniques), data processing, coding, and preliminary tabulation of data. Statistical methods of analysis will be limited primarily to percentages. **Prerequisite:** SOCI 60. Will not receive credit for SOCI 108 and SOCA 108.

SOCI 109. Analysis of Sociological Data (4)

Students test their own sociological research hypotheses using data from recent American and International social surveys and state-of-the-art computer software. Application of classical scientific method, interpretation of statistical results, and clear presentation of research findings. **Prerequisite:** SOCI 60. Will not receive credit for SOCI 109 and SOCA 109.

SOCI 110. Qualitative Research in Educational Settings (4)

Basic understanding of participant observation, interviewing, and other ethnographic research techniques through field experiences in school and community settings sponsored by CREATE. Students will learn to take field notes, write-up interviews, and compose interpretive essays based on their field experiences. **Prerequisite:** SOCI 60. Will not receive credit for SOCI 110 and SOCA 110A.

SOCI 111E. Human Rights: Principles and Problems (4)

An inquiry into the concept of human rights, the history of human rights in the twentieth century, and problems in both the concept and its implementation in modern societies. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 111E and SOCB 111A.

SOCI 111F. Human Rights: Practices and Cases (4)

An investigation into human rights practices in contemporary society, focusing on abuses and understanding both

their causes and responses to them. We will look at several key cases, probably including the Islamic world and East Asia. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 111F and SOCB 111B.

SOCI 112. Social Psychology (4)

This course will deal with human behavior and personality development as affected by social group life. Major theories will be compared. The interaction dynamics of such substantive areas as socialization, normative and deviant behavior, learning and achievement, the social construction of the self, and the social identities will be considered. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 112 and SOCB 112.

SOCI 113. Sociology of the AIDS Epidemic (4)

This course considers the social, cultural, political, and economic aspects of HIV/AIDS. Topics include the social context of transmission; the experiences of women living with HIV; AIDS activism; representations of AIDS; and the impact of race and class differences. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 113 and SOCB 113.

SOCI 114. Culture and Ethnicity (4)

Examines culture and inter-ethnic relations, the links between culture and ethnic variations in socio-economic achievement, and the intersection of culture and ethnicity with politics and policy. Topics include intermarriage, ethnic conflict, multicultural education and affirmative action. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 114 and SOCB 114.

SOCI 115. Social Problems (4)

Analyzes selected social problems in the United States, such as those regarding education, race relations, and wealth inequality, from various sociological perspectives, and also examines the various sites of debate discussion, like political institutions, TV and other media, and religious institutions. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 115 and SOCB 115.

SOCI 116. Gender and Language in Society (4)

(Same as LIGN 174.) This course examines how language contributes to the social construction of gender identities, and how gender impacts language use and ideologies. Topics include the ways language and gender interact across the life span (especially childhood and adolescence); within ethnolinguistic minority communities; and across cultures. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 116 and SOCB 118A.

SOCI 117. Language, Culture, and Education (4)

(Same as EDS 117.) The mutual influence of language, culture, and education will be explored; explanations of students' school successes and failures that employ linguistic and cultural variables will be considered; bilingualism; cultural transmission through education. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 117 and SOCB 117.

SOCI 118. Sociology of Gender (4)

An analysis of the social, biological, and psychological components of becoming a man or a woman. The course will survey a wide range of information in an attempt to specify what is distinctively social about gender roles and identities; i.e., to understand how a most basic part of the "self"—womanhood or manhood—is socially defined and socially learned behavior. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 118 and SOCB 118.

SOCI 118E. Sociology of Language (4)

An examination of how the understanding of language can guide and inform sociological inquiries and a critical evaluation of key sociological approaches to language, including ethnomethodology, frame analysis, sociolinguistics, structuralism and poststructuralism, and others. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 118E and SOCB 118L.

SOCI 119. Sociology of Sexuality and Sexual Identities (4)

Introduction both to the sociological study of sexuality and to sociological perspectives in gay/lesbian studies. Examines the social construction of sexual meanings, identities, movements, and controversies; the relation of sexuality to other institutions; and the intersection

of sexuality with gender, class, and race. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 119 and SOCB 119.

SOCI 120T. Special Topics in Culture, Language, and Social Interaction (4)

This course will examine key issues in culture, language, and social interaction. Content will vary from year to year. **Prerequisite:** upper-division standing.

SOCI 121. Economy and Society (4)

An examination of a central concern of classical social theory: the relationship between economy and society, with special attention (theoretically and empirically) on the problem of the origins of modern capitalism. The course will investigate the role of technology and economic institutions in society; the influence of culture and politics on economic exchange, production, and consumption; the process of rationalization and the social division of labor; contemporary economic problems and the welfare state. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 121 and SOCC 121.

SOCI 125. Sociology of Immigration (4)

Immigration from a comparative, historical, and cultural perspective. Topics include: factors influencing amount of immigration and destination of immigrants; varying modes of incorporation of immigrants; immigration policies and rights; the impact of immigration on host economies; refugees; assimilation; and return migration. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 125 and SOCB 125.

SOCI 126. Social Organization of Education (4)

(Same as EDS 126.) The social organization of education in the U.S. and other societies; the functions of education for individuals and society; the structure of schools; educational decision making; educational testing; socialization and education; formal and informal education; cultural transmission. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 126 and SOCC 126.

SOCI 127. Immigration, Race, and Ethnicity (4)

Examination of the role that race and ethnicity play in immigrant group integration. Topics include: theories of integration; racial and ethnic identity formation; racial and ethnic change; immigration policy; public opinion; comparisons between contemporary and historical waves of immigration. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 127 and SOCB 127.

SOCI 129. The Family (4)

An examination of historical and social influences on family life. Analyzes contemporary families in the United States, the influences of gender, class, and race, and current issues such as divorce, domestic violence, and the feminization of poverty. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 129 and SOCC 129.

SOCI 130. Population and Society (4)

This course offers insight into why and how populations grow (and decline), and where and under what conditions changes in population size and/or structure change have positive and negative consequences for societies and environment. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 130 and SOCC 130.

SOCI 131. Sociology of Youth (4)

Chronological age and social status; analysis of social processes bearing upon the socialization of children and adolescents. The emergence of "youth cultures," generational succession as a cultural problem. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 131 and SOCB 131.

SOCI 132. Gender and Work (4)

Examination and analysis of empirical research and theoretical perspectives on gender and work. Special attention to occupational segregation. Other topics include: the interplay between work and family; gender, work and poverty; gender and work in the Third World. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 132 and SOCC 132.

SOCI 133. Immigration in Comparative Perspective (4)

Societies across the world are confronting new immigration. In this course, we will focus on Europe, Asia, and North America, and examine issues of nationalism, cultural diversity and integration, economic impacts, and government policy. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 133 and SOCB 133.

SOCI 134E. The Making of Modern Medicine (4)

A study of the social, intellectual, and institutional aspects of the nineteenth-century transformation of clinical medicine, examining both the changing content of medical knowledge and therapeutics, and the organization of the medical profession. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 134E and SOCC 134A.

SOCI 135. Medical Sociology (4)

An inquiry into the roles of culture and social structure in mediating the health and illness experiences of individuals and groups. Topics include the social construction of illness, the relationships between patients and health professionals, and the organization of medical work. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 135 and SOCC 135.

SOCI 136E. Sociology of Mental Illness: An Historical Approach (4)

An examination of the social, cultural, and political factors involved in the identification and treatment of mental illness. This course will emphasize historical material, focusing on the eighteenth, nineteenth, and early twentieth centuries. Developments in England as well as the United States will be examined from an historical perspective. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 136E and SOCC 136A.

SOCI 136F. Sociology of Mental Illness in Contemporary Society (4)

This course will focus on recent developments in the mental illness sector and on the contemporary sociological literature on mental illness. Developments in England as well as the United States will be examined. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 136F and SOCC 136B.

SOCI 137. Sociology of Food (4)

Topics include food as a marker of social differences (e.g., gender, class, ethnicity); the changing character of food production and distribution; food as an object of political conflict; and the symbolic meanings and rituals of food preparation and consumption. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 137 and SOCB 137.

SOCI 138. Genetics and Society (4)

The class will first examine the direct social effects of the "genetic revolution": eugenics, genetic discrimination, and stratification. Second, the implications of thinking of society in terms of genetics, specifically—sociobiology, social Darwinism, evolutionary psychology, and biology. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 138 and SOCC 138.

SOCI 139. Social Inequality: Class, Race, and Gender (4)

Massive inequality in wealth, power, and prestige is ever-present in industrial societies. In this course, causes and consequences of class, gender, racial, and ethnic inequality ("stratification") will be considered through examination of classical and modern social science theory and research. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 139 and SOCC 139.

SOCI 140. Sociology of Law (4)

This course analyzes the functions of law in society, the social sources of legal change, social conditions affecting the administration of justice, and the role of social science in jurisprudence. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 140 and SOCC 140.

SOCI 140F. Law and the Workplace (4)

This course examines how the U.S. legal system has responded to workplace inequality and demands for employee rights. Particular attention is given to racial, gender, religious, and disability discrimination, as well as the law's role in regulating unions, the global economy, and

sweatshop labor. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 140F and SOCC 140F.

SOCI 141. Crime and Society (4)

A study of the social origins of criminal law, the administration of justice, causes, and patterns of criminal behavior, and the prevention and control of crime, including individual rehabilitation and institutional change, and the politics of legal, police, and correctional reform. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 141 and SOCC 141.

SOCI 142. Social Deviance (4)

This course studies the major forms of behavior seen as rule violations by large segments of our society and analyzes the major theories trying to explain them, as well as processes of rule making, rule enforcing, techniques of neutralization, stigmatization and status degradation, and rule change. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 142 and SOCB 142.

SOCI 143. Suicide (4)

Traditional and modern theories of suicide will be reviewed and tested. The study of suicide will be treated as one method for investigating the influence of society on the individual. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 143 and SOCB 143.

SOCI 144. Forms of Social Control (4)

The organization, development, and mission of social control agencies in the nineteenth and twentieth centuries, with emphasis on crime and madness; agency occupations (police, psychiatrists, correctional work, etc.); theories of control movements. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 144 and SOCC 144.

SOCI 145. Violence and Society (4)

Focusing on American history, this course explores violence in the light of three major themes: struggles over citizenship and nationhood; the drawing and maintenance of racial, ethnic, and gender boundaries; and the persistence of notions of "masculinity" and its relation to violence. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 145 and SOCB 145.

SOCI 146. Law Enforcement in America (4)

Provides a sociological understanding of policing in practice in the United States. Examines the social, political, and historical forces behind the development and shaping of policing in America—including the functions of police, the "working personality" of police officers, as well as police misconduct and its control. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 146 and SOCB 146.

SOCI 147. Organizations, Society, and Social Justice (4)

Organizations are dynamic forces in society. This course examines how organizations address human health and social justice issues in national and international settings, focusing on the links between internal dynamics of organizations and macro-level political, economic, and cultural factors. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 147 and SOCC 147.

SOCI 148. Political Sociology (4)

Course focuses on the interaction between state and society. It discusses central concepts of political sociology (social cleavages, mobilization, the state, legitimacy), institutional characteristics, causes, and consequences of contemporary political regimes (liberal democracies, authoritarianism, communism), and processes of political change. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 148 and SOCC 148.

SOCI 148E. Inequality and Jobs (4)

Some people do much better than others in the world of work. Causes and consequences of this inequality will be examined: How do characteristics of individuals (e.g., class, gender, race, education, talent) and characteristics of jobs affect market outcomes? **Prerequisite:** upper-division standing. Will not receive credit for SOCI 148E and SOCC 148L.

SOCI 149. Sociology of the Environment (4)

The "environment" as a socially and technically shaped milieu in which competing values and interests play out. Relation of humanity to nature; conflicts between

preservation and development; environmental pollution and contested illnesses. Will not receive credit for SOCI 149 and SOCC 149.

SOCI 150. Madness and the Movies (4)

Hollywood has had an ongoing obsession with mental illness. This course will examine a number of important or iconic films on this subject. By examining them against a background provided by relevant scholarly materials, we shall develop a critical perspective on these cultural artifacts. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 150 and SOCC 150.

SOCI 151. Comparative Race and Ethnic Relations (4)

An historical and comparative analysis of race and ethnic relations in various national settings, with emphasis on the United States. The course will analyze the origins of ethnic stratification systems, their maintenance, the adaptation of minority communities, and the role of reform and revolutionary movements and government policies in promoting civil rights and social change. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 151 and SOCC 151.

SOCI 151M. Chicanos in American Society (4)

Survey of contemporary sociological issues affecting Mexican-origin people in the United States. Lectures and reading will be oriented toward understanding the range of experiences within the Mexican-origin population. Focus will also be placed on evaluating theories and evidence used to understand this population. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 151M and SOCC 151M.

SOCI 152. Social Inequality and Public Policy (4)

(Same as USP 133.) Primary focus on understanding and analyzing poverty and public policy. Analysis of how current debates and public policy initiatives mesh with alternative social scientific explorations of poverty. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 152 and SOCC 152.

SOCI 153. Urban Sociology (4)

(Same as USP 105.) Introduces students to the major approaches in the sociological study of cities and to what a sociological analysis can add to our understanding of urban processes. **Prerequisite:** upper-division standing or consent of instructor. Will not receive credit for SOCI 153 and SOCC 153.

SOCI 154. Religious Institutions in America (4)

Examination of sociological theories for why people have religious beliefs. Also examines types of religious organizations, secularization, fundamentalism, religion and immigration, religion and politics, and religiously inspired violence and terrorism. The class will tend to focus on the American context. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 154 and SOCC 154.

SOCI 155. The City of San Diego (4)

A research-oriented course studying a specific city. Students will describe and analyze a local community of San Diego. Additional work on one citywide institution. Guest lecturers from San Diego organizations and government. Readings largely from city reports and news media. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 155 and SOCC 155.

SOCI 156. Sociology of Religion (4)

Diverse sociological explanations of religious ideas and religious behavior. The social consequences of different kinds of religious beliefs and religious organizations. The influence of religion upon concepts of history, the natural world, human nature, and the social order. The significance of such notions as "sacred peoples" and "sacred places." The religious-like character of certain political movements and certain sociocultural attitudes. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 156 and SOCC 156.

SOCI 157. Religion in Contemporary Society (4)

Sacred texts, religious experiences, and ritual settings are explored from the perspective of sociological analysis. The types and dynamic of religious sects and institutions are examined. African and contemporary U.S. religious data provide resources for lecture and comparative analysis.

Prerequisite: upper-division standing. Will not receive credit for SOCI 157 and SOCC 157.

SOCI 158. Islam in the Modern World (4)

The role of Islam in the society, culture, and politics of the Muslim people during the nineteenth and twentieth centuries; attempts by Muslim thinkers to accommodate or reject rival ideologies (such as nationalism and socialism); and a critical review of the relationship between Islam and the West. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 158 and SOCD 158.

SOCI 159. Special Topics in Social Organizations and Institutions (4)

Readings and discussion of particular substantive issues and research in the sociology of organizations and institutions, including such areas as population, economy, education, family, medicine, law, politics, and religion. Topics will vary from year to year. **Prerequisite:** upper-division standing.

SOCI 160. Sociology of Culture (4)

This course will examine the concept of culture, its "disintegration" in the twentieth century, and the repercussions on the integration of the individual. We will look at this process from a variety of perspectives, each focusing on one cultural fragment (e.g., knowledge, literature, religion) and all suggesting various means to reunify culture and consequently the individual. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 160 and SOCB 160.

SOCI 160E. Law and Culture (4)

This course examines major formulations of the relationship between law and culture in the sociological literature. Topics include formal law versus embedded law, law and morality, law and the self, legal consciousness, the rule of law, and the construction of legality. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 160E and SOCB 160L.

SOCI 161. Sociology of the Life Course (4)

This course explores concepts, theory and empirical research related to demographic, socio-psychological, and institutional aspects of the different stages of human development. It considers social influences on opportunities and constraints by gender, class, race/ethnicity, and historical period. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 161 and SOCB 161.

SOCI 162. Popular Culture (4)

An overview of the historical development of popular culture from the early modern period to the present. Also a review of major theories explaining how popular culture reflects and/or affects patterns of social behavior. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 162 and SOCB 162.

SOCI 162R. Religion and Popular Culture in East Asia (4)

(Same as HIEA 119.) Historical, social, and cultural relationships between religion and popular culture. Secularization of culture through images, worldviews, and concepts of right and wrong, which may either derive from or pose challenges to the major East Asian religions. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 162R and SOCB 162R.

SOCI 163. Migration and the Law (4)

Provides a global sociological perspective on the development and consequences of laws regulating migration within and across nation-state borders. The ability of the nation-state to control migration using law and its policy instruments. The effects of different legal statuses on political and socio-economic outcomes. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 163 and SOCC 163.

SOCI 165A. American News Media (4)

History, politics, social organization, and ideology of the American news media. 165A surveys the development of the news media as an institution, from earliest newspapers to modern mass news media. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 165A and SOCC 165A.

SOCI 166. Sociology of Knowledge (4)

This course provides a general introduction to the development of the sociology of knowledge, and will explore questions concerning social determination of consciousness as well as theoretical ways to articulate a critique of ideology. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 166 and SOCB 166.

SOCI 167. Science and War (4)

This class examines how science has been mobilized in the development of nuclear weapons and other weapons of mass destruction. The class applies sociological concepts to the analysis of modern technological violence. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 167 and SOCC 167.

SOCI 168E. Sociology of Science (4)

A survey of theoretical and empirical studies concerning the workings of the scientific community and its relations with the wider society. Special attention will be given to the institutionalization of the scientific role and to the social constitution of scientific knowledge. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 168E and SOCC 168E.

SOCI 168T. Sociology of Technology (4)

An introduction to classic and recent sociological perspectives on technology, giving special attention to the relations between technology and science, technology and work, and technology and politics. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 168T and SOCC 168T.

SOCI 169. Citizenship, Community, and Culture (4)

Will survey the liberal, communitarian, social-democratic, nationalist, feminist, post-nationalist, and multicultural views on the construction of the modern citizen and good society. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 169 and SOCD 169.

SOCI 172. Films and Society (4)

An analysis of films and how they portray various aspects of American society and culture. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 172 and SOCB 172.

SOCI 173. Elite Crime (4)

Explores theoretical and conceptual dimensions in the analysis of the systematic violation of the laws and ethics of business and politics in the United States. Covers a range of illegal and unethical practices, the social and political advantages of such violators, as well as the historical bias in both theory and research that has contributed to our lack of understanding of such issues in sociology and criminology. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 173 and SOCB 173.

SOCI 174. Sociology of Literature (4)

Literature will be discussed in the context of the ideas of national and regional culture, "historical situation," and "social order." Other issues to be studied are literary men and women as spokespersons and as rebels, literary movements and social conditions, and literary works as social documents. **Prerequisite:** upper-division standing.

SOCI 175. Nationality and Citizenship (4)

Surveys the development of nationality and citizenship law in historical and comparative perspective with an emphasis on the United States, Latin America, and Europe. Examines competing sociological accounts for national variation and convergence; consequences of the law; and local, transnational, and extraterritorial forms of citizenship. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 175 and SOCD 175.

SOCI 176. War and Society (4)

This course considers classical and contemporary theories that address the social organization of war-making and the effects of war on society since the Middle Ages, emphasizing more recent history. Topics include state formation, citizenship, gender, social stratification, and social protest. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 176 and SOCD 176.

SOCI 177. International Terrorism (4)

(Same as POLI 1420.) This course covers the definitions, history, and internationalization of terrorism; the interrelation of religion, politics and terror; and the representation

of terrorism in the media. A number of organizations and their activities in Europe and the Middle East are examined.

Prerequisite: upper-division standing. Will not receive credit for SOCI 177 and SOCD 177.

SOCI 178. The Holocaust (4)

The study of the unique and universal aspects of the Holocaust. Special attention will be paid to the nature of discrimination and racism, those aspects of modernity that make genocide possible, the relationship among the perpetrators, the victims and the bystanders, and the teaching, memory, and denial of the Holocaust. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 178 and SOCD 178.

SOCI 179. Social Change (4)

Course focuses on the development of capitalism as a worldwide process, with emphasis on its social and political consequences. Topics include: precapitalist societies, the rise of capitalism in the West, and the social and political responses to its expansion elsewhere. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 179 and SOCD 179.

SOCI 180. Social Movements and Social Protest (4)

An examination of the nature of protests and violence, particularly as they occur in the context of larger social movements. The course will further examine those generic facets of social movements having to do with their genesis, characteristic forms of development, relationship to established political configurations, and gradual fading away. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 180 and SOCC 180.

SOCI 181. Modern Western Society (4)

This course examines the nature and dynamics of modern western society in the context of the historical process by which this type of society has emerged over the last several centuries. The aim of the course is to help students think about what kind of society they live in, what makes it the way it is, and how it shapes their lives. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 181 and SOCD 181.

SOCI 182. Ethnicity and Indigenous Peoples in Latin America (4)

Ethnicity and the reassertion of Indian identity in contemporary Latin America. Issues related to these trends are examined in comparative perspective, with attention to changes in global conditions and in the socioeconomic, political, and cultural contexts of Latin American modernization. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 182 and SOCD 182.

SOCI 183. Minorities and Nations (4)

We will study minority rights and aspirations as well as the logic and dynamic of nationalist movements in selected cases. We will conclude by examining the chances and challenges of a post-nationalist world. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 183 and SOCD 183.

SOCI 184. Gender and Film (4)

This class will examine issues of masculinity and femininity through analysis of films. Emphasis is on contemporary American society and will include varying issues such as race, class, and sexualities; worlds of work; romance, marriage, and family. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 184 and SOCC 184.

SOCI 185. Globalization and Social Development (4)

Social development is more than sheer economic growth. It entails improvements in the overall quality of human life, particularly in terms of access to health, education, employment, and income for the poorer sectors of the population. Course examines the impact of globalization on the prospects for attaining these goals in developing countries. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 185 and SOCD 185.

SOCI 187. African Societies through Film (4)

Exploration of contemporary African urbanization and social change via film, including 1) transitional African communities, 2) social change in Africa, 3) Western vs. African filmmakers' cultural codes. Ideological and ethnographic representations, aesthetics, social relations, and market demand for African films are analyzed. **Prerequisite:**

upper-division standing. Will not receive credit for SOCI 187 and SOCD 187.

SOCI 187T. The Sixties (4)

A sociological examination of the era of the 1960s in America, its social and political movements, its cultural expressions, and debates over its significance, including those reflected in video documentaries. Comparisons will also be drawn with events in other countries. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 187T and SOCD 187S.

SOCI 188D. Latin America: Society and Politics (4)

Course focuses on the different types of social structures and political systems in Latin America. Topics include positions in the world economy, varieties of class structure and ethnic cleavages, political regimes, mobilization and legitimacy, class alignments, reform and revolution. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 188D and SOCD 188D.

SOCI 188E. Community and Social Change in Africa (4)

The process of social change in African communities, with emphasis on changing ways of seeing the world and the effects of religion and political philosophies of social change. The methods and data used in various village and community studies in Africa will be critically examined. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 188E and SOCD 188A.

SOCI 188F. Modern Jewish Societies and Israeli Society (4)

Contradictory effects of modernization on Jewish society in Western and Eastern Europe and the plethora of Jewish responses: assimilation, fundamentalism, emigration, socialism, diaspora nationalism, and Zionism. Special attention will be paid to issues of discontinuity between Jewish societies and Israeli society. Simultaneously, we will scrutinize the influence of the Palestinian-Israeli conflict on Israeli society, state, and identity. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 188F and SOCD 188F.

SOCI 188G. Chinese Society (4)

The social structure of the People's Republic of China since 1949, including a consideration of social organization at various levels: the economy, the policy, the community, and kinship institutions. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 188G and SOCD 188B.

SOCI 188J. Change in Modern South Africa (4)

Using sociological and historical perspectives, this course examines the origins and demise of apartheid and assesses the progress that has been made since 1994, when apartheid was officially ended. Contrasts of racism in South Africa and the United States. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 188J and SOCD 188J.

SOCI 188K. American Society (4)

Comparative and historical perspectives on U.S. society. The course highlights "American exceptionalism": did America follow a special historical path, different from comparable nations in its social relations, politics, and culture? Specific topics include class relations, race, religion, and social policy. **Prerequisite:** upper-division standing. Will not receive credit for SOCI 188K and SOCD 188K.

SOCI 189. Special Topics in Comparative-Historical Sociology (4)

Readings and discussion in selected areas of comparative and historical macro-sociology. Topics may include the analysis of a particular research problem, the study of a specific society or of cross-national institutions, and the review of different theoretical perspectives. Contents will vary from year to year. **Prerequisite:** upper-division standing.

SOCI 192. Senior Seminar in Sociology (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in sociology (at the upper-division level). Topics will vary from quarter to quarter. Senior Seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. (P/NP grades only.)

Prerequisites: instructor permission or department stamp, upper-division standing.

SOCI 194. Research Seminar in Washington, D.C. (4)

(Same as PS 194, COGN 194, EARTH 194, HIST 193, USP 194.) Course attached to six-unit internship taken by students participating in the UCDC Program. Involves weekly seminar meetings with faculty and teaching assistant and a substantial research paper. **Prerequisites:** department approval. Participating in UCDC Program. Will not receive credit for SOCI 194 and SOCE 194.

SOCI 196A. Honors Seminar: Advanced Studies in Sociology (4)

This seminar will permit honors students to explore advanced issues in the field of sociology. It will also provide honors students the opportunity to develop a senior thesis proposal on a topic of their choice and begin preliminary work on the honors thesis under faculty supervision. **Prerequisite:** acceptance into Department of Sociology Honors Program.

SOCI 196B. Honors Seminar: Supervised Thesis Research (4)

This seminar will provide honors candidates the opportunity to complete research on and preparation of a senior honors thesis under close faculty supervision. **Prerequisite:** completion of Soc/E 196A.

SOCI 198. Directed Group Study (4)

Group study of specific topics under the direction of an interested faculty member. Enrollment will be limited to a small group of students who have developed their topic and secured appropriate approval from the departmental committee on independent and group studies. These studies are to be conducted only in areas not covered in regular sociology courses. **Prerequisites:** junior standing and departmental approval required.

SOCI 199. Independent Study (4)

Tutorial: individual study under the direction of an interested faculty member in an area not covered by the present course offerings. Approval must be secured from the departmental committee on independent studies. **Prerequisites:** junior standing and departmental approval required.

GRADUATE

Soc/G 201A. Classical Sociological Theory I (4)

A discussion of major themes in the work of Tocqueville and Marx. **Prerequisite:** graduate standing in sociology.

Soc/G 201B. Classical Sociological Theory II (4)

An examination of major themes in the work of Weber and Durkheim. **Prerequisite:** graduate standing in sociology.

Soc/G 202. Contemporary Sociological Theory (4)

Themes important for social theory at the turn of the twenty-first century: Marxism (Gramsci, Althusser), Critical Theory (Adorno, Habermas), Interpretation (Geertz), Social Systems (Parsons), post-structuralism (Foucault), postmodernism, and social constructivism (Bourdieu). **Prerequisite:** graduate standing in sociology.

Soc/G 203. Field Methods (4)

Research will be conducted in field settings. The primary focus will be on mastering the problems and technical skills associated with the conduct of ethnographic and participant observational studies. **Prerequisite:** graduate standing in sociology.

Soc/G 204. Text and Discourse Analysis (4)

Techniques of gathering and analyzing transcripts of naturally occurring conversations, interviews, discourse in institutional settings, public political discourse, and text of historical materials. **Prerequisite:** graduate standing in sociology.

Soc/G 205. Quantitative Methods I (4)

This course covers some of the elementary techniques used 1) to select random samples, 2) to detect statistical patterns in the sample data, and 3) to determine whether any patterns found in sample data are statistically significant. The course also stresses the benefits and drawbacks of survey and aggregate data and some common ways in which

these data are used incorrectly. **Prerequisite:** graduate standing in sociology.

Soc/G 206. Quantitative Methods II (4)

The course covers some of the more advanced techniques used 1) to select random samples, 2) to detect statistical patterns in the sample data, and 3) to determine whether any patterns found in sample data are statistically significant. The course also stresses the benefits and drawbacks of survey and aggregate data and some common ways in which these data are used incorrectly. **Prerequisite:** graduate standing in sociology.

Soc/G 207. Comparative-Historical Methods (4)

A broad-based consideration of the use of historical materials in sociological analysis, especially as this facilitates empirically oriented studies across different societies and through time. **Prerequisite:** graduate standing in sociology.

Soc/G 208. Faculty Research Seminar (2)

An introduction for entering graduate students to the range and variety of research and scholarly interest of the department's faculty. Through this introduction students will be better able to relate their own research interests and professional objectives to the ongoing work of faculty. **Prerequisite:** graduate standing in sociology. (S/U grades only.)

Soc/G 212. Social Stratification (4)

The causes and effects of social ranking in various societies. Theories of stratification; the dynamics of informal social grouping; determinants of institutional power, and the nature of struggles for power; the distribution of wealth and its causes; the dynamics of social mobility; the effects of stratification on life-styles, culture, and deviance. **Prerequisite:** graduate standing in sociology.

Soc/G 216. Sociology of Culture (4)

The history of the concept of culture; cultural pluralism in advanced industrialized societies; the differentiation of cultural institutions; cultural policy and social structure; culture as a property of social groups; conflict and accommodation over efforts to change and sustain traditional culture.

Soc/G 217. Globalization, Culture, and Everyday Life (4)

This course explores the cultural, economic, and political processes which constitute globalization. Particular emphasis will be placed on understanding how consciousness and daily life practices are formed and transformed in a globalizing world. **Prerequisite:** graduate standing in sociology.

Soc/G 222. Social Movements (4)

An examination of theories accounting for the causes and consequences of social movements, including a discussion of the strengths and weaknesses of such theories for understanding historically specific revolutions, rebellions, and violent and nonviolent forms of protest in various parts of the world. **Prerequisite:** graduate standing in sociology.

Soc/G 226. Political Sociology (4)

This course discusses the relationship between state and society in a comparative perspective. The focus is on the interaction among states, domestic economic elites, and external economic and political processes in the determination of different developmental paths. Analytically, it includes topics such as characteristics and functions of the state in different types of society throughout history (with an emphasis on the varieties of capitalist and socialist state), the autonomy of the state and its causes in different settings, and developmental and predatory consequences of state activity. Readings will include both theoretical and empirical materials, the latter dealing mostly with nineteenth- and twentieth-century Europe and twentieth-century Latin America. **Prerequisite:** graduate standing in sociology.

Soc/G 227. Ethnographic Film: Media Methods (6)

Ethnographic recording of field data in written and audiovisual formats, including film, video, and CD Rom applications. Critical assessment of ethnographies and audiovisual data in terms of styles, format, and approaches. Graduate students are required to submit a fifteen-page mid-term paper comparing a written and an audiovisual ethnography and a final video ethnography with a project

abstract. **Prerequisites:** graduate standing/Soc/L 1A, 1B or consent of instructor.

Soc/G 232. Advanced Issues in the Sociology of Knowledge (4)

The social construction of 'knowledge' and the social institutions in which these processes take place are examined. Topics include relationships between knowledge and social institutions, foundations of knowledge in society, knowledge and social interactions, and contrasting folk and specialized theories. **Prerequisites:** graduate standing in sociology.

Soc/G 234. Intellectual Foundation of the Study of Science, Technology, and Medicine (4)

This course focuses on some classic methodological and theoretical resources upon which the sociology of science, technology, and medicine all draw. It gives special attention to relationships between knowledge and social order, and between knowledge and practice, that are common to science, technology, and medicine. **Prerequisites:** graduate standing in sociology.

Soc/G 238. Survey of the Sociology of Scientific Knowledge (4)

An introduction to some enduring topics in the sociology of scientific knowledge and to some resources for addressing them. Attention is drawn to problems of accounting for scientific order and change, and to recurrent debates over the proper method for sociological accounts of science. **Prerequisite:** graduate standing.

Soc/G 243. Sociology of Social Control (4)

An examination of the sociological literature on social control, looking at theoretical developments over time, and examining the contemporary literature dealing with social control in historical and comparative perspective. **Prerequisite:** graduate standing.

Soc/G 244. Sociology of Race and Ethnicity (4)

Analysis of enduring topics in the study of race and ethnicity, including stratification, discrimination conflict, immigration, assimilation, and politics. Other topics include racial and ethnic identity and the social construction of race and ethnic categories. A special focus is on the role of 'culture' and 'structure' for explaining race/ethnic differentiation. **Prerequisites:** graduate standing in sociology.

Soc/G 246. The Welfare State (4)

Surveys major theories of the development and functioning of the welfare state, addressing the roles of economic development, political institutions, stratification, and culture. The course focuses on the development of the U.S. social provision in comparison with other advanced industrial societies.

Soc/G 247. Madness and Society (4)

An examination of changing Western responses from the age of Bedlam to the age of Prozac. Topics include: the rise and decline of the total institution; the emergence of psychiatry; changing cultural meanings of madness; and the therapeutics of mental disorder. **Prerequisites:** graduate standing in sociology.

Soc/G 249. Technology and the Human (4)

This course explores the ethical and political implications of technological interventions into human life. Approaches from science studies, the sociology of the body, and philosophy. Topics include transformations in domains of life such as work, health, childhood, and death.

Soc/G 252. Research Practicum I (4)

In this seminar students work on a research project, which might have originated in a paper written for another course. The goal is to produce the first draft of a paper that will be submitted to an academic journal. **Prerequisite:** graduate standing in sociology.

Soc/G 253. Research Practicum II (4)

In this seminar students revise an existing research paper (usually the one they wrote for Sociology 252) for submission to an academic journal. Emphasis is placed on conceptual development, writing style and structure, and drawing links to the existing theoretical and empirical literature. **Prerequisite:** graduate standing in sociology.

Soc/G 255A. Introduction to Science Studies (4)

(Same as Phil. 209A, HIGR 238, and COGR 225A.) Study and discussion of classic work in history of science, sociology of science, and philosophy of science, and of work that attempts to develop a unified science studies approach. Required for all students in the Science Studies Program. **Prerequisite:** enrollment in Science Studies Program.

Soc/G 255B. Seminar in Science Studies (4)

(Same as Phil. 209B, HIGR 239, and COGR 225B.) Study and discussion of selected topics in the science studies field. Required for all students in the Science Studies Program. **Prerequisite:** enrollment in Science Studies Program.

Soc/G 255C. Colloquium in Science Studies (4)

(Same as Phil. 209C, HIGR 240, and COGR 225C.) A forum for the presentation and discussion of research in progress in science studies, by graduate students, faculty, and visitors. Required of all students in the Science Studies Program. **Prerequisite:** enrollment in the Science Studies Program.

Soc/G 255D. Advanced Approaches to Science Studies (4)

(Same as COGR 225D, HIGR 241, Phil. 209D.) Focus on recent literature in the history, philosophy, and sociology of science, technology, and medicine. Required of all students in the Science Studies Program. **Prerequisites:** Soc/G 255A is a prerequisite for Soc/G 255D; enrollment in Science Studies Program or instructor's permission.

Soc/G 258. Institutional Change in the Contemporary World; Latin American Societies in a Comparative Perspective (4)

This course explores institutional change in contemporary Latin America, and compares this area with other transitional societies. Issues include social consequences of economic liberalization, changing forms of inequality, dynamics of civil society, conceptions of citizenship, quality and future of democracy. **Prerequisite:** graduate standing.

Soc/G 260. Sociology of Religion (4)

This seminar will examine major theories and debates in the sociology of religion. Possible topics include secularization, religion and immigration, and religion and politics. **Prerequisite:** graduate standing in sociology.

Soc/G 263. Graduate Seminar in the Sociology of Art (4)

This seminar explores the production and interpretation of art forms in cross-cultural context. Processes of symbolic and economic exchange in art worlds will be examined from sociological and semiotic perspectives. Contemporary and popular art forms will be analyzed as types of cultural reproduction. Graduate students will be required to submit a project abstract and final research paper of twenty-seven pages. **Prerequisite:** graduate standing in sociology.

Soc/G 264. Economic Sociology (4)

This course provides an overview of the classical and current debates in the economic sociology literature. It presents theories of the rise of industrial economics and addresses how economic activities are constituted and influenced by institutions, culture, and social structure. **Prerequisite:** graduate standing in sociology.

Soc/G 267. Sociology of Gender (4)

Course examines social construction of gender focusing on recent contributions to the field, including micro- and macro-level topics, i.e., social psychological issues in the development of gender, gender stratification in the labor force, gender and social protest, feminist methodologies. **Prerequisite:** graduate standing in sociology.

Soc/G 268. Sociology of Masculinities (4)

This course introduces students to recent developments in the field of masculinities with attention to theoretical conceptualizations as well as empirical analyses of social organization of masculinity. Topics include the development of masculinity in boys, historical and cultural influences on male identity, differences of race, class, sexuality, the male body, and the meaning of work and family in men's lives.

Soc/G 269. The Citizenship Debates (4)

Will examine the controversies surrounding the construction of the modern citizen and the good society of the liberal outlook, and their alternatives in the communitarian,

social-democratic, nationalist, feminist, and multiculturalist perspectives. **Prerequisite:** graduate standing in sociology.

Soc/G 270. The Sociology of Education (4)

A consideration of the major theories of schooling and society, including functionalist, conflict, critical and interactional; selected topics in the sociology of education will be addressed in a given quarter, including the debate over inequality, social selection, cultural reproduction and the transition of knowledge, the cognitive and economic consequences of education. Major research methods will be discussed and critiqued. **Prerequisite:** graduate standing in sociology.

Soc/G 278. Immigration, Assimilation, and Identity (4)

This course focuses on theoretical and empirical approaches to the study of immigration, assimilation, and identity. The course will focus primarily on the post-1965 immigrants, but consideration will also be given to earlier waves of immigration. **Prerequisites:** graduate standing in sociology.

Soc/G 282. Immigration and Citizen (4)

Alternative theories of the relations of immigrants and host societies, and an examination on the debates on, and dynamic of, immigration expansion and restriction. Comparison of the bearing of liberal, communitarian, and ethnic citizenship discourses on the inclusion and exclusion of immigrants and their descendants. **Prerequisite:** graduate standing in sociology.

Soc/G 284. Contemporary Biomedicine (4)

Develops central themes in medical sociology in order to understand twentieth- and twenty-first-century medical practice and research. Topics include authority and expertise; health inequalities; managed care; health activism; biomedical knowledge production; and the construction of medical objects and subjects. **Prerequisite:** graduate standing.

Soc/G 288. Knowledge Capitalism (4)

This seminar examines the place of scientific knowledge and information and communication technology in the transformation of capitalist economy and society. The class explores new interactions between science studies and social theory of advanced capitalism. **Prerequisite:** graduate standing in sociology.

Soc/G 290. Graduate Seminar (4)

A research seminar in special topics of interest to available staff, provides majors and minors in sociology with research experience in close cooperation with faculty. (S/U grades permitted.) **Prerequisite:** graduate standing in sociology.

Soc/G 298. Independent Study (1-8)

Tutorial individual guides study and/or independent research in an area not covered by present course offerings. (S/U grades only.) **Prerequisite:** graduate standing in sociology; departmental approval.

Soc/G 299. Thesis Research (1-12)

Open to graduate students engaged in thesis research. (S/U grades only.) **Prerequisite:** graduate standing in sociology.

Soc/G 500. Apprentice Teaching (2-4)

Supervised teaching in lower-division contact classes, supplemented by seminar on methods in teaching sociology. (S/U grades only.) **Prerequisite:** graduate standing in sociology.

Theatre and Dance

PROFESSORS

Steven Adler, M.F.A., *Provost, Warren College, Stage Management and Directing*
Andrei Both, M.F.A., *Scenic Design*
Alan Burrett, GCE (U.K.), *Lighting Design*
Frantisek Deak, Ph.D., *Emeritus, Criticism and Theory*
Judith A. Dolan, Ph.D., *Costume Design, Associate Dean, Division of Arts and Humanities*
Kyle Donnelly, M.F.A., *Arthur and Molli Wagner Chair in Acting, Acting and Directing*
Deborah M. Dryden, M.F.A., *Emerita, Costume/Set Design*
Allyson Green, M.F.A., *Chair, Dance*
Allan Havis, M.F.A., *Playwriting, Provost, Marshall College*
Jorge A. Huerta, Ph.D., *Emeritus, Dramatic Literature*
Naomi Iizuka, M.F.A., *Playwriting*
James Ingalls, B.F.A., *Lighting Design (Adjunct)*
Walt Jones, M.F.A., *Emeritus, Directing/Acting/Sound Design*
Marianne McDonald, Ph.D., *Dramatic Literature*
Adele Edling Shank, M.A., *Emerita, Playwriting*
Theodore Shank, Ph.D., *Emeritus, Directing*
Janet Smarr, Ph.D., *Dramatic Literature and Italian Studies*
Yolande Snaith, B.A., *Dance*
Gabor Tompa, Ph.D., *Directing*
Arthur Wagner, Ph.D., *Emeritus, Acting*
Les Waters, B.A., *Emeritus, Directing*
James R. Winker, M.F.A., *Academic Senate, Distinguished Teaching Award, Acting*

ASSOCIATE PROFESSORS

James Carmody, Ph.D., *Dramatic Literature*
Mary Corrigan, M.A., *Emerita, Voice*
Tony Curiel, M.A., *Emeritus, Chicano Literature, Acting*
Nadine George-Graves, Ph.D., *Dramatic Literature and Dance History*
Lisa Porter, M.F.A., *Stage Management*
Victoria Petrovich, M.F.A., *Design*
John Rouse, Ph.D., *Dramatic Literature*
Kim Rubinstein, B.S., *Head of Undergraduate Acting*
Jonathan Saville, Ph.D., *Emeritus, Literature/Criticism*
Shahrokh Yadegaari, Ph.D., *Sound Design/Composition/Audio Technology*

ASSISTANT PROFESSORS

Robert Castro, M.F.A., *Acting, Directing, Chicano Literature*
Liam Clancy, M.F.A., *Dance*
Emily Roxworthy, Ph.D., *Dramatic Literature*

SENIOR LECTURERS WITH SECURITY OF EMPLOYMENT

Eva W. Barnes, M.F.A., *Speech and Acting*
Margaret Marshall, M.F.A., *Emerita, Ballet, Dance History, Choreography*
Ursula Meyer, M.F.A., *Voice and Acting*

Charlie Oates, M.F.A., *Movement and Acting*
Patricia A. Rincón, M.F.A., *Modern and Jazz Dance*

LECTURER WITH POTENTIAL SECURITY OF EMPLOYMENT

Eric Geiger, M.A., *Dance*

LECTURERS

Kristin Arcidiacono, M.A., *Dance*
Tony Caligagan, *Dance*
Sandra Foster-King, M.F.A., *Dance*
Mark Guirguis, M.F.A., *Design*
Jean Isaacs, B.A., *Emerita, Dance*
Alicia E. Rincón, M.F.A., *Dance*
Todd Salovey, M.F.A., *Acting and Directing*
Tonnie Sammartano, B.A., *Dance*
Judith A. Sharp, B.S., *Dance*
Linda Vickerman, D.M.A., *Singing*
Terry Wilson, M.F.A., *Dance*

OFFICE: 202 Galbraith Hall, Revelle College
(858) 534-3791
<http://theatre.ucsd.edu>

THE UNDERGRADUATE PROGRAM

The curriculum of the Department of Theatre and Dance is based on the belief that a good undergraduate education in theatre or dance should provide the student with a solid background in dramatic literature and the aesthetics and history of theatrical performance as well as exposure to the different artistic components of theatrical art—performance, playwriting, design, and choreography.

In addition to providing an integrated program for students desiring a theatre or dance major, the curriculum provides a sequence of courses to fulfill the fine arts and/or humanities requirements for Muir College; courses fulfilling Warren College's program of concentration requirements; courses to fulfill Revelle, Thurgood Marshall, and Eleanor Roosevelt Colleges' fine arts requirements; public speaking courses to fulfill requirements in the Schools of Engineering and Pharmacy; and elective courses for the general student desiring experience in theatre or dance.

Any student who has been accepted to the University of California, San Diego is eligible to declare theatre or dance as a major, double major, or minor. Auditions are not required. Continuing UCSD students who are changing their major to theatre or dance must file a Change of Major form with the UCSD Registrar's Office.

DEPARTMENT OF THEATRE AND DANCE ADVISING

The department's undergraduate faculty advisors can provide guidance and answers to students' questions concerning specific course content, transfer course work, honors research projects, academic success, production, auditioning procedures, postgraduate opportunities, and departmental policy changes.

The undergraduate coordinator can answer students' questions regarding major requirements, procedural matters, class enrollment, and the petition process, and give referrals to faculty and other campus resources for specific information.

Undergraduate student representatives are another important resource for theatre and dance majors. The student reps organize quarterly meetings at which students and faculty discuss departmental issues and concerns.

The department regularly communicates with the majors and minors, as well as other students involved in classes and productions, through the campus e-mail and Listserv systems. Students are strongly urged to check their campus e-mail accounts for timely messages or to make arrangements with Academic Computing Services to have campus e-mail forwarded to any other e-mail account they may use. Additionally, a handbook containing useful information is available in the department office, Room 202, Galbraith Hall.

PROGRAMS ABROAD

The department encourages students to enrich their undergraduate experience by studying abroad. Students majoring in theatre and/or dance are encouraged to participate in the Education Abroad Program (EAP) and to investigate other options of foreign study through the Opportunities Abroad Program (OAP). By petition, credits earned through EAP/OAP can fulfill UCSD degree and major requirements. Please visit the Programs Abroad Web site at <http://pao.ucsd.edu/pao> for further details. Financial aid is applicable and special study abroad scholarships are readily available.

The Department of Theatre and Dance will accept a maximum of three courses per semester abroad, and students are encouraged to take courses abroad that will fulfill major elective requirements. Please meet with the undergraduate coordinator prior to the EAP/OAP application deadline.

THE THEATRE MAJOR

The theatre major provides a student with a solid artistic and academic background. The required lower-division courses equip the student with the skills and knowledge necessary for more advanced work in each of the areas of study. The major is structured to respond to the needs of students who seek a broad-based liberal arts education in theatre as well as those who plan to pursue their studies at the graduate level with the aim of acquiring either an M.F.A. or a Ph.D. degree. Students should meet with the department's undergraduate coordinator during the quarter in which they declare a theatre major in order to plan an appropriate individual course of study.

The major requirements are those published in the catalog in effect for the first quarter that a first-year student attends UCSD; transfer students will be held to the catalog requirements two years previous to their first quarter at UCSD. Any student in good standing may declare a theatre major by completing a Change of Major form and delivering it to the Registrar's Office. A department stamp is not required.

THE DANCE MAJOR

The dance major offers students an opportunity to specialize their training in the creative, aesthetic, and conceptual discipline of expressive movement as a contemporary art form, within the context of a broad undergraduate education. The primary focus

of the dance major will be the study of contemporary and ballet techniques, dance history, theory, and choreographic methods, emphasizing innovation and interdisciplinary collaboration, and pushing forward the boundaries of dance as a contemporary art form. It will provide the rigor of an academic program that fosters the balanced development of the dancer's creative artistic potential, physical skills, and intellectual growth. The aim is to provide students with a broad range of artistic and conceptual tools for achieving goals in a variety of career areas and for pursuing advanced study in dance and dance related fields. Growth of individual artistic potential is encouraged through the integration of creative, physical and intellectual process, which provide a foundation for the creative and critical thinking needed for success in all career paths.

The major requirements are those published in the catalog in effect for the first quarter that a first-year student attends UCSD; transfer students will be held to the catalog requirements two years previous to their first quarter at UCSD. Any student in good standing may declare a theatre major by completing a Change of Major form and delivering it to the Registrar's Office. A department stamp is not required.

THE THEATRE-DANCE DOUBLE MAJOR

The double major in Theatre and Dance provides students with a solid academic base and an artistic base in both theatre and dance disciplines. Furthermore, requirements for this double major will create stronger and more experienced directors (for their exposure to choreography), choreographers (for their exposure to directing), actors (for the poise and strength they will attain from dance), and dancers (for having confronted text and character).

Students should meet with the department's undergraduate coordinator as soon as practical (but no later than the quarter in which they declare the major) in order to plan an appropriate individual course of study.

Double majors should complete the Petition for Double Major form obtained from their college and submit it to the department for review and approval.

THEATRE MINOR

The theatre minor consists of seven theatre courses, one of which is the Practicum. It is recommended that students declare the theatre minor as soon as possible as priority enrollment in the Practicums is given to majors and minors.

DANCE MINOR

The dance minor consists of seven courses, one of which is the Practicum. The dance minor will provide a balanced educational experience for the student who has a strong interest in dance but who wishes to major in another area of study. It is recommended that students declare the dance minor as soon as possible as priority enrollment in the Practicums is given to majors and minors.

SATISFYING YOUR MAJOR REQUIREMENTS

Fifty percent of all course work required for the theatre or dance major (including both upper- and lower-division courses) must be taken at UCSD, regardless of approved transfer work and petitions.

Theatre practicum (TDPR) classes completed elsewhere do not satisfy the theatre and dance department's requirements unless they have been formally petitioned and approved. Only one practicum class from another institution may be petitioned. All courses required for the major or minor must be taken for a letter grade. A theatre and dance department course for which a student earns a grade lower than C- will not satisfy any of the department's graduation requirements. Four units of Instructional Assistance (TDGE 195, P/NP credit) may be used as an upper-division elective for the theatre major, double major, or minor. Courses taken outside the Department of Theatre and Dance will not satisfy core or elective major requirements.

MAJOR REQUIREMENTS

Theatre majors are required to complete ten lower-division courses. Dance majors are required to complete three lower-division courses. All lower-division courses should be satisfied before starting upper-division course work in the respective areas.

Theatre and Dance majors and minors should complete a Practicum course—either TDPR 1, TDPR 2, TDPR 3, or TDPR 5—within three quarters of declaring their major or minor. Theatre majors should plan to complete their second Practicum requirement as soon as possible thereafter, as space in these classes is limited. The second Practicum course must be in an area different from the initial Practicum course.

Theatre History 10, 21, 22, and 23 are prerequisites for most upper-division theatre history and theory courses. Introduction to Acting (TDAC 1), Theatre Design (TDDE 1), and Theatre Playwriting (TDPW 1) are all prerequisites for any upper-division course work in their respective areas. Students should take these classes as soon as possible after declaring their major. Prerequisites ensure that students are properly prepared for the work required.

Theatre Major

Please refer to the major requirements section for an overview of the theatre major.

Lower-Division Requirements

- Two courses selected from
 - TDPR 1. Practicum—Scenery
 - TDPR 2. Practicum—Costume
 - TDPR 3. Practicum—Lighting
 - TDPR 5. Practicum—Sound
- Each of the following:
 - TDHT 10. Introduction to Play Analysis
 - TDHT 21. Performance Dynamics: Spaces, Performers, and Audiences
 - TDHT 22. One Actor, Two, or More: How Theatre Peoples the World
 - TDHT 23. Social Contexts of Performance
- TDGE 1. Introduction to Theatre
- Each of the area threshold classes:
 - a. TDAC 1. Introduction to Acting
 - b. TDDE 1. Introduction to Design
 - c. TDPW 1. Introduction to Playwriting

Note: The threshold classes listed above must be completed before taking upper-division courses in their respective areas.

Upper-Division Requirements

- One upper-division four-unit acting course
- One upper-division four-unit design course
- One upper-division four-unit directing course
- One upper-division four-unit playwriting course
- One upper-division four-unit stage management course
- Three upper-division four-unit theatre history courses
- Four upper-division four-unit theatre electives

Note: THGE 197 and 199 may not be used as upper-division electives by theatre majors unless approved by petition.

Dance Major

Lower-Division Requirements

- One course from
 - TDPR 1. Practicum—Scenery
 - TDPR 2. Practicum—Costume
 - TDPR 3. Practicum—Lighting
 - TDPR 5. Practicum—Sound
- TDTR 10. Introduction to Dancing
- TDCH 40. Principles of Choreography

Upper-Division Requirements

- TDTR 101. Dance Movement Analysis
- Two choreography courses chosen from the following:
 - TDCH 140. Improvisation/Composition
 - TDCH 142. Choreographic Workshop
 - TDCH 145. Music for Dance Composition
- One design course chosen from the following:
 - TDDE 113. Costume Design for Dance
 - TDDE 121. Lighting Design for Dance
- Four dance history and theory courses chosen from the following:
 - TDHD 171. Dance History I (Ancient to 1900)
 - TDHD 172. Dance History II (1900 to 1960)
 - TDHD 173. Dance History III (1960 to present)
 - TDHD 174. Dance Aesthetics and Criticism
 - TDHD 175. Cultural Perspectives on World Dance
- Forty-eight units of movement courses in ballet and contemporary dance chosen from the following (each of the courses listed below may be repeated up to six times):
 - TDMV 110. Intermediate Ballet
 - TDMV 111. Advanced Ballet
 - TDMV 112. Advanced Ballet for Contemporary Dance
 - TDMV 120. Intermediate Contemporary Dance
 - TDMV 122. Advanced Contemporary Dance
- Eight units of electives chosen from the following:
 - TDAC 109. Singing for the Actor
 - TDAC 111. Freeing the Voice
 - TDAC 115. Movement for Actors
 - TDCH 143. Choreography and Dramatic Text
 - TDMV 133. Advanced Jazz
 - TDMV 142. Latin Dance of the World
 - TDMV 143. West African Dance

TDMV 144. Asian Dance
TDTR 102. Movement Research
TDTR 103. Dance and Technology
TDTR 104. Dance Theory and Pedagogy

Theatre and Dance Double Major

Lower-Division Requirements

1. One course from
TDPR 1. Practicum–Scenery
TDPR 2. Practicum–Costumes
TDPR 3. Practicum–Lighting
TDPR 5. Practicum–Sound
2. TDAC 1. Introduction to Acting
3. TDCH 40. Principles of Choreography
4. Each of the following threshold classes:
TDDE 1. Introduction to Design
TDPW 1. Introduction to Playwriting

Upper-Division Requirements

5. One upper-division four-unit acting course
6. One upper-division four-unit design course
7. One upper-division four-unit directing course
8. One upper-division four-unit playwriting course
9. One upper-division four-unit stage management course
10. Six upper-division four-unit theatre and dance history courses (TDHT 114 required as one of the six upper-division history courses)
11. Four upper-division theatre electives (with no more than two from the core dance curriculum)
12. TDTR 101. Dance Movement Analysis
13. TDDE 121. Theatre Process: Lighting
14. TDCH 140. Improvisation/Composition
TDCH 142. Choreographic Workshop
TDCH 145. Music for Dance Composition
15. Twelve units of advanced movement courses in one of the following areas of emphasis:
TDMV 111. Advanced Ballet
TDMV 122. Advanced Contemporary Dance
TDMV 133. Advanced Jazz
16. One four-unit advanced movement course outside the area of emphasis selected in number 15.

Note: TDGE 197 and 199 may not be used as upper-division electives by theatre and dance majors unless approved by petition.

THE THEATRE MINOR

Minor forms are available at the advising office of the student's college. Minor courses may not be taken on a Pass/Not Pass basis.

The minor requirements are those published in the catalog in effect for the first quarter that a first-year student attends UCSD; transfer students will be held to the catalog requirements two years previous to their first quarter at UCSD.

Lower-Division Requirements

1. One course from
TDPR 1. Practicum–Scenery
TDPR 2. Practicum–Costumes
TDPR 3. Practicum–Lighting
TDPR 5. Practicum–Sound
2. One course from the following list:
TDHT 21. Performance Dynamics: Spaces, Performers, and Audiences
TDHT 22. One Actor, Two, or More: How Theatre Peoples the World
TDHT 23. Social Contexts of Performance
TDAC 1. Introduction to Acting
TDDE 1. Introduction to Design
TDPW 1. Introduction to Playwriting

Upper-Division Requirements

3. Any five four-unit, upper-division theatre courses chosen from the following subjects: TDAC, TDDE, TDDR, TDGE, TDHT, TDPR, TDPW.

THE DANCE MINOR

Minor forms are available at the advising office of the student's college. Minor courses may not be taken on a Pass/Not Pass basis.

The minor requirements are those published in the catalog in effect for the first quarter that a first-year student attends UCSD; transfer students will be held to the catalog requirements two years previous to their first quarter at UCSD.

Dance Minor Requirements

Lower-Division Requirements

1. One course from
TDPR 1. Practicum–Scenery
TDPR 2. Practicum–Costumes
TDPR 3. Practicum–Lighting
TDPR 5. Practicum–Sound
2. TDTR 10. Introduction to Dance

Upper-Division Requirements

3. One choreography course chosen from
TDCH 140. Improvisation/Composition
TDCH 142. Choreographic Workshop
TDCH 145. Music for Dance Composition
or
One dance history course chosen from
TDHD 171. Dance History I (Ancient to 1900)
TDHD 172. Dance History II (1900 to 1960)
TDHD 173. Dance History III (1960 to present)
TDHD 174. Dance Aesthetics and Criticism
TDHD 175. Cultural Perspectives on World Dance
4. Three movement courses:
TDMV 110. Intermediate Ballet
TDMV 111. Advanced Ballet
TDMV 112. Advanced Ballet for Contemporary Dance
TDMV 120. Intermediate Contemporary Dance
TDMV 122. Advanced Contemporary Dance
5. Four units movement, theory, or choreography chosen from
TDMV 133. Advanced Jazz
TDMV 142. Latin Dance of the World

TDMV 143. West African Dance
TDMV 144. Asian Dance
TDTR 101. Dance Movement Analysis
TDTR 103. Dance and Technology
TDTR 104. Dance Theory and Pedagogy
TDCH 143. Choreography and Dramatic Text

Honors Program

The department offers a special program of advanced study for outstanding undergraduates majoring in theatre or dance. Successful completion of the Honors Program enables the student to graduate With Highest Distinction (A+), With High Distinction (A), or With Distinction (A-), depending upon performance in the program.

Eligibility

1. Junior standing (ninety units or more completed)
2. 3.7 GPA or better in the major
3. 3.5 GPA or better overall, which student must maintain until final graduation
4. Completion of at least four upper-division theatre courses
5. Recommendation of a faculty sponsor who is familiar with the student's work

Guidelines

Application to the Honors Program may be made upon completion of ninety units or no later than the fifth week of the quarter preceding the final two quarters before graduation. The Undergraduate Committee will consider the application and, if approved, the student and the principal advisor will have the responsibility of proposing an Honors Thesis Committee to the Undergraduate Committee for final approval.

Students are required to take THGE 196A, Honors Studies in Theatre, and 196B, Honors Thesis in Theatre, in addition to the thirteen upper-division required courses for the major. THGE 196A-B are to be taken consecutively and may not be taken concurrently.

Placement and Proficiency for Dance Majors

The technical command and the expansion of a vocabulary of movement are essential to the dancer's creative expression. The faculty advise new students in dance to participate in beginning dance in all areas for a minimum of one year, as well as enrolling in TDTR 10, Introduction to Dance. These courses are designed to give the student the basic information needed to move on to the intermediate level. Students should remain in this level for a minimum of one year unless the instructor encourages them to move up to the advanced level. All students are required to audition and be approved by the faculty to be enrolled in advanced dance courses. If you come to UCSD with a background in dance and would like to take an advanced class, you need to audition in the class of your choice on the first day of the class meeting so that the teacher can

accept you in the class or recommend another more appropriate class.

Undergraduate Student Petitions

Undergraduate student petitions are required whenever an exception to a rule is being requested. They are required for major or minor requirement substitutions, substitution of courses from other departments or institutions, late course adding or dropping, or requesting a retroactive incomplete grade. Students should submit petitions for course substitutions well in advance of taking the course. If they have difficulty with the form, students should have the Department of Theatre and Dance undergraduate coordinator assist them with the petition process to ensure that the petition is complete and well documented.

Receiving Transfer Credit

Students must petition the department to substitute courses taken in another department or institution for courses required by the Department of Theatre and Dance. The following procedures and guidelines will help students with the transfer petition process.

First, review the Department of Theatre and Dance residency requirement. It is generally a good idea to petition a course before taking it. The Department of Theatre and Dance undergraduate coordinator will review petitions for all transfer courses. Students may obtain a General Undergraduate Student Petition form on TritonLink. A detailed syllabus for the course to be evaluated must be attached to the completed petition form. Any petition relating to courses within the Department of Theatre and Dance should be dropped off at the main office during normal business hours.

Transfer credits must be accepted by the Admissions Office at the appropriate level and for the appropriate number of units for the substitution to be effective. Upper-division credit cannot be given for lower-division work. Course work done at a junior college can only transfer to UCSD as lower-division credit.

Theatre and Dance Performance and Production Opportunities

The Department of Theatre and Dance produces undergraduate productions throughout the academic year. These productions range in scale from student directed "black box" productions to full-scale faculty directed undergraduate productions on the main stage. Every effort is made to provide a faculty directed opportunity for undergraduates each quarter.

Each of these productions is staged with undergraduate actors and dancers. Historically, where there are design assignments to be made (sets, costumes, lights, sound), those assignments are given to qualified undergraduates. Upper-division credit is available for students involved in the design or staging of department productions. Students may not work on department productions unless they are formally enrolled in a related class. Information regarding design and advanced crew opportunities is typically available from the design faculty or may

be posted on the bulletin board in the lobby of Galbraith Hall as opportunities arise.

Cabaret

Cabarets are independent productions that are produced in Galbraith Hall Studio Theatre 157. Students may submit proposals for cabarets one quarter in advance to the cabaret manager. The cabaret policy is subject to revision on a quarterly basis. Please check at the front desk for details and deadlines.

Undergraduate Audition Policy

Undergraduates are encouraged to audition for all shows produced in the department. Auditions are typically held in the quarter preceding the staging of a production. Audition announcements will be posted on the bulletin board in the lobby of Galbraith Hall. Undergraduates who have completed or are currently enrolled in TDAC 1, Introduction to Acting are eligible to audition. Qualified undergraduates may audition for roles in graduate productions as they are available.

UCSD Dance Repertory

This repertory is open to dance students through auditions. The company will perform lecture-demonstrations, and performances, and teach master classes in the community or at other UC campuses.

Annual Dance Concerts

Two main stage and one studio theatre dance concert are presented each year. In fall quarter a small-scale faculty-directed laboratory or cabaret performance is presented in the Molli and Arthur Wagner Dance Building's Studio Theatre. In winter quarter's *Dance Alive* concert, students perform choreography created by the professional faculty and international guest artists in the Mandell Weiss Center for the Performing Arts, Forum Theatre, or the Potiker Theatre; and in spring quarter's *New Works* student dance concert, students perform the faculty-directed experimental choreographic works for other students at the Potiker Theatre. In addition, smaller productions and student cabarets take place in our intimate Studio Theatre, located in the dance facility. Auditions are held at the beginning of the quarter for all productions. Students interested in performing in the winter concert must audition for a specific repertory class taught by the faculty or guest choreographer with whom they wish to work. Students who are then cast must enroll in both the appropriate Dance Repertory (TDPF 160, 161, 162) and Studies in Performance (TDPF 163). Students interested in performing in the spring concert must audition at the beginning of spring quarter; if cast, they enroll in Studies in Performance (TDPF 160, 161, 162). Students participating in either dance production are required to be concurrently attending a technique class. Students who wish to choreograph for the spring concert must have completed or be concurrently enrolled in a choreography class.

Ushering

A fantastic and simple way for students to become involved with the Department of Theatre and Dance is to be a volunteer usher. When a student volunteers, he or she will receive a complimentary

ticket and a guaranteed seat to a predetermined performance in exchange for carrying out easy but important front-of-house tasks (such as tearing tickets, seating patrons, or handing out programs). Ushering is fun and easy—no experience is required and all majors are welcome.

To inquire about usher availability, contact the Theatre and Dance promotions manager at promotions@ucsd.edu and put the word "USHER" (in all caps) in the subject line. Someone will respond to your inquiry with more information in a timely manner.

Comps

Declared Theatre or Dance majors are eligible to receive one free complimentary ticket per departmental production. The complimentary tickets are on a first-come-first-served basis. Majors need to come into the department office and fill out a complimentary request form at least forty-eight hours prior to the performance. Majors will be notified through e-mail if the request cannot be filled. For the complete Complimentary Ticket Policy, please visit our Web site (<http://theatre.ucsd.edu>) or come into the office.

THE GRADUATE PROGRAM

MASTER OF FINE ARTS IN THEATRE JOINT DOCTORAL DEGREE PROGRAM

M.F.A. IN THEATRE

The Department of Theatre and Dance at UC San Diego has set an ambitious goal for its M.F.A. program: the training of artists who will shape the future direction of the theatre. The professional theatre training program is ranked third in the nation (and first west of the Hudson River), according to U.S. News & World Report, 1997.

The curriculum for all students involves studio classes and seminars. These are integrated with a progressive sequence of work on productions and with a professional residency at the La Jolla Playhouse.

The M.F.A. program at UCSD is built around the master-apprentice system of training. All the faculty are active professionals who teach at UCSD because of a shared commitment to training young artists. Instruction takes place not just in the classroom, but in theatres around the country where faculty, with students as assistants, are involved in professional productions, including those at the La Jolla Playhouse.

Students graduating from the M.F.A. program at UCSD should be prepared to take positions in the professional theatre in the United States and abroad. Students are now working in New York, in resident theatres, in the film and television industry, and in European repertory theatres. M.F.A. candidates in acting, dance theatre, design, directing, playwriting, and stage management will complete at least ninety quarter-units of academic work during their tenure in the program.

PROGRAM DESCRIPTIONS

Acting

The body and mind of the actor are synthesized to serve as an instrument of expression. Actors must depend on their instrument to perform, and the program places great emphasis on the strengthening and tuning of that instrument. The innate talent of the student is nurtured, coaxed, and challenged with individual attention from an extraordinary team of professionals and specialists in actor training.

Classes

Each year, intensive studio work in movement, voice, speech, and singing accesses, expands, and frees the physical body. Acting process introduces a range of improvisational and rehearsal techniques that help the actor approach onstage events with imagination and a rich emotional life. In the first year, studio classes guide the actor through daily explorations that encourage, change, and enhance artistic expression. The second year is devoted to the study of classical texts as well as the specific vocal and physical skills required to perform them. In the final year, classes focus on the needs of individual actors as they prepare to enter the professional world.

Productions

Actors work on classical and contemporary texts as well as new plays with graduate students, faculty, and professional guest directors. Each year the department schedules from fifteen to twenty productions of varying size and scope. Graduate students are given casting priority for all but a few plays. Student-scheduled and produced cabaret/workshop productions occur year-round and provide additional acting opportunities.

Externship

All graduate students serve a residency with the La Jolla Playhouse and are cast in positions ranging from supporting to leading roles alongside professional actors and directors of national and international stature. For many actors this opportunity establishes valuable networking relationships and exposure for future employment.

Research and Other Opportunities

Modest funds are sometimes available for the pursuit of research, special technique workshops, and travel to auditions and festivals. In addition, in the third year, the entire acting class receives a showcase presentation in both Los Angeles and New York at which specially invited groups of film, television, and theatre professionals are in attendance.

Dance Theatre

With an emphasis on the collaborative process, the purpose of the Dance Program is to create an intensive laboratory for candidates to pursue artistic processes that will hone their unique artistic voices. Dance Theatre artists are encouraged to explore and develop processes that employ both theatre and dance methodology, leading to the synthesis between choreographic, theatrical, visual, technological, and sound media.

Classes

The M.F.A. program in Dance Theatre provides an intensive laboratory for candidates to pursue processes that will hone their particular artistic voice in dance theatre. The curriculum is designed to allow graduate students to explore their own unique creative processes, to define their own particular aesthetic, and to discover and develop their own distinctive movement and performance language. Core courses consist of Choreography Seminars in the study and practice of aesthetic concepts, history, and methodology for choreographic creation of dance theatre; Dance Theatre Topics Seminars that provide in-depth discussion and research on a full spectrum of topics from collaborative processes to professional practice; costume, lighting, sound, and scenic design; and a rich offering of electives across media and between disciplines that allow each student to pursue individual areas of interest. Graduate students maintain a physical practice chosen from Graduate Studio offerings in contemporary practices, improvisation, ballet for contemporary dance, yoga, Pilates, and a range of Latin, African, and Asian dance forms.

Productions

Dance Theatre students will have the opportunity to create work throughout their time at UCSD in studio, workshop, cabaret, and site-specific productions. Second-year students will present a short work in the existing production in the spring quarter. Thesis projects of a significant dance theatre work will be fully executed by the extensive production talents of the M.F.A. design program in the winter quarter of the third year.

Externship

Students are encouraged to work or research in the field when time permits, and they are assisted with professional opportunities, typically in the spring or summer of the second year. Dance Theatre candidates may have an opportunity to gain production experiences in a variety of theatres and venues in San Diego, New York, Seattle, Los Angeles, and London, at the La Jolla Playhouse, or through a comparable professional residency experience.

Design

The design program aims to train students in the best professional practices of regional and commercial theatre. The design faculty are award-winning working professionals also committed to teaching. The design training program stresses an interaction with the works of many visual and sound artists from a wide range of disciplines. Students are trained to create designs that “comment” on the play and the text, not merely “illustrate” it. Students’ talent and design work are showcased at a number of venues that have directly resulted in many national grants, awards, and other work opportunities for our alumni.

Classes

All students take a core curriculum of first-year design studio classes in scenery, costume, lighting, and sound (taken together with directors), and a design seminar where all three years come together in a forum to share production experiences, portfolios, and professional career techniques and skills. This is

followed in subsequent years by more specialized advanced design classes that combine with production work in the student’s own area of concentration. A double-emphasis study (e.g., scenery and costume design combined) is offered to appropriate students. Classes in other areas (e.g., drafting, text analysis, visual arts, music) are also normally offered.

Productions

There are a generous number of (fully executed) production opportunities, and generally all productions are designed by students. Designers collaborate with student, faculty, and internationally prominent guest directors. Students are fully supported by the same professional workshop staff as the La Jolla Playhouse and are not expected to build or run their own productions.

Externship

Student designers participate in a residency program at the La Jolla Playhouse, and normally work as assistants to visiting professional designers. However, there are also some opportunities for talented students to be hired as principal designers by the Playhouse during its season.

Research and Other Opportunities

Students may also be offered opportunities to travel with faculty as assistants on professional assignments to major regional theatres, Broadway, England, or Europe. Modest funds are sometimes available for student research and travel to see productions and to attend conferences and workshops.

Directing

With an emphasis on the collaborative process, the purpose of the Directing Program is to develop directors with a solid foundation in the components of production and the interpretation of text. Individuals are encouraged to make challenging choices, to break down barriers, and to create exciting, meaningful theatre. Graduates of the program are prepared to select and get to the heart of a text, to communicate effectively with and inspire production designers, and to elicit expressive performances from the actors with whom they work.

Classes

The core curriculum of the Directing Process Program offers students opportunities to hone their skills in text analysis and scene work in all three years. The first-year student also completes a sequence in the acting process, develops a visual vocabulary in theatrical design and visual arts courses, and explores the nature of the collaborative process.

Productions

Directing students will direct from two to four department scheduled and supervised productions in the Mandell Weiss Center for the Performing Arts during their time at UCSD. In addition, studio, workshop, and cabaret productions of the director’s choice are strongly encouraged. The production season also offers opportunities to assist guest and faculty directors.

Externship

In the students' second year, the La Jolla Playhouse provides a residency during which students typically serve as assistant directors.

Additional Opportunities

It is common for the directing faculty to take M.F.A. directors with them to work as assistant directors at theatres around the United States and the world.

Playwriting

Playwrights are more than mere writers. They are artists who unleash their imagination in incredibly dramatic ways. The successful playwright writes with intellectual power and emotional honesty, with a distinct and essential voice that speaks with vulnerability and sentience to the heart and soul of the audience. The dedicated, individual attention and formidable production opportunities of the program offer talented writers the ability to stretch, expand, and witness the unfolding of their work onstage in the bodies of very gifted actors.

Classes

In Playwriting Seminar—the core course—writers in all three years read and discuss their ongoing work, focusing on style, character, and structure. They also observe their work being read by M.F.A. actors at times throughout the year. Writing for Television, Screenwriting, and Dramatization/Adaptation are offered in rotation within a three-year cycle. In addition, students take a variety of topics in theatre and dramatic literature along with individual practicum classes. Playwrights can take advantage of rich offerings in literature, music, visual arts, and language study, as well as in dramatic texts, theory, and design.

Production

First-year students receive a one-act showcase production each year, while second- and third-year students receive a fully designed production. These are produced in the New Plays Festival each spring, which is attended by literary managers, agents, and artistic directors from across the country. Typically, these productions are directed, designed, and acted by students in the M.F.A. program. Production of plays in any year of study is dependent on the readiness of the work for staging.

Externship

Each student is assisted with a carefully chosen assignment, typically in the summer of the second year. Our playwrights may have an opportunity to gain exceptional literary and production experiences in a variety of theatres and venues in New York, Seattle, Los Angeles, London, Germany, and Romania.

Stage Management

The stage manager is a pivotal member of the collaborative process and creates the environment that supports the work of the other members of the artistic team. The stage manager is the prime communicator and liaison who synthesizes the disparate elements of production into a cohesive whole and is

responsible for the implementation of diverse artistic choices throughout the production process.

The Stage Management Program at UCSD integrates a comprehensive knowledge of all critical components of this complex field in order to prepare students for work in leading professional theatres. The program develops individualized, creative artists with personal approaches to their work. UCSD creates a supportive and stimulating environment that allows each student to develop the confidence and flexibility necessary to meet the challenges of production in a wide variety of professional venues.

Classes

All first-year students take a core curriculum in stage management process that explores the role of the stage manager in professional theatre today and offers a comprehensive investigation of the work from pre-production to closing a show. Students in all three years attend the stage management seminar, which serves as a weekly forum for sharing insights and solving problems on current production assignments, meeting with a variety of guest artists, and examining the bigger picture of stage management and theatre in America today. Additional course work is offered in various aspects of theatre administration and management, professional practice, directing, design, and collaborative process.

Productions

Great emphasis is placed on the student's ability to apply the theories learned in class to the production process. Students typically serve as both assistant stage manager and stage manager on a number of studio and main stage productions in a variety of theatrical spaces. In addition to established scripts directed by M.F.A. students, faculty, and nationally prominent guest directors, students also work on new plays by graduate or guest playwrights, as well as faculty and student choreographed dance concerts.

Research Opportunities

Students are encouraged to work or research in the field when time permits. Past projects have included stage managing at the National Playwrights Conference at the O'Neill Center in Connecticut, interning at Warner Brothers Feature Animation, working as production assistant for the Broadway production of *Play On*, stage managing Andrei Serban's production of *Our Country's Good* at the Romanian National Theatre, and researching stage combat and weaponry at the Royal Shakespeare Company.

Externship

Each student is guaranteed at least one production opportunity at the La Jolla Playhouse, or a comparable professional residency experience.

PH.D. IN THEATRE AND DRAMA

The UCSD Department of Theatre and Dance and the Department of Drama at UC Irvine began to recruit students for the new Joint Doctoral Program in Theatre and Drama in fall 1999 for admission in fall 2000. Within the context of the program's twin focus on theory and history, an innovative structure permits each student to pursue a custom designed curriculum that draws from a rich variety of seminars

in faculty research areas that include Greek classical theatre; Shakespeare and his contemporaries; Italian, French, and German theatre; U.S.-Latino, African-American, and Asian-American theatre; and critical, historical, and performance theories.

Interested students are encouraged to request detailed information about the program and application materials, which will be available from either department each September.

Preparation

Students with a B.A. (minimum GPA: 3.5), M.A., or M.F.A. degrees in drama and theatre are eligible for admission to the doctoral program. Students with training in literature (or another area in the humanities) will also be considered, provided they can demonstrate a background in drama or theatre. Experience in one of the creative activities of theatre (acting, directing, playwriting, design, dramaturgy) will enhance chances of admission.

All applicants are required to take the Graduate Record Examination and to submit samples of their critical writing.

While not required for admission, a working knowledge of a second language is highly desirable (see "[Language Requirement](#)").

Course of Study

Students are required to take a minimum of 144 units, which is equivalent to four years of full-time study (full-time students must enroll for a minimum of twelve units each quarter). Forty of these units will be taken in required seminars; the balance will be made up of elective seminars, independent study, and research projects (including preparing the three qualifying papers), and dissertation research. Students must take a minimum of one seminar per year in the Department of Drama at UC Irvine. The program of study makes it possible for students to take a significant number of elective courses and independent studies both with faculty in drama and theatre and in other departments.

Required Seminars

1. A minimum of twelve units of TDGR 290 (Dramatic Literature and Theatre History to 1900).
2. A minimum of twelve units of TDGR 291 (Dramatic Literature and Theatre History 1900 to the Present).
3. A minimum of sixteen units of TDGR 292 (Cultural and Critical Theory).

These required seminars must be completed before the end of the student's third year. In addition to the ten required seminars, students must pass comprehensive examinations at the end of the first and second years (see "[Comprehensive Examinations](#)" below).

Comprehensive Examinations

In the first year, students prepare for the written comprehensive examination, which is based on a reading list of approximately 150 titles ranging from the ancient Greeks to the present. Students take the written comprehensive at the beginning of the fall quarter of the second year. (Comprehensive examinations are scheduled at the beginning of fall

quarter in order to allow the students the summer to prepare.) Students who fail the written comprehensive may retake it no later than the first week of winter quarter of the second year. Students who fail the written comprehensive for a second time are dismissed from the program.

In the second year, students prepare for oral comprehensive examination. The reading list for this examination is designed to permit the student to acquire a knowledge of his or her dissertation subject area, broadly conceived. The reading list is compiled by the student and his or her dissertation advisor, in consultation with other members of the faculty, as appropriate; the reading list must be established by the end of winter quarter of the second year. Students take the oral comprehensive at the beginning of the fall quarter of the third year. Students also submit a dissertation prospectus (approximately five pages) at the time of the oral comprehensive. Students who fail the oral comprehensive may retake it no later than the first week of winter quarter of the third year. Students who fail the oral comprehensive for a second time are dismissed from the program.

Advancement to Candidacy: Three Qualifying Papers

Students normally select a dissertation advisor during the second year and must do so before the end of spring quarter of that year. In consultation with the dissertation advisor and other faculty members, students develop topics for three qualifying papers, which are written during the third year. The three qualifying papers—one long (approximately fifty pages) and two short (approximately thirty pages each)—must be completed by the end of the third year; when completed, the qualifying papers provide the basis for the oral qualifying examination. Students write the long paper under the direction of the dissertation advisor; it is understood that the long paper is preparatory to the dissertation. The short papers deal with other related topics, subject to the approval of the student's advisors; the two short papers are understood as engaging in exploring the larger contexts of the dissertation. Students normally pass the qualifying examination and advance to candidacy at the end of the third year; students must advance to candidacy no later than the end of fall quarter of the fourth year. Once admitted to candidacy, students write the dissertation that, upon completion, is defended in a final oral examination. Students may select a dissertation advisor from either UCSD's Department of Theatre and Dance or UC Irvine's Department of Drama. All UCSD doctoral dissertation committees must include at least one faculty member from UC Irvine.

Language Requirement

Students are required to complete an advanced research project using primary and secondary material in a second language ("materials" should be understood as including live and/or recorded performance; interviews with artists, critics, and scholars; and other non-documentary sources, as well as more conventional textual sources). This requirement may be satisfied by writing a seminar paper or a qualifying paper (see "[Advancement to Candidacy](#)") that makes extensive use of materials in a second language. The second language requirement must be satisfied before the end of the third year. This

requirement will not be waived for students who are bi- or multilingual; all students are required to do research level work in more than one language.

It is assumed that students will have acquired a second language before entering the doctoral program, although second-language proficiency is not a requirement for admission. While students may study one or more second languages while at UC Irvine or UCSD, language classes may not be counted toward program requirements.

Teaching

Students are required to teach a minimum of four quarters. No more than eight units of apprentice teaching (TDGR 500) may be counted toward the required 144 units.

Departmental Ph.D. Time Limit Policies

Students must advance to candidacy by the end of the fall quarter of their fourth year. Departmental normative time for completion of the degree is five years; total registered time in the Ph.D. program at UCSD or UC Irvine cannot exceed seven years. While students with an M.A. or M.F.A. degree may be admitted to the Ph.D. program, they will be required to take all required doctoral seminars.

Financial Support

Students entering the Ph.D. program may be supported (by either employment or fellowships) for four years. Support depends on the funds available and on the student's rate of progress toward the degree.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Note: For changes in major requirements and in course offering implemented after publication, inquire at the office of the Department of Theatre and Dance.
The subject codes are

TDAC (formerly THAC) Theatre Acting
TDCH Dance Choreography
TDDE (formerly THDE) Theatre Design
TDDR (formerly THDR) Theatre Directing/Stage Management
TDGE (formerly THGE) Theatre General
TDGR (formerly THGR) Theatre Graduate
TDHD Dance History
TDHT (formerly THHS) Theatre History and Theory
TDMV Dance Movement
TDPF Dance Performance
TDPR (formerly THPR) Theatre/Dance Practicum
TDPW (formerly THPW) Theatre Playwriting
TDTR Dance Theory

TDAC—THEATRE ACTING

TDAC 1. Introduction to Acting (4)

A beginning course in the fundamentals of acting: establishing a working vocabulary and acquiring the basic skills of the acting process. Through exercises, compositions, and improvisations, the student actor explores the imagination as the actor's primary resource, and the basic approach to text through action. **Prerequisite:** none.

TDAC 101. Acting I (4)

This course focuses on beginning scene study with an emphasis on exploring action/objective and the given circumstances of a selected text. **Prerequisite:** THAC or TDAC 1 or consent of instructor.

TDAC 102. Acting II (4)

Further study in the application of the given circumstances to a text and the development of characterization. **Prerequisite:** THAC or TDAC 101 or consent of instructor.

TDAC 103A. Acting Intensive I (4)

An intensive foundation class for students interested in professional actor training. Using Viewpoints, students will train the physical, vocal, and emotional aspects of their actor instrument toward developing character and relationships by using scenes from contemporary and modern plays. **Prerequisites:** THAC 101 or TDAC 101, department stamp, and consent of instructor.

TDAC 103B. Acting Intensive II (4)

A continuation of TDAC 103A. Working from Meisner technique, students will learn to deepen and detail their objectives, spontaneous response, and deep listening skills. Focus on the process that will lead to scenework using this technique. **Prerequisites:** TDAC 103A, department stamp, and consent of instructor.

TDAC 104. Classical Text (4)

Studies in the heightened realities of poetic drama. Verse analysis, research, methods and how to approach a classical dialogue. **Prerequisites:** THAC or TDAC 102, and department stamp.

TDAC 105. Rehearsing Shakespeare (4)

Advanced exploration of Shakespeare's language through examining and performing scenes from the plays. Admission by audition/interview. **Prerequisites:** THAC 102 or TDAC 102, department stamp, interview/audition, consent of instructor.

TDAC 106. Chekhov Acting (4)

Practical exercises, discussion, text analysis, and scene work on the writings of Anton Chekhov. Admission by audition/interview. **Prerequisites:** THAC 101 or TDAC 101, THAC 102 or TDAC 102, interview/audition, and consent of instructor.

TDAC 107. Improvisation for the Theatre (4)

Improvisation for the Theatre explores improvisation techniques as an alternative and unique approach to acting. Students should have a performance background. **Prerequisite:** THAC or TDAC 1.

TDAC 108. Advanced Topics (4)

Advanced topics in acting, such as avant garde drama, multimedia, or Beckett, for students who possess basic acting techniques. **Prerequisites:** THAC or TDAC 102, admission by audition, and department stamp.

TDAC 109. Singing for Actors (4)

This course introduces basic skills of breathing, placement, diction, musicianship, harmony, interpretation, and presentation needed by actors for roles requiring singing. Through a combination of group and individual coaching in class, students will prepare a program of short solo and ensemble pieces for a finals-week presentation. **Prerequisites:** THAC or TDAC 1 and audition; department stamp.

TDAC 111. Freeing the Voice (4)

Intensive workshop for actors and directors designed to "free the voice," with special emphasis on characteristics and vocal flexibility in a wide range of dramatic texts. This proven method combines experimental and didactic learning with selected exercises, texts, tapes, films, and total time commitment. **Prerequisite:** concurrent enrollment in THAC or TDAC 101.

TDAC 112. Major Seminar in Acting (4)

An in-depth study seminar focused on special issues in acting as they relate to contemporary theatre. Of particular interest to students who plan to pursue a career in this area of theatre. **Prerequisites:** department stamp; theatre majors only; upper-division only.

TDAC 115. Movement for Actors (4)

An exploration of the wide array of physical skills necessary for the actor. Using techniques derived from mime, clowning, sports, acrobatics, and improvisation, students

will investigate their individual physical potential as well as their sense of creativity and imagination. **Prerequisite:** THAC or TDAC 101.

TDAC 120. Ensemble (4)

An intensive theatre practicum designed to generate theatre created by an ensemble with particular emphasis upon the analysis of text. Students will explore and analyze the script and its author. Ensemble segments include black theatre, Chicano theatre, feminist theatre, and commedia dell'arte. Audition may be required. A maximum of four units may be used for major credit. (Cross-listed with ETHN 146A.) **Prerequisite:** department stamp.

TDAC 122. Ensemble: Undergraduate Production (4)

Participation in a fully staged theatre production directed by an M.F.A. or Ph.D. student for the Department of Theatre and Dance. Admission by audition only. A maximum of four units may be used for major credit. **Prerequisites:** consent of the instructor; department stamp.

TDAC 123. Advanced Studies in Performance (4)

Participation in a fully staged season production that is directed by a faculty member or guest for the Department of Theatre and Dance. Admission by audition only. A maximum of four units may be used for major credit. **Prerequisites:** consent of the instructor; department stamp.

TDAC 126. Acting-Directing Process (4)

A studio class that investigates the relationship between the actor and the director. Working alongside directors, students learn how to animate the writer's and director's vision onstage through status exercises and scene work while expanding their skills in the acting process. **Prerequisites:** THAC or TDAC 1 and THAC or TDAC 101, or consent of instructor.

TDCH—DANCE CHOREOGRAPHY

TDCH 40. Principles of Choreography (4)

Presents the fundamentals of the concepts, elements, aesthetics, and process of choreographic creation through practical studies, discussions, and examination of theories and major choreographic works. **Prerequisite:** TDTR 10.

TDCH 140. Improvisation/Composition (4)

The study of compositional and improvisation methods concerning the aesthetic awareness of movement, and organization of elements in time, space, and energy. Both structured and unstructured tasks facilitate development of movement vocabulary, imagination, timing, spontaneity, contact skills, and compositional choices. **Prerequisite:** TDTR 10.

TDCH 142. Choreographic Workshop (4)

Advanced problem solving through practical and conceptual studies. Choreographic projects enable students to create short works for solo, duet, and small group situations, with options of focus on cross-media collaboration, site specific work, dramatic text, and advanced partner work. **Prerequisites:** TDTR 10, TDCH 40.

TDCH 143. Choreography and Dramatic Text (4)

Choreographic problems in movement style and purpose will be explored through analysis of both historical and contemporary dramatic text. Emphasis will be places on dance as a complement to verbal communication and a medium for nonverbal communication. **Prerequisites:** TDTR 10, TDCH 40.

TDCH 145. Music for Dance Composition (4)

Presents the fundamentals of the concepts, elements, aesthetics, and process of music; explores choreographer/composer/musician collaborations. Rhythmic analysis will include the physical application of relating movement and sound. **Prerequisites:** TDTR 10, TDCH 40.

TDCH 146. Advanced Improvisation: Partnering (4)

Advanced problem solving through practical and conceptual studies pertaining to improvisation and partnering. **Prerequisites:** TDTR 10, TDCH 40, or consent of instructor.

TDCH 196A. Senior Honors Focus Choreographic (4)

Selected seniors create a significant choreographic work or media project under faculty mentorship for presentation in

the studio theatre, spring dance production, or site-specific alternative location. All courses in the choreography series must be completed or concurrent with the senior honors focus. Individual honors contract for selected senior dance majors. Honors content noted on transcript. Requirements: 3.5 overall GPA, 3.7 major GPA, 90 units completed, and 2 quarter commitment. **Prerequisites:** TDCH 40, TDCH 140, TDCH 142, TDCH 145, consent of instructor, and department stamp. May be taken two times for credit.

TDCH 196B. Senior Honors Focus Choreographic (4)

Continuation of TDCH 196A. Selected seniors present a significant choreographic work or media project under faculty mentorship in the studio theatre, spring dance production, or site-specific alternative location. All courses in the choreography series must be completed or concurrent with the senior honors focus. Individual honors contract for selected senior dance majors. Honors content noted on transcript. Requirements: 3.5 overall GPA, 3.7 major GPA, 90 units completed, and 2 quarter commitment. **Prerequisites:** TDCH 40, TDCH 140, TDCH 142, TDCH 145, TDCH 196A, consent of instructor, and department stamp. May be taken two times for credit.

TDDE—THEATRE DESIGN

TDDE 1. Introduction to Design for the Theatre (4)

A survey of contemporary and historical concepts and practices in the visual arts of the theatre; studies in text analysis, studio processes and technical production; elementary work in design criticism, scale model making, and costume design. A course serving as an introduction to theatre design and production.

TDDE 101. Theatre Process—Scenery (4)

A hands-on course develops craft skills and solution-finding process in design including script analysis, concept sketches, research, and scale model making. An exploration of fundamental ways of seeing and understanding visual design. **Prerequisite:** THDE or TDDE 1 or THPR 1.

TDDE 102. Advanced Scenic Design (4)

An advanced course based on the "practice" of scenic design, dealing with the solution finding process, from text to idea to realized work. **Prerequisite:** THDE or TDDE 1, THDE or TDDE 101, or consent of instructor.

TDDE 111. Theatre Process—Costume Design (4)

The process of the costume designer from script analysis and research visualization of ideas, through the process of costume design. Lecture and demonstration labs parallel lecture material. This course is intended for those interested in a basic understanding of the costumer's process. No previous drawing or painting skills required. **Prerequisite:** THDE or TDDE 1.

TDDE 112. Advanced Costume Design (4)

An advanced course based on the "practice" of costume design, dealing with the solution finding process, from text to idea to realized work. **Prerequisite:** THDE or TDDE 1, THDE or TDDE 111, or consent of instructor.

TDDE 113. Costume Design for Dance (4)

This course covers the basics of costume design specific to the needs of choreographers and dance productions. Topics include principles of design, rendering techniques, fabrics, and construction. The course also explores the collaborative process of design for dance. **Prerequisite:** TDDE 1 or consent of instructor.

TDDE 121. Theatre Process—Lighting Design (4)

One of three classes in theatre process. The course aims to develop basic skills in lighting design through practical projects, lab work and lecture. These emphasize collaborating, manipulating light and color, and developing craft skills. **Prerequisite:** THDE or TDDE 1 or THPR or TDPR 3 or consent of instructor.

TDDE 122. Advanced Lighting Design (4)

Creative projects and topics in lighting design. Work to include studies and design research, concepts, collaboration, professional procedures and systems, paperwork, and organization. Varies scales of theoretical and practical projects in the light lab and classroom will be addressed by the student for presentation and critique. Final project will be a lighting design suitable for a design portfolio.

Prerequisite: THDE or TDDE 1, THDE or TDDE 121, or consent of instructor.

TDDE 130. Assistant Designer (2–6)

A production-oriented course that continues to introduce students to the fundamentals of design assisting. Laboratory format allows the student to work with faculty, graduate, or advanced undergraduate theatre designers, doing research, developing design concepts, and supporting the designer in a number of professional ways. **Prerequisites:** THDE or TDDE 1, any upper-division undergraduate theatre design class, THPR or TDPR 1, 2, 3, or 5; and consent of instructor; department stamp. May be taken twice for credit.

TDDE 131. Special Topics in Theatre Design (4)

A course designed to expose the theatre design students to a variety of specialized topics that will vary from quarter to quarter. **Prerequisite:** THDE or TDDE 1 or consent of instructor. May be taken three times for credit.

TDDE 132. Undergraduate Mainstage Production: Design (4)

A course that will guide a student in a design assignment on the undergraduate main stage production. Specialized topics dependent on the design requirements of the production. **Prerequisites:** THDE or TDDE 1 and THDE or TDDE 101 or THDE or TDDE 121, or THDE or TDDE 131, or consent of instructor. May be taken three times for credit.

TDDE 141. Theatre Process—Sound Design (4)

A hands-on course on the process of sound design from conception to planning and implementation. The course will concentrate equally on the technical and artistic aspects of the sound design process and will include a survey of modern audio technologies. **Prerequisite:** TDPR 5 or MUS 173 or consent of instructor.

TDDE 142. Advance Sound Design (4)

This course focuses on advancing students in their artistic and technical skills in sound design. A large-scale project will be identified with special attention given to text analysis and technical specification of the sound design. **Prerequisites:** TDDE 1 and TDDE 141 or equivalent, or consent of instructor.

TDDE 190. Major Project in Design/Theatre Production (4)

For the advanced design/production student. Concentration on a particularly challenging design or theatre production assignment, including such areas as assistant designer (scenery, lighting, or costumes), technical director, master cutter, or master electrician. May be repeated one time for credit. A maximum of eight units of major project study, regardless of area (design, directing, or stage management) may be used to fulfill major requirements. **Prerequisite:** admission by consent of instructor only. See department for application form. May be taken two times for credit.

TDDR—THEATRE DIRECTING/STAGE MANAGEMENT

TDDR 101. Stage Management (4)

Discussion and research into the duties, responsibilities, and roles of a stage manager. Work to include studies in script analysis, communication, rehearsal procedures, performance skills, and style and conceptual approach to theatre. THGE or TDGE 1, THAC or TDAC 1, and THDE or TDDE 1 recommended.

TDDR 108. Text Analysis for Actors and Directors (4)

This is an introductory class in the process of understanding the play script. The class will focus on analyzing the story and the underlying dramatic structure in terms of dramatic action. Objectives, actions, choices, given circumstances, and character will be examined. **Prerequisite:** upper-division standing or consent of instructor.

TDDR 111. Directing-Acting Process (4)

A studio class that investigates the fundamental skills a director needs to work with actors. Working with actors, students learn how to animate the text onstage through status exercises and scene work as they develop their skill in

text work, staging, and dramatic storytelling. **Prerequisite:** THDR or TDDR 108 or THHS or TDHT 10.

TDDR 190. Major Project in Directing (4)

For the advanced student in directing. Intensive concentration on the full realization of a dramatic text from research and analysis through rehearsal and into performance. A maximum of eight units of major project study, regardless of area (design, directing, or stage management) may be used to fulfill major requirements. See department for application. **Prerequisites:** THDR or TDDR 108, THDR or TDDR 111, consent of instructor, and department stamp. May be taken two times for credit.

TDDR 191. Major Project in Stage Management (4)

For the advanced student in stage management. Intensive concentration on the full realization of a dramatic text, from research and analysis through rehearsal and final performance. A maximum of eight units of major project study regardless of area (design, directing, stage management, or playwriting) may be used to fulfill major requirements. See department for application. **Prerequisites:** THPR or TDPR 4, THPR or TDPR 104, THDR or TDDR 101, consent of instructor, and department stamp. May be taken two times for credit.

TDGE—THEATRE GENERAL

TDGE 1. Introduction to Theatre (4)

An introduction to fundamental concepts in drama and performance. Students will attend performances and learn about how the theatre functions as an art and as an industry in today's world. **Prerequisite:** none.

TDGE 2. Solo Performance (4)

Analysis, history, and literature of solo performance in the United States; screening of pivotal one-person shows; workshops to design and mount students' own solo theatre pieces; focus on delivery of American experiences through performance. **Prerequisite:** none.

TDGE 10. Theatre and Film (4)

Theatre and Film analyzes the essential differences between theatrical and cinematic approaches to drama. Through selected play/film combinations, the course looks at how the director uses actors and the visual languages of the stage and screen to guide and stimulate the audience's responses. **Prerequisite:** none.

TDGE 11. Great Performances on Film (4)

Course examines major accomplishments in screen acting from the work of actors in films or in film genres. **Prerequisite:** none. May be taken three times for credit.

TDGE 25. Public Speaking (4)

This course is designed to establish a clear understanding of the fundamentals of effective oral communication. The methodologies explore the integration of relaxation, concentration, organization, and clear voice and diction as applied to various public speaking modes. **Prerequisite:** none.

TDGE 87. Freshman Seminar in Theatre and Dance (1)

Seminar on a topic in theatre or dance on a level appropriate for first-year students, conducted in an informal, small group setting limited to ten to twenty students. Topics will vary. **Prerequisite:** open to freshmen only.

TDGE 90. Undergraduate Seminar (1)

Discussion of various theatre topics.

TDGE 108. Production (4)

The collaborative process from the rehearsal process through public performance. All participants will enroll for the same number of units with the director of theatre. **Prerequisite:** consent of instructor.

TDGE 122. The Films of Woody Allen (4)

Students explore a variety of issues: screenwriting, directing, cinematography, and editing; the intersection of comedy and tragedy in Allen's works; recurring themes; and critical responses. Students view thirteen films and write two three-page essays and one ten-page research paper. **Prerequisite:** upper-division standing.

TDGE 123. Mary Poppins Meets Bladerunner (4)

A lecture class that examines significant historical and contemporary art direction/scenic design that effectively supports film narration in a unique manner. Highlights and video clips accompany each feature film presentation. (THDE 1 recommended.) **Prerequisite:** upper-division standing.

TDGE 124. Cult Films: Weirdly Dramatic (4)

A select survey of eight to ten exceptional offbeat, frequently low-budget films from the last sixty years that have attained cult status. The mix includes Tod Browning's *Freaks* (1932) to John Water's *Pink Flamingos* (1973). Aspects of bad taste, cinematic irony, and theatrical invention will be highlighted. **Prerequisite:** upper-division standing.

TDGE 125. Topics in Theatre and Film (4)

Great films and the performance of the actors in them are analyzed in their historical, cinematic, or theatrical contexts. This course examines the actor's contribution to classic cinema and the social and aesthetic forces at work in film. **Prerequisites:** upper-division standing or consent of instructor.

TDGE 126. Storytelling and Design in Animation (4)

This course will use a broad range of animation styles and genres to examine larger issues in art practice, focusing closely on the relationship between form and content, and how sound/set/costume/character design impacts narrative. **Prerequisite:** upper-division standing or consent of instructor.

TDGE 127. The Films of Spike Lee (4)

Students view eight to ten films of this important filmmaker to examine style; genre; screenwriting; directing; cinematography; recurring themes; the place of this work in (African) American history; race and movie industry politics; and critical responses. **Prerequisite:** upper-division standing or consent of instructor.

TDGE 130. Let There Be Light! (4)

An adventure-theory class investigating the power of light and color in art, architecture, theatre, film, and television, and exploring its impact on students' lives. Students will perform research, submit papers, and create practical examples. No prior light/design skills required. **Prerequisites:** none.

TDGE 192. Senior Seminar in Theatre and Dance (1)

The Senior Seminar Program is designed to allow senior undergraduates to meet with faculty members in a small group setting to explore an intellectual topic in theatre and dance (at the upper-division level). Topics will vary from quarter to quarter. Senior seminars may be taken for credit up to four times, with a change in topic, and permission of the department. Enrollment is limited to twenty students, with preference given to seniors. **Prerequisites:** senior standing; department stamp and/or consent of instructor.

TDGE 195. Instructional Assistance (2 or 4)

Assist with instruction in undergraduate theatre courses. Full description of duties will appear on the "Application for Instructional Assistance." **Prerequisites:** upper-division standing; 3.0 GPA; department stamp. May be repeated for a total of 8 units.

TDGE 196A. Honors Study in Theatre (4)

Theatre honors students undertake research for a scholarly thesis or a creative project in playwriting or in directing under the guidance of a faculty mentor. Creative projects will culminate in a written thesis that is either a full-length play or a dramaturgical discussion of the directing project. **Prerequisites:** upper-division course work in the area of thesis, department stamp, 3.5 GPA in major, approval of faculty member.

TDGE 196B. Honors Study in Theatre (4)

Theatre honors students complete the thesis, play, or dramaturgical analysis of a directing project under the close supervision of a faculty mentor. **Prerequisites:** upper-division course work in the area of thesis, TDGE 196A, 3.5 GPA in major, approval of faculty member.

TDGE 197. Field Studies (1–12)

Designed for advanced students, this course significantly extends their knowledge of the theatre through intensive participation in the creative work of a major professional

theatre, television, or film company under the guidance of artists resident in those theatres or companies. Students will submit regular written evaluations each week of their ongoing field study. **Prerequisites:** consent of instructor, upper-division standing, and department stamp. May be taken two times for credit.

TDGE 198. Directed Group Studies (0-2-4)

Group studies, readings, projects, and discussions in theatre history, problems of production and performance, and similarly appropriate subjects. **Prerequisites:** upper-division standing, 2.5 GPA, consent of instructor, and department stamp. May be repeated for a total of 12 units.

TDGE 199. Special Projects (0-2-4)

Qualified students will pursue a special project in theatre history, problems of production and performance, and similarly appropriate topics. **Prerequisites:** upper-division standing, 2.5 GPA, consent of instructor, and department stamp.

TDHD—DANCE HISTORY

TDHD 171. Dance History I (Ancient to 1900) (4)

The study of the history of dance from antiquity to the early twentieth century. An analysis and understanding of the social, political, and cultural forces on the development of early dance theories and practices. **Prerequisite:** TDTR 10. Not equivalent to THDA 151, Dance History–Ballet.

TDHD 172. Dance History II (1900 to 1960) (4)

The study of the history of dance from the early twentieth century to the 1960s. An analysis and understanding of the social, political, and cultural forces on the development of dance theories and practices. **Prerequisite:** TDTR 10. Not equivalent to THDA 152, Dance History–Modern.

TDHD 173. Dance History III (1960 to Present) (4)

The study of the history of dance from the 1960s to the present. An analysis and understanding of social, political, and cultural forces on the development of current dance theories and practices. **Prerequisite:** TDTR 10. Not equivalent to THDA 151, Dance History–Jazz Dance and Related Ethnic Studies.

TDHD 174. Dance Aesthetics and Criticism (4)

An historical overview of the aesthetic concepts that form the foundation for the creation, performance, and critical analysis of dance. Critical and aesthetic theory in related arts will be discussed and contrasted. **Prerequisite:** TDTR 10 or consent of instructor.

TDHD 175. Cultural Perspectives on World Dance (4)

The study of world dance forms from a global perspective. An analysis and understanding of ethnic dance traditions and their connections to religion, ritual, folklore, custom, festive celebration, popular culture, and political movements. **Prerequisite:** TDTR 10 or consent of instructor.

TDHD 176. Dance History—Special Topics (4)

An in-depth exposure to an important topic in dance history, theory, aesthetics, and criticism. Topics vary from quarter to quarter. **Prerequisites:** TDTR 10, upper-division standing.

TDHD 196A. Senior Honors Focus Scholarly (4)

Selected seniors will complete a scholarly research project on a dance topic of their choice under faculty mentorship that will be reviewed by the faculty and archived. All courses in the history series must be completed or concurrent with the senior honors focus. Individual honors contract for selected senior dance majors. Honors content noted on transcript. Requirements: 3.5 overall GPA, 3.7 major GPA, 90 units completed, and 2 quarter commitment. **Prerequisite:** TDHD 171, TDHD 172, TDHD 173, TDHD 174, TDHD 175, consent of instructor, and department stamp.

TDHD 196B. Senior Honors Focus Scholarly (4)

Continuation of TDHD 196A. Selected seniors will present a scholarly research project on a dance topic of their choice under faculty mentorship that will be reviewed by the faculty and archived. All courses in the history series must be completed or concurrent with the senior honors focus. Individual honors contract for selected senior dance majors. Requirements: 3.5 overall GPA, 3.7 major GPA, 90 units completed, and 2 quarter commitment. **Prerequisites:**

TDHD 171, TDHD 172, TDHD 173, TDHD 174, TDHD 175, TDHD 196A, consent of instructor, and department stamp.

TDHT—THEATRE HISTORY

TDHT 10. Introduction to Play Analysis (4)

An introduction to the fundamental techniques of analyzing dramatic texts. Focus is on the student's ability to describe textual elements and their relationships to each other as well as on strategies for writing critically about drama. **Prerequisites:** none.

TDHT 21. Ancient and Medieval Theatre (4)

Ancient and medieval theatre. Explores the roots of contemporary theatre in world performance traditions of ancient history with a focus on humans' gravitation toward ritual and play. Examples come from Egypt, Greece, Rome, Mesoamerica, Japan, China, India, Indonesia, Persia, and England. **Prerequisite:** none.

TDHT 22. Theatre 1500–1900 (4)

Explores varieties of drama in professional theatre from 1500 to 1900 in Europe, Japan, and China, and their interconnections both formal and historical. **Prerequisite:** none.

TDHT 23. Twentieth-Century Theatre (4)

Twentieth-century theatre: a survey of drama from 1900 to 1990, with attention also paid to the development of avant-garde performance forms. Plays discussed reflect developments in Europe and the U.S., but also transnational, postcolonial perspectives. **Prerequisite:** none.

TDHT 101. Topics in Dramatic Literature and Theatre History (4)

An in-depth exposure to an important individual writer or subject in dramatic literature and/or theatre history. Topics vary from quarter to quarter. Recent courses have included Modern French Drama, and the History of Russian Theatre. **Prerequisite:** THHS or TDHT 10 or consent of instructor. May be taken three times for credit.

TDHT 101XL. Topics in Dramatic Literature and Theatre History: Foreign Language Discussion Section (1)

Foreign-language discussion of materials in the English-language course with corresponding number. This section is taught by the course professor, has no final exam, and does not affect the grade in the parent course. **Prerequisite:** concurrent enrollment in TDHT 101.

TDHT 102. Masters of Theatre (4)

Focus on the artists of seminal importance in the theatre. Consideration will be given to theory and practice of the artist, with emphasis on theatrical realizations that can be reconstructed by integrated research. Examples of recent courses include Molière, Fugard, and Strindberg. **Prerequisite:** THHS or TDHT 10 or consent of instructor. May be taken three times for credit.

TDHT 103. Asian American Theatre (4)

This course examines pivotal dramatic works in the history of professional Asian American theatre in the U.S. (1960s to the present). Issues include interculturalism, the crossover between minority theatres and mainstream venues, and the performance of identity. **Prerequisite:** THHS or TDHT 10 or consent of instructor.

TDHT 104. Italian Comedy (4)

Continuities and changes in Italian comedy from the Romans through the Renaissance and commedia dell'arte to modern comedy. **Prerequisite:** THHS or TDHT 10 or consent of instructor.

TDHT 105. French Comedy (4)

Masterpieces of French farce and comedy from the seventeenth century to the twentieth century studied their theatrical and cultural contexts. Readings include plays by Molière, Marivaux, Beaumarchais, and Feydeau. **Prerequisite:** THHS or TDHT 10 or consent of instructor.

TDHT 106. Brecht and Beyond (4)

Examination of the German playwright and director, Bertolt Brecht and of recent representative plays and performances from world theatre that reveal a creative assimilation of Brecht's influence on artists including Peter Weiss, Heiner

Muller, Augusto Boal, and Tony Kushner. **Prerequisite:** THHS or TDHT 10 and TDHT 21 or consent of instructor.

TDHT 106XL. Brecht and Beyond: Foreign

Language Discussion Section (1)

Foreign language discussion of materials in the English-language course with corresponding number. This section is taught by the course professor, has no final exam, and does not affect the grade in the parent course. **Prerequisite:** concurrent enrollment in TDHT 106.

TDHT 107. American Theatre (4)

In this course we will examine representative plays and playwrights who write about the American experience from a variety of historical periods and diverse cultural communities. Playwrights will include O'Neill, Glaspell, Miller, Williams, Hellman, Wasserstein, Wang, and Parks. **Prerequisite:** THHS or TDHT 10 or consent of instructor.

TDHT 108. Luis Valdez (4)

In this course examines the works of Luis Valdez, playwright, director, screenwriter, film director, and founder of the Teatro Campesino. Readings include plays and essays by Valdez and critical books and articles about this important American theatre artists. **Prerequisite:** THHS or TDHT 10 or consent of instructor.

TDHT 109. African American Theatre (4)

This course provides a survey of the contributions to the theatre arts made by African Americans. Analytic criteria will include the historical context in which the piece was crafted; thematic and stylistic issues; aesthetic theories and reception. **Prerequisite:** THHS 10 or TDHT 10 or consent of instructor.

TDHT 110. Chicano Dramatic Literature (4)

Focusing on the contemporary evolution of Chicano dramatic literature, this course will analyze playwrights and theatre groups that express the Chicano experience in the United States, examining relevant "actors," plays, and documentaries for their contributions to the developing Chicano theatre movement. (Cross-listed with Ethnic Studies 132.) **Prerequisite:** THHS or TDHT 11 or 12 or 13 or consent of instructor.

TDHT 111. Hispanic-American Dramatic Literature (4)

Course examines the plays of leading Cuban-American, Puerto-Rican, and Chicano playwrights in an effort to understand the experience of these Hispanic-American groups in the United States. (Cross-listed with Ethnic Studies 133.) **Prerequisite:** THHS or TDHT 11 or 12 or 13 or consent of instructor.

TDHT 112. Gay and Lesbian Themes in U.S. Latino Theatre (4)

This course examines plays by Latina and Latino playwrights that include characters who are gay, lesbian, bisexual, or transgendered. Readings include the plays as well as articles and essays about the plays, playwrights, and queer theory. **Prerequisites:** THHS or TDHT 10 and 13.

TDHT 113. Avant-Garde Theatre (4)

Innovations in theatre production and performance since the late nineteenth century. Artists and movements studied include Jarry, Appia, Constructivism, Expressionism, Dada cabaret, performance art, and dance theatre. Complements TDHT 13's focus on dramatic innovation. **Prerequisite:** THHS or TDHT 10 or consent of instructor.

TDHT 114. American Musical Theatre (4)

The class will explore this vital and unique theatre form by examining its origins, evolution components, and innovators. Special emphasis is placed on the process of adaptation and the roles of the director and choreographer. **Prerequisites:** upper-division standing; THHS or TDHT 10; or consent of instructor.

TDHT 115. History and Theory of Directing (4)

Evolution of directing theory from 1850 to the present with reference to the work of internationally influential directors such as Saxe-Meiningen, Antoine, Stanislavski, Meyerhold, Brecht, and Brook, among others. **Prerequisite:** THHS or TDHT 10, TDHT 21 and THAC 101 or TDAC 101 or consent of instructor.

TDHT 116. Old Myths in New Films (4)

The course will address the work of different writers each quarter, showing how their films derive from classic myths, legends, and traditions of a specific ethnic group. Authors discussed may include Kurosawa (Japanese), Herzog (German), Neil Jordan (Irish), and other moderns. **Prerequisite:** upper-division standing or consent of instructor. May be taken three times for credit.

TDHT 118. Dramaturgy in Practice (4)

Provides opportunities for students to undertake dramaturgy assignments for productions or as projects. Class meetings will create a mentoring atmosphere focused on the concrete, day-to-day process of dramaturging a project. **Prerequisites:** Theatre major, THHS or TDHT 11, 12, 13, and TDHT 118; at least two UD History courses; consent of instructor.

TDMV—DANCE MOVEMENT

TDMV 1. Beginning Ballet (2)

An introduction to classical ballet principles, technique, and terminology. Develops the body for strength, flexibility, and artistic interpretation. Emphasis on developing a foundation in classical movement for continuation of ballet training. Historical origin of ballet will be discussed. **Prerequisite:** none. May be taken six times for credit.

TDMV 2. Beginning Contemporary Dance (2)

Introduction to contemporary dance as an expressive medium, building technical skills at the beginning level. Pattern variations analyzed in time, space, design, and kinetic sense. Movement exploration includes improvisation and composition. **Prerequisite:** none. May be taken six times for credit.

TDMV 3. Beginning Jazz (2)

Introduction to the technique of jazz dance, while placing the art form in its historical context as an American vernacular form. Builds a beginning technical jazz vocabulary with a focus on rhythmic exercises, isolations, turns, and locomotor combinations. **Prerequisite:** none. May be taken six times for credit.

TDMV 11. Theatrical Tap (2)

The study of theatrical tap dance. Various styles of tap—such as classical, rhythm, and musical theatre—will be introduced. Emphasis on rhythm, coordination, timing, and theatrical style. Includes basic through intermediate tap movement. **Prerequisite:** none.

TDMV 110. Intermediate Ballet (4)

Continued studio work in ballet technique at the intermediate level and terminology. Emphasis on increasing strength, flexibility, and balance, and the interpretation of classical musical phrasing. Includes proper alignment training and artistic philosophy of classical ballet. **Prerequisite:** six units of THDA or TDMV 1 or consent of instructor. May be taken six times for credit.

TDMV 111. Advanced Ballet (4)

Further emphasis on advanced ballet technique, performance, terminology, and an introduction to point work. Introduces historical ballet choreographic variations. Individual and group composition will be examined and aesthetic criticism applied. **Prerequisite:** twelve units of THDA 101A-B-C or TDMV 110 or consent of instructor. May be taken six times for credit.

TDMV 112. Advanced Ballet for Contemporary Dance (4)

Designed for students with advanced training in contemporary modern dance and intermediate to advanced training in ballet. Emphasis is on increasing composition and performance skills in ballet through contemporary modern dance aesthetics. **Prerequisite:** twelve units of THDA 101A-B-C or TDMV 111 or consent of instructor. May be taken six times for credit.

TDMV 120. Intermediate Contemporary Dance (4)

The development of contemporary dance as an expressive medium, with emphasis on technical skills at the intermediate level. Includes the principles, elements, and historical context of contemporary modern postmodern dance. **Prerequisite:** six units of THDA 2 or TDMV 2 or consent of instructor. May be taken six times for credit.

TDMV 122. Advanced Contemporary Dance (4)

The development of contemporary dance as an expressive medium, with emphasis on advanced technical skills, expressive style, and performance elements. Choreography and aesthetic concepts will be explored. Incorporates applied physiological principles of human movement. **Prerequisite:** twelve units of THDA 110A-B-C or TDHA 111A-B-C, or TDMV 112, or TDMV 120 or consent of instructor. May be taken six times for credit.

TDMV 130. Intermediate Jazz (2)

Designed to provide training in the technique of jazz dance, while placing the art form in its historical context as an American vernacular form. Builds an intermediate technical jazz level with a focus on style, musicality, dynamics, and performance. **Prerequisite:** six units of THDA 3 or TDMV 3 or consent of instructor. May be taken six times for credit.

TDMV 133. Advanced Jazz Dance (4)

Further development in the technique of jazz dance, while placing the art form in its historical context as an American vernacular form. Builds an advanced technical jazz level with a focus on style, musicality, dynamics, and performance. **Prerequisite:** six units of THDA 120A-B-C or THDA 121A-B-C or TDMV 130 or consent of instructor. May be taken six times for credit.

TDMV 138. Hip-Hop (2)

An introduction to the basic technique of hip-hop, studied to enhance an understanding of the historical cultural content of the American form hip-hop and street dances in current choreography. **Prerequisite:** THDA 3 or TDTR 10 or consent of instructor. May be taken twice for credit.

TDMV 139. Pilates Dance Conditioning (2)

A conditioning program based on the teachings of Joseph Pilates, designed to correct muscular imbalances, and body alignment by incorporating strength, flexibility, and relaxation techniques. **Prerequisite:** THDA 1 or THDA 2 or THDA 3 or TDMV 1 or TDMV 2 TDMV 3 or consent of instructor. May be taken three times for credit.

TDMV 140. Beginning Dances of the World (2)

Courses designed for the in-depth study of the dances and historical context of a particular culture or ethnic form: Afro-Cuban, Spanish, Balinese, Japanese, Latin, etc. Specific topic will vary from quarter to quarter. **Prerequisite:** upper-division standing.

TDMV 141. Advanced Dances of the World (4)

Courses designed for the advanced continuing study of the dances and historical context of a particular culture or ethnic form: Afro-Cuban, Spanish, Balinese, Japanese, Latin, etc. Specific topic will vary from quarter to quarter. **Prerequisite:** THDA 132 or TDMV 136 or TDMV 142 or TDMV 143 or TDMV 144, or consent of instructor.

TDMV 142. Latin Dance of the World (4)

To develop an appreciation and understanding of the various Latin dances. Emphasis on learning basic social dance movement vocabulary, history of Latin cultures, and use of each dance as a means of social and economic expression.

TDMV 143. West African Dance (4)

An introductory course that explores the history of West African cultures and diasporas through student research, oral presentation, dance movement, and performance. Contemporary African dances influenced by drum masters and performing artists from around the world are also covered. **Prerequisite:** upper-division standing.

TDMV 144. Asian Dance (4)

To develop an appreciation and understanding of the dances from various Asian cultures. Emphasis on learning the basic forms and movement vocabularies, their historical context, and the use of each dance as a means of cultural and artistic expression. **Prerequisite:** upper-division standing.

TDPF—DANCE PERFORMANCE

TDPF 160. Studies in Performance— Fall Production (2–4)

The in-depth study of a major dance production in a fall dance cabaret led by faculty. Admission by audition only.

Prerequisites: audition; department stamp; concurrent enrollment in TDMV 110, 111, 112, 120, 122, 130, or 133.

TDPF 161. Studies in Performance— Winter Production (2–4)

The in-depth study for a fully staged dance production in various venues, including a fall dance cabaret led by faculty, a winter faculty concert with guest choreographers, and a spring student choreographed concert directed by faculty. Admission by audition only. **Prerequisites:** audition, department stamp, concurrent enrollment in TDMV 163, TDMV 110 or TDMV 111 or TDMV 112 or TDMV 120 or TDMV 122 or TDMV 130 or TDMV 133. May be taken four times for credit.

TDPF 162. Studies in Performance Winter Production (2–4)

The in-depth study for a fully staged dance production in various venues, including a fall dance cabaret led by faculty, a winter faculty concert with guest choreographers, and a spring student choreographed concert directed by faculty. Admission by audition only. **Prerequisites:** audition, department stamp, concurrent enrollment in TDMV 163, TDMV 110 or TDMV 111 or TDMV 112 or TDMV 120 or TDMV 122 or TDMV 130 or TDMV 133. May be taken four times for credit.

TDPF 162. Studies in Performance Spring Production (2–4)

The in-depth study for a fully staged dance production in various venues, including a fall dance cabaret led by faculty, a winter faculty concert with guest choreographers, and a spring student choreographed concert directed by faculty. Admission by audition only. **Prerequisites:** audition, department stamp, concurrent enrollment in TDMV 163, TDMV 110 or TDMV 111 or TDMV 112 or TDMV 120 or TDMV 122 or TDMV 130 or TDMV 133. May be taken four times for credit.

TDPF 163. Dance Repertory (1–4)

The study and aesthetic examination of major choreographic works by dance faculty or distinguished guest artists. Students will experience the creative process, staging, production, and performance of a complete dance work in conjunction with a conceptual study of its form and content. Audition is required. **Prerequisite:** concurrent enrollment in TDPF 160 or TDPF 161 or TDPF 162. May be taken four times for credit.

TDPF 164. Performance Laboratory (2–4)

A faculty directed dance theatre project culminating in a public performance. Both purely choreographic approaches to creating dance and collaborations with visual design, musical composition, texts, film, and video will be explored, as well as participation in production elements. **Prerequisites:** audition and department stamp.

TDPR—THEATRE/DANCE PRACTICUM

TDPR 1. Practicum—Scenery (4–6)

A production performance oriented course that introduces fundamentals of scenery construction and its theatrical operation. Laboratory format allows students to work through the scenery production process culminating in a crew assignment for a fully mounted theatrical production. **Prerequisite:** department stamp required.

TDPR 2. Practicum—Costume (4–6)

A production performance oriented course that introduces fundamentals of costume construction and its integration into theatre operations. Laboratory format allows students to work through the costume production process culminating in a crew assignment for a fully mounted theatrical performance. **Prerequisite:** department stamp required.

TDPR 3. Practicum—Lighting (4–6)

A production performance oriented course that introduces fundamentals of stage lighting or sound and its technical operation. Laboratory format allows a student to work through the lighting or sound production process culminating in a crew assignment for a fully mounted theatrical production. **Prerequisite:** department stamp.

TDPR 5. Practicum—Sound (4–6)

A production performance-oriented course that introduces fundamentals of theatre sound and its technical operation. Laboratory format allows a student to work through the sound production process culminating in a crew assignment for a fully mounted theatrical production. **Prerequisite:** department stamp.

TDPR 102. Advanced Theatre Practicum (4–6)

A production performance-oriented course that continues the development of costume, lighting, scenery, or sound production and introduces greater responsibilities in the laboratory format. Students serve as crew heads on major departmental productions or creative projects. **Prerequisites:** THPR or TDPR 1, 2, 3, or 5; permission of instructor; department stamp required. May be taken for credit two times.

TDPR 104. Advanced Practicum in Stage Management (4–6)

A production performance oriented course that continues the development of stage management skills and introduces greater responsibilities in the laboratory format. Students serve as either assistant stage managers on mainstage productions or stage managers on studio projects. **Prerequisites:** THDR or TDDR 101 and consent of instructor. May be taken two times for credit.

TDPW—THEATRE PLAYWRITING

TDPW 1. Introduction to Playwriting (4)

Beginning workshop in the fundamentals of playwriting. Students discuss material from a workbook that elucidates the basic principles of playwriting, do exercises designed to help them put those principles into creative practice, and are guided through the various stages of the playwriting process that culminate with in-class readings of the short plays they have completed. **Prerequisite:** none.

TDPW 101. Playwriting Workshop (4)

A workshop where students present their plays at various stages of development for group analysis and discussion. Students write a thirty-minute play that culminates in a reading. Also includes writing exercises designed to stimulate imagination and develop writing techniques. **Prerequisite:** THPW or TDPW 1 or consent of instructor. May be taken two times for credit.

TDPW 102. Playwriting Workshop II (4)

Advanced workshop where students study the full-length play structure and begin work on a long play. Students present their work at various stages of development for group discussion and analysis. **Prerequisite:** THPW or TDPW 101 or consent of the instructor. May be taken for credit two times.

TDPW 104. Screenwriting (4)

Basic principles of screenwriting using scenario composition, plot points, character study, story conflict, with emphasis on visual action and strong dramatic movement. **Prerequisite:** THPW or TDPW 1. May be taken twice for credit.

TDPW 105. Writing for Television: Situation Comedy (4)

Basic principles of writing comedy for television. Course incorporates study of sample episodes. Analysis focuses on structure and character development. **Prerequisite:** THPW or TDPW 1. May be taken twice for credit.

TDPW 106. Writing for Television: Hour-Long Drama (4)

Basic principles of writing in the hour-long format for television. Course incorporates study of sample programs. Analysis of structure and character development. Students create concepts, structure, pitch, and write treatments and partial script. **Prerequisite:** THPW or TDPW 1. May be taken twice for credit.

TDPW 108. Topics (4)

Topics in playwriting, such as documentary theatre, adaptation and modernization, writing for media, for students who possess basic knowledge of playwriting. Admission by interview with instructor. **Prerequisites:** THPW or TDPW 1 and department stamp.

TDPW 190. Major Project in Playwriting/Screenwriting (4)

For the advanced student in playwriting/screenwriting. This intensive concentration in the study of playwriting and/or screenwriting will culminate in the creation of a substantial length play. A maximum of eight units of major project study, regardless of area (design, directing, stage management, playwriting) may be used to fulfill major requirements. Applicants must have completed the playwriting sequence, THPW or TDPW 1, 101, and/or consent of instructor. See department for application form. **Prerequisite:** THPW or TDPW 1 and THPW or TDPW 101.

TDTR—DANCE THEORY

TDTR 10. Introduction to Dance (4)

An overview of dance, examining its social and cultural history and its evolution as an art form. Focus is on dance and its many genres as an expressive medium and form of communication. **Prerequisite:** none.

TDTR 101. Dance Movement Analysis (4)

An overview and analysis of movement theory systems that offer approaches to improve movement quality, prevent injuries, aid in rehabilitation, develop mental focus and kinesthetic control, establish a positive body language, and develop vocabulary for creative research. **Prerequisite:** TDTR 10.

TDTR 102. Movement Research (4)

Students will study images of anatomical alignment and use their bodies to translate those images into physical action. They will expand their movement potential, deepen their awareness of body language and alignment and develop their dance coordination and technique. **Prerequisites:** TDTR 10, TDTR 101, or THDA 101B-C or THDA 110A-B-C, or consent of instructor; department stamp.

TDTR 103. Dance and Technology (4)

This course introduces the theoretical and practical understanding of both available and developing computer-assisted media for the design and production of choreography. **Prerequisites:** TDTR 10, TDCH 40; or consent of instructor.

TDTR 104. Dance Theory and Pedagogy (4)

The study of the theoretical aspects of dance education, including an analysis of movement concepts for all ages. Development of basic technique training in all forms, curriculum planning, social awareness, and problem solving. Fundamental elements of cognitive and kinetic learning skills. **Prerequisites:** TDTR 10, TDMV 110, 120, 130 or THDA 101A-B-C, or THDA 110A-B-C, or THDA 120A-B-C; consent of instructor, department stamp.

TDTR 195. Instructional Assistance (2–4)

Assist with instruction in undergraduate dance courses. Full description of duties will appear on the Application for Instructional Assistance. **Prerequisite:** upper-division standing, 3.0 GPA, etc. (per CEP guidelines).

TDTR 197. Field Studies in Dance (1–12)

Designed for advanced students, this course significantly extends their knowledge of the theatre and dance through intensive participation in the creative work of a major professional theatre or dance company, under the guidance of artists resident in those theatres or companies. Students will submit regular written evaluations each week of their ongoing field study. **Prerequisites:** upper-division standing and consent of instructor required, 3.0 overall GPA, 90 units completed.

TDGR—THEATRE GRADUATE

TDGR 200. Dynamics (1)

A daily program of physical, vocal, and speech exercises designed to prepare the student to move in a focused way into specific class areas with minimum amount of warm-up time. The exercises work on development of flexibility, strength, and coordination throughout the body. Strong emphasis is placed on physical and mental centering within a structured and disciplined approach to preparation. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 201. Stage Combat (2)

A study of the dramatic elements of stage violence, and practical work in developing the physical skills necessary to fully realize violent moments on the stage. At the core of the study is the process from text to convincing theatrical action. Physical work revolves around basic principles of energy, focus, and center inherent in unarmed and weapons combat. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 202. Joint Stock (3)

The process of collaborative creation from idea to performance. **Prerequisite:** admission to the M.F.A. program or consent of instructor.

TDGR 203. Seminar and Supervision for ArtsBridge Scholars (1)

A workshop to address the specific pedagogical requirements and techniques to be employed by students as ArtsBridge (outreach) Scholars and Mentors of ArtsBridge Scholars. Instructor will mentor the students on-site as well as in seminars. **Prerequisites:** graduate standing and consent of instructor.

TDGR 204A. Text Analysis (4)

Topics to be covered will include (1) concept of poetic language; lexical and syntactic analysis of dialogue; (2) the semantic context of dialogue; (3) thematic structure, from motive to themes; (4) the concept of dramatic character or hero; (5) dramatic narrative; (6) the material of drama; the relationship of myth and ritual to drama; (7) analysis versus interpretation; (8) practical applications. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 204B. Contemporary Theories of Theatre (4)

An investigation of contemporary theories of theatre with an emphasis on structural and poststructural perspectives on text and textuality. The seminar will focus on adapting contemporary techniques of close reading to the interpretive and creative process in the theatre. **Prerequisites:** TDGR 204A; admission to M.F.A. Theatre program or consent of instructor.

TDGR 204C. Collective Creation (4)

The culmination of the TDGR 204 sequence, in which students in all disciplines create and perform publicly presented original theatre pieces. **Prerequisites:** TDGR 204B; admission to M.F.A. Theatre program or consent of instructor.

TDGR 205. Improvisation for the Theatre (3)

A course designed to introduce improvisational techniques to professional acting students. A variety of approaches to the art of improvisation will be presented and practiced, both serious and comic. Small and large group improvisations will be offered. **Prerequisite:** admission to the M.F.A. program or consent of instructor.

TDGR 206. Faculty Directed Production (4)

Faculty directed production, from the rehearsal process through public performance. All participants will enroll in the same section, the number of units depending upon degree of involvement. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 207. Production (4)

The collaborative process from the rehearsal process through public performance. All participants will enroll in the same section, the same number of units. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 209. Commedia and Comic Techniques (3)

A course designed to provide actors with tools, both physical and verbal, to play comedy. Included will be commedia dell'arte techniques, clown work, masks, circus techniques, mime, and scene work from comic scripts. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 210A. Process I—Part I (4)

The actors focus on the nature of the acting process, using various exercises to stimulate imagination and to inspire instinctual choices. Later work includes improvisational and imaginative experiences to explore character and text. The class culminates in intensive scene work chosen for the particular actor to meld the improvisational approach with scripted material. The class is a combination of both actors and directors so that a common language is developed.

Prerequisite: admission to the M.F.A. program or consent of instructor.

TDGR 210B. Process I—Part II (4)

Intensive studio examination of realistic texts using improvisational and imaginative techniques to realistically based texts commonly from American theatre. Second course in a three course sequence. **Prerequisites:** TDGR 210A and admission to the M.F.A. program or consent of instructor.

TDGR 210C. Process I—Part III (4)

The intensive study of the dramatic and fictional work of Anton Chekhov and an actor's approach to that work. This course includes many of the techniques begun in earlier classes and applies them to this material. Also included is a study of Chekhov's short stories and plays, and involves adapting and staging these works. Third course of a three course sequence. **Prerequisites:** TDGR 210B and admission to the M.F.A. program or consent of instructor.

TDGR 211 Choreography Seminar (4)

The study and practice of aesthetic concepts, history, and methodology for choreographic creation of dance theatre; and expanding the choreographers' ability to establish innovative creative processes with performers and craft their material, both independently and in conjunction with other theatrical and technological elements. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 211A. Speech for the Actor (2–4)

Introduction of the principles of phonetics and articulation. Constant study and drill to prepare the actor for standard speech and flexibility. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 211B. Speech for the Actor (2–4)

Continued introduction of the principle of phonetics and articulation. Constant study and drill to prepare the actor for standard speech and flexibility. Second course in a three-course series. **Prerequisites:** TDGR 211A and admission to the M.F.A. program or consent of instructor.

TDGR 211C. Speech for the Actor (2–4)

Continued introduction of the principle of phonetics and articulation. Constant study and drill to prepare the actor for standard speech and flexibility. Third course in a three-course series. **Prerequisites:** TDGR 211B and admission to the M.F.A. program or consent of instructor.

TDGR 212. Acting Practicum (2)

One-on-one laboratory workshop that examines practical applications of accents, speech and voice work, dialect, movement and combat work specific and ancillary to the productions in which the students have been cast. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 213. Dance Theatre Topics Seminar (2)

A topics seminar in current dance theatre history, issues and research, with varying content by faculty. **Prerequisite:** admission to the M.F.A. program or consent of instructor.

TDGR 213A-B-C. Movement for Theatre I (2-2-2)

An intensive studio course in the art of movement as a basis for theatre performance. Theory and practice of energy flow, weight, spatial focus, time consumption, and the shape factor. (S/U grades only.) **Prerequisites:** THGR or TDGR 213A for B, THGR or TDGR 213B for C; admission to the M.F.A. Theatre program.

TDGR 214. Dance Theatre Topics: Collaborative Processes (2)

This seminar examines the nature of collaborative creative processes and artistic relationships between choreographers and other primary artists in the creation of interdisciplinary dance theatre, from the initial concepts, themes, and inspiration through the research, rehearsal and final presentation. **Prerequisite:** admission to the M.F.A. program or consent of instructor.

TDGR 214A. Voice for Theatre I—Part I (3)

Voice exercises designed to "free the voice" with emphasis on diaphragmatic breathing, articulation exercises, and singing exercises. Course designed to broaden pitch, range, projection, and to expand the full range of potential characterizations. **Prerequisites:** admission to the M.F.A. program or consent of instructor.

TDGR 214B. Voice for Theatre II—Part I (3)

Voice exercises designed to “free the voice” with emphasis on diaphragmatic breathing, articulation exercises, and singing exercises. Course designed to broaden pitch, range, projection, and to expand the full range of potential characterizations. Second course in a three-course sequence. **Prerequisites:** TDGR 214A and admission to the M.F.A. program or consent of instructor.

TDGR 214C. Voice for Theatre I—Part III (3)

Voice exercises designed to “free the voice” with emphasis on diaphragmatic breathing, articulation exercises, and singing exercises. Course designed to broaden pitch, range, projection, and to expand the full range of potential characterizations. Third course in a three course series. **Prerequisites:** TDGR 214B and admission to the M.F.A. Theatre program or consent of instructor.

TDGR 215. Dance Theatre Seminar (2)

This seminar focuses on the aesthetic concepts that form the foundation for the creation, performance, research, and critical analysis of dance theatre. Students will discuss critical theory in related arts and develop individualized projects that advance their creative and intellectual goals. **Prerequisite:** admission to the M.F.A. Theatre program or consent of the instructor.

TDGR 216. Principles of Curriculum Theory (2)

This comprehensive seminar provides an assessment of the field of curriculum theory as preparation for teaching general dance education courses. Conceptual thinking, problem solving, current publications, methods of inquiry, assessment, and a range of practical teaching issues will be discussed. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 217. New Media and Technology (2)

This seminar explores the interaction of new media and technologies for collaboration, research, and creation in performance. Students will pursue diverse and innovative research in technology as a medium for new forms of expression in dance theatre. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 218. Dance Theatre: Professional Practice (2)

This seminar focuses on the skills and tools needed for the professional practice of self-production in performance. Areas introduced include grant writing, press kits, media relations, marketing, Web sites, documentation, budgets, artistic management, and nonprofit organization administration. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 219. Directing Process Studio (4)

Preparation, presentation, and discussion of representative scenes from various periods of dramatic literature. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 220. Advanced Contemporary Dance (2)

Designed for graduates with advanced training in contemporary modern dance and intermediate to advanced training in ballet. Emphasis is on increasing composition and performance skills in ballet through contemporary modern dance aesthetics. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 220A. Process II: Classical Text I (4)

An intensive studio examination of problems and potentials associated with the theatrical realization of the classical text. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 220B. Process II: Classical Text II (4)

An intensive studio examination of problems and potentials associated with the theatrical realization of the classical text. This course is a continuation of TDGR 220A. **Prerequisites:** TDGR 220A and admission to the M.F.A. Theatre program or consent of instructor.

TDGR 220C. Process II: Classical Text III (4)

An intensive studio examination of problems and potentials associated with the theatrical realization of the classical text. This course is a continuation of TDGR 220B. **Prerequisites:** TDGR 220B and admission to the M.F.A. Theatre program or consent of instructor.

TDGR 221. Graduate Studio: Contemporary Movement Practices (2)

Designed for development of a movement practice in various modalities including contemporary dance, yoga, Pilates, and Alexander. Emphasis on advanced technical skills, expressive style, and performance elements. Aesthetic concepts will be explored. Incorporates applied physiological principles of human movement. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 221A–B. Speech for the Actor II (3-3)

Advanced work in phonetics and articulation. Intensive study of stage dialects to prepare actor for variety of roles. **Prerequisites:** graduate standing; THGR or TDGR 221A **Prerequisite:** THGR or TDGR 221B; admission to the M.F.A. Theatre program.

TDGR 222. Topics in World Dance (2)

Course designed for study of specific world dances. Historical and contemporary context of a particular culture or ethnic form: Afro-Cuban, West African, Asian, Spanish, Balinese, Japanese, Latin, American jazz, hip-hop, etc. Specific topic will vary from quarter to quarter. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 222A–B–C. Theatre Production II (1–4)

Range from staged reading of new plays, documentary drama, or synthetically created dramatic text to totally integrated production of full-length plays (faculty or student directed), and incorporating the creative contribution of actors, directors, playwrights, and critics, this intensive involvement of multiple forms of theatre will serve as the necessary creative laboratory for the M.F.A. program. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 223. Improvisation Ensemble (2)

A course for dance theatre practitioners to exchange ideas, work with scores, text, expository writing, contact improvisation, in a supportive and focused environment. Students will participate as group leaders allowing participants to explore new areas of their artistic practice. **Prerequisite:** admission to the M.F.A. program or consent of instructor.

TDGR 223A–B. Movement for Theatre II (3-3)

An advanced course in the art of movement for the theatre, building on the knowledge gained in Theatre 213. (S/U grades only.) **Prerequisites:** THGR or TDGR 223A for B; admission to the M.F.A. Theatre program.

TDGR 224A–B. Voice for Theatre II (3-3)

Advanced voice training designed to help the actor fuse voice, emotion, and body into a fully realized reflection of the text. (S/U grades only.) **Prerequisites:** THGR or TDGR 224A for B; admission to the M.F.A. Theatre program.

TDGR 225A–B. Singing for the Actor II (1-1)

Continuing vocal technique for the musical theatre. More complicated musical material investigated and prepared. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 227. Directing Assistantship (6–12)

Assisting faculty with productions off-campus. Perform research necessary for project. Assist with casting. Participate in design meetings. Observe and participate in rehearsal. Direct, if delegated to do so. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 228. Designing Assistantship (6–12)

Assisting faculty with productions off-campus. To draft some or all of the project design. To perform research, either visual, historical or technical. To create and maintain all production plans and paperwork records from pre-production through opening night. To organize the staff for focus and work calls. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 229. Theatre Externship (6–12)

Selected professional opportunities in repertory and commercial theatre, designed to engage the student in particular creative responsibilities under the guidance of master artist-teachers. Student is expected to give biweekly reports detailing his/her experience with the professional company. **Prerequisite:** admission to the M.F.A. Theatre program, or consent of instructor.

TDGR 230. Acting Process III: Actors' Studio (4)

An advanced studio for graduate actors and directors, this work will explore a single text from the modern theatre under the direction of a master teacher-artist. Concentration will be on multiple possible modes of encountering a text, varieties of interpretation and performance realization, and the development of a theatre ensemble. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 231A. Professional Preparation for the Actor (4)

A twice-weekly seminar focusing on the actor's confrontation with the industry, including in-depth preparation for auditions; cold readings; and meetings/interviews with producers, casting directors, agents, and managers. Actors will also begin to create material that could be crafted into solo performances. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 233. Acting for the Camera (1)

This course is designed to aid the actor in the transition from stage to film work. Examination of film production and its physical characteristics and the acting style needed for work in film and television. Students will rehearse and perform in simulated studio setting. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 235. Singing for the Actor III (1)

Continuing vocal technique for the musical theatre. More complicated musical material investigated and prepared. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 239. Skills (4)

A unifying approach to acting skills (voice, movement, and speech) designed to result in providing the graduating actor with a daily regimen appropriate for professional work. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 240. Directing Seminar (1–6)

A seminar focusing on the current directing projects of all graduate directing students. Depending upon individual student needs, the work may include play selection, historical or sociological research, and discussion of emerging directorial concepts, the rehearsal process, and post-production evaluation. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 242. Director Designer Collaboration Seminar (4)

A seminar focusing on the creative application of design solutions to problems presented by specific texts, and how they function in directorial and design production concepts. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 243. Director/Playwright/Choreographer Lab (4)

Collaborative process between directing and playwrighting students providing a focused exploration of a broad range of directing and writing methodologies. Students work in teams to develop and create pieces based on the methodology of guest directors. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 244. New Plays Workshop (2)

A course where playwrights and actors work together to develop new plays-in-progress. **Prerequisite:** admission to the M.F.A. Theatre program or consent of instructor.

TDGR 245. Directing Practicum (4)

Students enrolled in this course will work on productions in the function of a director. This will include staging, creative interpretation, blocking, etc. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 249A. Music Theatre Workshop (4)

A workshop in which students from music and theatre departments study examples of various forms of music theatre and collaboratively develop creative projects that are presented at the end of the two-quarter sequence. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 249B. Music Theatre Workshop (4)

Continuation of workshop in which students from music and theatre departments study examples of various forms of music theatre and collaboratively develop creative

projects that are presented at the end of the two-quarter sequence. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 250. Playwriting Seminar (4)

A seminar focusing on the current playwriting project of all graduate playwriting students. Work for each quarter is individually determined according to student needs, but may include exploration of an inception idea, development of a scenario or other structural work, and writing dialogue. Students present work to be discussed in class. May include group or individual playwriting exercises. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 251. Playwriting Practicum (2)

Creative writing project developing original scripts from outline to the final play. Plays may vary depending on the quarter, but will include writing of a realistic one-act, a nonrealistic one-act, a one-act documentary or dramatization of fiction, a full-length play. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 252. Dramaturgy Seminar (4)

The seminar will deal with all dramaturgical issues pertaining to departmental productions: production research, textual and analysis, translation, adaptation, rehearsal process, and critique. Concurrently with the dramaturgy issues of the given year, the seminar will discuss possible choices of plays for future production seasons. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 253. Dramaturgy Practicum (1-6)

Students enrolled in this course will work on productions in the function of a dramaturg. This will entail preparation of texts, research, participation at rehearsals, etc. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 254. Television Writing (4)

A one-quarter course covering the hourlong format (five weeks) and situation comedies (five weeks). Includes study and discussion of television script format and structure. Students will create the concept and structure for spec scripts in each genre. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 256. Contemporary Plays (1-4)

A guided reading course focusing exclusively on very recent plays in an attempt to become aware of what is being written now. Course may be repeated for credit. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 257A-B. Screenwriting (4-4)

Students will develop the concept for an original piece for television or film and will write the screenplay. Student work will be discussed in seminar at each phase of the development. **Prerequisites:** admission to the M.F.A. Theatre program and THGR or TDGR 250.

TDGR 258A-B. Dramatization and Adaptation (4-4)

Seminar will deal with dramatization and adaptation of literary texts for the purpose of theatrical production. The class will study some significant examples of such practice from the past, and subsequently, students will develop their own projects of dramatization, adaptation, or modernization of texts. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 260. New-Play Festival (4)

The collaborative process of new-play development through readings, rehearsals, and public performance. M.F.A. actors, designers, directors, playwrights, and stage managers enroll in one section and collaborate in creating the annual festival of full-length and one-act plays. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 262. Crossing Boundaries: Design Improvisations (4)

Conceiving interactive designs. A project/performance-based course, concentrating on the conception of designs adaptable to improvisatory contexts, in which technological strategies such as real-time processing and control of sound and light are encouraged and discussed. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 267. Automated Lighting (4-6)

Introduces the design student to the technology, control, and creative use of automated lighting in the entertainment lighting field. The class involves substantial independent research. Students create both theoretical and realized design projects. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 268. Storyboarding (4)

Course will cover multiple applications of storyboarding as a tool of communication and expression; comic books, theatre, opera, film, TV, and commercial applications will be explored. Individual and team assignments will be given to develop the basic vocabulary and techniques. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 269A. Photoshop I (4)

Course will introduce the basic functions and applications of Photoshop as they may be applied to theatrical design. Emphasis on using Photoshop as an artistic tool. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 269B. Photoshop II (4)

Advanced Photoshop techniques will be explored and applied to the creation of multimedia projects. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 270A. Design Studio I (4)

This course will focus on beginning-level problems in theatre design, including text analysis, research, conceptualization, and visual expression. Students will work on individual projects in lighting, costume, and scenic design. The course will include group critiques of completed designs and works in progress. 270A, Scenic Design (fall); 270B, Costume Design (winter); 270C, Lighting Design (spring). **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 270B. Design Studio I: Costume Design (4)

This course will focus on beginning-level problems in theatre design, including text analysis, research, conceptualization, and visual expression. Students will work on individual projects in lighting, costume, and scenic design. The course will include group critiques of completed design and works in progress. 270A, Scenic Design (fall); 270B, Costume Design (winter); 270C, Lighting Design (spring). **Prerequisites:** THGR 270A, graduate standing, consent of instructor.

TDGR 270C. Design Studio I: Lighting Design (4)

This course will focus on beginning-level problems in theatre design, including text analysis, research, conceptualization, and visual expression. Students will work on individual projects in lighting, costume, and scenic design. The course will include group critiques of completed design and works in progress. 270A, Scenic Design (fall); 270B, Costume Design (winter); 270C, Lighting Design (spring). **Prerequisites:** THGR 270A or TDGR 270A, THGR 270B or TDGR 270B, graduate standing, and consent of instructor.

TDGR 270D. Design Studio I: Sound Design (4)

This course will focus on beginning-level problems in theatre design, including text analysis, research, conceptualization, and visual/auditory expression. Students will work on individual projects in sound, lighting, costume, and scenic design. This course will include group critiques of completed design and works in progress. 270A, Scenic Design (fall); 270B, Costume Design (winter); 270C, Lighting Design (spring). **Prerequisites:** THGR 270A, THGR 270B, graduate standing, consent of instructor.

TDGR 271. Design Seminar (2)

A seminar focusing on all aspects of the design profession, including current projects of graduate design students. The work may also include portfolio presentations, research presentations, and guest lectures. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 272. Master Class in Design (1-4)

Special topics in design taught in an intensive workshop format by professionals in the respective fields of study. Topics could include, but are not limited to, sound design techniques, new development in set design, AutoCAD. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 273. Fashioning the Body (4)

A survey/history of artistic and cultural stylistic change as embodied in clothing from early Western civilization to the contemporary period. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 274. Advanced Scenic Design (4)

This course explores advanced problems in scenic design through development and critique of creative class projects and production works-in-progress. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 275. Advanced Lighting Design (4)

Creative projects and topics in lighting design to develop the student's techniques and professional practices. Work to include studies in design research, concepts, psychophysical considerations, collaboration, professional procedures and systems, paperwork, and organization. Various scales of production projects will be addressed by the student for presentation and critique, and may be theoretical or productions in the departmental calendar. **Prerequisites:** second- or third-year design students only; admission to the M.F.A. Theatre program.

TDGR 276. Advanced Costume Design (4)

Projects in costume design, emphasizing script analysis, research, conceptualization, and visual expression. Studio work includes costume rendering in various media for specific plays. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 278. Special Topics in Theatre Design (1-6)

A course designed to expose the theatre design student to a variety of specialized topics, including millinery, pattern drafting and draping, scenic painting, model making, figure drawing, drafting, fitting, rendering. Topics will vary from quarter to quarter. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 279. Design Practicum (4)

This course covers the artistic, aesthetic, and practical aspects of the designers' work as they develop and execute the design toward a fully realized production. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 280A. Stage Management 1 (4)

Discussion and research into the duties, responsibilities, and roles of a stage manager. Work to include studies in script analysis, communication, conflict resolution, rehearsal procedures, performance skills, style, and conceptual approach to stage management. **Prerequisite:** admission to M.F.A. Theatre program or consent of instructor.

TDGR 280B. Stage Management 2 (4)

The second of the three-part introductory stage management series, this course further explores the stage manager's process, focusing on the technical rehearsal period through the opening of a production. **Prerequisites:** TDGR 280A; admission to M.F.A. Theatre program or consent of instructor.

TDGR 280C. Stage Management 3 (4)

The final course in the three-part introductory stage management series focuses on the stage manager's role once a production has opened. The course will also address topics such as new plays, touring, dance, multimedia productions, and music. **Prerequisites:** TDGR 280A and TDGR 280B; admission to M.F.A. Theatre program or consent of instructor.

TDGR 282. Advanced Sound Design (4)

Creative projects to develop student's techniques and professional practices. Studies include research, concepts, collaboration, professional procedures, systems and organization. Various scales of projects will be addressed for presentation and critique; may be theoretical or productions in the Department calendar. **Prerequisite:** admission to the M.F.A. program or consent of instructor.

TDGR 286. Special Topics in Stage Management (1-6)

A course for M.F.A. students in stage management. Topics will focus on various aspects of theatre administration, and advanced stage management, including nonprofit theatre, commercial theatre, advanced problems, venues, musicals/dance, production management, theatre development, business problems, and theatre marketing. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 288. Stage Management Seminar (4)

A weekly seminar in which all graduate stage managers participate. Includes discussions of problems encountered on current productions, paperwork, methodology, and production approaches. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 289. Introduction to Doctoral Studies (4)

Seminar acquaints doctoral students of all levels with research methods, theoretical models, publishing protocol, professional preparation, and pedagogical approaches particular to theatre and performance studies. Course assignments are tailored to students' scholarly interests and progress toward degree. **Prerequisite:** admission to Ph.D. program in theatre or consent of instructor.

TDGR 290. Dramatic Literature and Theatre History Prior to 1900 (4)

Selected material from following topics: Classical Drama, Asian Drama, Medieval and Early Modern Drama, Shakespeare, European Drama 1600–1900. May be taken eight times as content varies. **Prerequisite:** admission to Ph.D. program in Theatre.

TDGR 291. Dramatic Literature and Theatre History 1900 to the Present (4)

Selected material from following topics: European Theatre 1900–Present, American Theatre 1900–Present, Contemporary Theatre and Performance. May be taken eight times as content varies. **Prerequisite:** admission to Ph.D. program in Theatre.

TDGR 292. Cultural and Critical Theory (4)

Selected material from following topics: Performance Theory, Dramatic Theory, Critical Theory, Cultural Studies. May be taken eight times as content varies. **Prerequisite:** admission to Ph.D. program in Theatre.

TDGR 293. Directed Studies (4–12)

Individual or small group directed study.

TDGR 294. Dissertation Research (4–12)

Research and preparation of doctoral dissertation.

TDGR 295. Acting Practicum (2)

This course covers the artistic, aesthetic, and practical aspects of the actors' work as they develop and execute the character/role toward a fully realized production. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 296. Stage Management Practicum (4)

Taken each term by all graduate stage management students. The class focuses on the development of knowledge and skills necessary for the contemporary stage manager. Seminar format is augmented by lab work that may include departmental productions. **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 297. Thesis Research (2–12)

Thesis research for M.F.A. degree. (S/U grades only.) **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 298. Special Projects (0–4)

Advanced seminar and research projects in theatre. (S/U grades only.) **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 299. Thesis Project (2–12)

Specific projects in theatre individually determined to meet the developing needs, interests, and abilities of M.F.A. candidates. (S/U grades only.) **Prerequisite:** admission to the M.F.A. Theatre program.

TDGR 500. Introduction to Apprentice Teaching (4)

This course, designed to meet the needs of the graduate students who serve as teaching assistants, includes analysis of texts and materials, discussion of teaching techniques, conducting discussion sections, formulation of topics and questions for papers, and examinations and grading. 2 units = 25% TAship. 4 units = 50% TAship. **Prerequisites:** graduate standing and consent of the instructor.

TDGR 501. Teaching—Non-Departmental (4)

Consideration of pedagogical applications in the teaching of literacy, historical and philosophical text at the undergraduate level. Pedagogical aids for the teaching of composition and supervised teaching in sections of undergraduate courses such as the Revelle Humanities sequence

and in the CAT programs of Sixth College. **Prerequisite:** admission to the M.F.A. Theatre program.

Third World Studies

PROFESSORS

Carlos Blanco-Aguinaga, Ph.D., *Spanish and Latin American Literature, Emeritus*

Jaime Concha, Ph.D., *Spanish and Latin American Literature*

Michael P. Montéon, Ph.D., *Latin American History*

Rosaura Sanchez, Ph.D., *Spanish and Latin American Literature, Linguistics*

Yingjin Zhang, Ph.D., *Chinese and Comparative Literature*

Oumelbanine Zhiri, Ph.D., *Literature*

ASSOCIATE PROFESSORS

John D. Blanco, Ph.D., *Literatures of the Americas*

Robert Cancel, Ph.D., *African and Caribbean Literature, Coordinator of Third World Studies*

Ann L. Craig, Ph.D., *Political Science*

Rosemary George, Ph.D., *Literature*

Milos Kokotovic, Ph.D., *Literature*

Max Parra, Ph.D., *Mexican Literature*

Winnie Woodhull, Ph.D., *Literature*

OFFICE: 251 Literature Building
Warren College
(858) 822-0377

<http://tws.ucsd.edu>

The Third World Studies Program has three main objectives:

1. To provide an understanding of the Third World and its relationships to the West. In order to understand these relationships, it is necessary to study the historical context out of which the present relationships developed. For example, besides trying to understand what kind of society existed in Meso-America when the Spaniards arrived in 1520, the student must also have an understanding of the historical development in Europe which resulted in Spain's decision to seek wider trade abroad. There is insistence on both the similarities and differences which Third World societies have among themselves and the similarities and differences with Western societies.
2. To provide an interdisciplinary approach to the study of the Third World. The program is not conceived as being exclusively historically oriented nor as being predominantly a social science program, but rather one that integrates both the social sciences and the humanities.
3. To provide an understanding of the shifting economic and political nature of the countries designated as belonging to the "Third World," especially in light of the dramatic political and economic changes worldwide in the late 1980s and 1990s. To this end, our Third World studies courses will, where appropriate, address and contextualize the history of the term "Third World" and its current applications in scholarship and the broader international media.

THE MAJOR PROGRAM

Students interested in Third World studies may focus on a theme, problem, or geohistorical area. A Third World studies program of study must be interdisciplinary. Students must choose course offerings from at least three disciplines (anthropology, economics, history, literature, political science, sociology, etc.).

A Third World studies major requires a minimum of *twelve* upper-division courses plus three lower-division courses from the Third World studies sequence (TWS 21, 22, 23, 24, 25, or 26). Students at Eleanor Roosevelt College may substitute up to two courses, Making of the Modern World 4 and 5, for two of the three-course lower-division sequence, but must take at least one course in the TWS 21–26 sequence. Selection of a specific concentration, discipline, or department should be determined in consultation with a Third World studies faculty member or program advisor.

Students majoring and minoring in Third World studies are encouraged to experience their areas first-hand by studying abroad in any number of ways. Most convenient, depending on the area, is the University of California's Education Abroad Program, whereby students can gain UC credit for study at foreign universities. This is especially convenient for students who cannot find sufficient courses at UC San Diego pertaining to such regions as the Caribbean and the Indian subcontinent. Moreover, Latin America, Asia, and Africa course work is available in these regions through the Education Abroad Program and various programs available through other U.S. universities.

DOUBLE MAJOR

Students interested in Third World studies as a double major must have at least ten upper-division courses that are unique to each departmental major. The courses required for Third World studies may cover one or more disciplines. Courses may focus on a theme or problem or on a geo-historical area. The remaining two courses may overlap with the other major requirements. Approval from both departments is required for overlaps. Students should consult a Third World studies faculty member or program advisor for approval of a major program.

MINOR

A student may minor in Third World studies by selecting two courses from the lower-division Third World studies sequence (TWS 21, 22, 23, 24, 25, or 26) and five upper-division courses in disciplines dealing with the Third World.

Third World studies faculty members offer courses in the Departments of Anthropology, Communication, Literature, Political Science, Sociology, History, and in the Third World Studies Program. Appropriate courses in other departments may also be considered. Students should consult departmental and program listings for Third World area offerings.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

See listings also under the Departments of Anthropology, Communication, History, Literature, Political Science, and Sociology for other Third World area offerings.

LOWER-DIVISION

21-22-23-24-25-26. Third World Literatures (4-4-4-4-4)

An introduction to the cultures of various Third World countries through close reading of selected literary texts. TWS 21 focuses on African literature, TWS 22 deals with Latin American literature, TWS 23 examines Chinese literature, TWS 24 examines Caribbean literature, TWS 25 focuses on Middle Eastern literature, and TWS 26 treats literature of the Indian Subcontinent. Topics will vary each quarter. (F, W, S)

UPPER-DIVISION

132. Literature and Third World Societies (4)

This course will investigate novelistic and dramatic treatments of European society in the era of nineteenth-century imperialism, Third World societies under the impact of colonialism, and the position of national minorities inside the United States to the present day. Attention will center on the interplay between the aesthetic merits and social-historical-philosophical content of the works read.

135. Bilingualism: Research and Field Studies (4)

A study of sociolinguistic findings on bilingualism throughout the world and an evaluation of bilingual education theories. The students will also engage in surveys of local communities to assess bilingualism and educational needs of bilingual communities. **Prerequisite:** upper-division standing.

190. Undergraduate Seminars (4)

Seminars will be organized on the basis of topics with readings, discussions, and papers. Specific subjects to be covered will change each quarter depending on particular interest of instructors or students. May be repeated for credit.

197. Field Work (4)

In an attempt to explore and study some unique processes and aspects of community life, students will engage in research in field settings. Topics to be researched may vary, but in each case the course will provide skills for carrying out these studies.

198. Directed Group Studies (2 or 4)

Directed group study on a topic or in a field not included in the regular department curriculum, by special arrangement with a faculty member. **Prerequisite:** upper-division standing.

199. Independent Study (2 or 4)

Tutorial, individual guided reading and research projects (to be arranged between student and instructor) in an area not normally covered in courses currently being offered in the department. (P/NP grades only.) **Prerequisites:** upper-division standing and consent of instructor. (F, W, S)

Third World studies offerings in other departments:

ANTHROPOLOGY: REGIONAL

ANRG 104. Traditional African Societies and Cultures

ANRG 170. Traditional Chinese Society

ANRG 173. Chinese Popular Religion

ANRG 182. Ethnography of Island Southeast Asia

ANTHROPOLOGY: SOCIOCULTURAL

ANSC 131. Urban Cultures in Latin America

ANSC 142. Anthropology of Latin America

ANSC 165. Contemporary South Asia

COMMUNICATION AND CULTURE

COCU 179. Colonialism and Culture

ETHNIC STUDIES

ETHN 142. Medicine, Race, and the Global Politics of Inequality

HISTORY

HIAF 111. Modern Africa since 1880

HIAF 112. West Africa since 1880

HIAF 113. Small Wars and the Global Order: Africa and Asia

HIAF 120. History of South Africa

HIAF 130. African Society and the Slave Trade

HIAF 160. Special Topics in the Economic History of Africa

HIAF 161. Special Topics in African History

HIEA 113. The Fifteen-Year War in Asia and the Pacific

HIEA 130. History of the Modern Chinese Revolution: 1800–1911

HIEA 131. History of the Modern Chinese Revolution: 1911–1949

HIEA 132. History of the People's Republic of China

HIEA 137. Women and Family in Chinese History

HILA 100. Latin America: Colonial Transformation

HILA 101. Latin America: The Construction of Independence 1810–1898

HILA 102. Latin America in the Twentieth Century

HILA 112. Economic and Social History of Andean Region

HILA 113. Lord and Peasant in Latin America

HILA 114. Dictatorships in Latin America

HILA 115. The Latin American City: A History

HILA 116. Encounter of Two Worlds: Early Colonial Latin America

HILA 120. History of Argentina

HILA 121. History of Brazil

HILA 122. Cuba: From Colony to Social Republic

HILA 126. From Columbus to Castro: Caribbean Culture and Society

HILA 127. History, Culture, and Power

HILA 131. A History of Mexico

HILA 132. A History of Contemporary Mexico

HILA 160. Topics in Latin America Colonial History: 1500–1820

HILA 161. History of Women in Latin America

HILA 162. Special topics in Latin America

HINE 114. History of the Islamic Middle East

LITERATURE

English

LTEN 188. Contemporary Caribbean Literature

LTEN 189. Twentieth Century Postcolonial Literatures

Spanish (texts read in Spanish)

LTSP 130B. Development of Latin American Literature

LTSP 133. Spanish American Literature: Twentieth Century

LTSP 134. Argentine Literature

LTSP 135. Mexican Literature

LTSP 136. Peruvian Literature

LTSP 137. Caribbean Literature

LTSP 140. Spanish-American Novel

LTSP 141. Spanish-American Poetry

LTSP 142. Spanish-American Short Story

LTSP 172. Indigenista Themes in Spanish-American Literature

LTSP 173. Problems in Spanish and Spanish-American Literary History

LITERATURES OF THE WORLD (TEXTS READ IN ENGLISH)

LTAF 110. African Oral Literature

LTAF 120. Literature and Film of Modern Africa

LTAM 110. Latin American Literature in Translation

LTAM 111. Comparative Caribbean Discourse

LTAM 120. Mexican Literature in Translation

LTEA 100A. Classical Chinese Poetry in Translation

LTEA 100B. Modern Chinese Poetry in Translation

LTEA 110C. Contemporary Chinese Fiction in Translation

LTEA 136. Special Topics in Japanese Literature

LTCS 133. Globalization and Culture

POLITICAL SCIENCE

POLI 130H. Vietnam: The Politics of Intervention

POLI 134A. Comparative Politics of Latin America

POLI 134B. Politics in Mexico

POLI 134D. Selected Topics in Latin American Politics

POLI 134N. Politics in Central America

POLI 144AB. Selected Topics in International Political Economy

POLI 145B. Conflict and Cooperation in International Politics

POLI 146A. The U.S. and Latin America: Political and Economic Relations

POLI 150A. Politics of Immigration

SOCIOLOGY: B

SOCB 114. Culture and Ethnicity

SOCIOLOGY: C

SOCC 139. Social Inequality: Class, Race, and Gender

SOCIOLOGY: D

SOCD 151. Comparative Race and Ethnic Relations

SOCD 158. Islam in the Modern World

SOCD 179. Social Change

SOCD 182. Ethnicity and Indigenous Peoples in Latin America

SOCD 183. Minorities and Nations

SOCD 185. Globalization and Social Development

SOCD 187. African Societies through Film

SOCD 188A. Community and Social Change in Africa

SOCD 188B. Chinese Society

SOCD 188D. Latin America: Society and Politics

SOCD 188J. Change in Modern South Africa

Students wishing to include additional related courses from these and other departments should consult a Third World studies advisor.

Thurgood Marshall College

OFFICE: Provost, Thurgood Marshall College Administration Building

HONORS PROGRAM

The Thurgood Marshall College Honors Program is designed to address one of the greatest responsibilities and challenges of public higher education: the education of students of exceptionally high academic achievement. The program provides the organization and the environment within which students are encouraged to pursue individual excellence.

Honors activities and events are designed to introduce Thurgood Marshall students to the excitement of pioneering research and innovative scholarship in all disciplines at UC San Diego and to create opportunities for discussion on public issues with locally and nationally known figures. This happens primarily through the honors seminar, offered every quarter, and open to all class levels of honors students.

To qualify for the honors program, incoming transfer and freshmen students must check the Marshall College Honors eligibility criteria on the Marshall Web site: <http://marshall.ucsd.edu>. Continuing UCSD students are eligible upon successful completion of at least twelve graded units with a 3.8 or better cumulative GPA. All honors students must maintain a 3.50 or better cumulative GPA.

Thurgood Marshall College annually recognizes superior achievement. The Provost Award is presented at commencement to a graduating senior who is recognized for outstanding academic achievement and breadth of scholarship. In addition, students may be eligible for universitywide and departmental honors, Provost Honors, Thurgood Marshall College Honors, Phi Beta Kappa membership, and participation in small honors classes in science.

PUBLIC SERVICE MINOR

Thurgood Marshall College sponsors the Public Service Minor at UCSD, which encourages students to understand the history and practices of public service and to participate in the development of civic skills. This minor is open to all UCSD students in good standing. Please see "Public Service Minor" in the departmental listings or visit the Web site at <http://publicsvminor.ucsd.edu>.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

10. Thurgood Marshall College Methods of Inquiry (2)

In this course, students learn analytical thinking strategies routinely used by professional scholars, historians, and social planners. Each student applies methodologies from the materials presented in lectures, films, and readings relevant to the current course work. **Prerequisite:** department stamp. (P/NP only.)

15. Introduction to Public Service in America (4)

This course is designed to study, discuss, and analyze the history and current role of public service in the United States. Students will be introduced to the different roles held by the three sectors of the American economic structure (government, business, and nonprofit/public service) with opportunity to provide a critical analysis of those roles within American society.

20. Thurgood Marshall College Honors Seminar (1)

Weekly seminar conducted by UCSD faculty and distinguished guest lecturers on topics related to the core curriculum: diversity, justice, and imagination. (P/NP only.)

90. Undergraduate Seminar (1)

These seminars are designed to expose undergraduate students, especially freshmen and sophomores, to exciting research conducted by UCSD faculty. **Prerequisite:** none. (P/NP only.)

198. Thurgood Marshall College Directed Group Studies (4)

Directed group studies of a creative project. Designated for TMC students to work as a group on a project supervised by faculty; not included in regular curriculum, where group emphasis would be more beneficial and constructive than individual special studies. **Prerequisites:** upper-division standing (ninety units) including lower-division writing requirement (DOC 2 and DOC 3), minimum overall GPA of 2.5 and consent of instructor.

199. Marshall College Special Project (1–4)

Individual, independent research, or creative work intended to satisfy Marshall College graduation requirement. Designated for Marshall College students, topics are supervised by Marshall faculty in association with the honors seminar and honors projects. A written application describing the project is required. See Office of the Provost. **Prerequisites:** upper-division students with 2.5 GPA and 90 units and approval of the provost or faculty designee. Honors standing required for honors projects. (P/NP only)

UC San Diego Washington Program (UCDC)

Career Service Center, Room 112
<http://career.ucsd.edu/sa/UCDC.shtml/>
<http://www.ucdc.edu>

Since 1997, the UC San Diego Washington Center has provided students an opportunity to intern in the nation's capital while continuing their academic course work. The program is open to all students who have completed ninety units toward graduation with a 2.5 grade-point average. Students earn fourteen units of academic credit, continue to be registered full-time, and fulfill university residency requirements.

Students maintain financial aid eligibility; the amount can be adjusted to reflect the additional costs of the program. In addition, eligible students are considered for the University of California President's Washington Scholarship Program. Students live in the University of California Washington Center, located in the heart of Washington, D.C.

Internship—Students work twenty-four hours per week as interns in federal agencies, interest groups, trade associations, the national news media, museums, research institutions, or in other organizations related to policy, politics, science, and culture and geared to the interests and objectives of individual students. *Political Science 197*: six or eight units of academic credit.

Research Seminar—Drawing on the internship experience, each student participates in a seminar and undertakes an independent research project. *Political Science 194* (or depending on the student's major, one of the cross-listed equivalents): four units of academic credit.

Elective Course—Each student also enrolls in one upper-division seminar course at the Washington Center. These courses are taught by the different campuses' resident faculty and change each quarter. Typically they include a mix of political science, international relations, other social sciences, history, and the arts and humanities. In addition to regular instruction, these seminars may take advantage of the Washington locale and often include guest speakers and fieldwork activities.

Urban Studies and Planning

FACULTY

Mirle Rabinowitz Bussell, Ph.D., *USP Lecturer*

Steven P. Erie, Ph.D., *Professor, Political Science, Director of USP*

Nancy Kwak, Ph.D., *Assistant Professor, History*

April Linton, Ph.D., *Assistant Professor, Sociology*

Isaac Martin, Ph.D., *Associate Professor, Sociology*

Gabriel Mendes, Ph.D., *Assistant Professor, Ethnic Studies*

Natalia Molina, Ph.D., *Associate Professor, Ethnic Studies*

Keith Pezzoli, Ph.D., *Lecturer, USP Supervisor of Field Studies*

Michelle White, Ph.D., *Professor, Economics*

AFFILIATED FACULTY

David Abel, J.D., *USP Lecturer*

Marisa Abrajano, Ph.D., *Assistant Professor, Political Science*

Amy Bridges, Ph.D., *Professor, Political Science*

Erik Bruvold, *USP Lecturer*

Edwin Teddy Cruz, *Associate Professor, Visual Arts*

Gary Fields, Ph.D., *Associate Professor, Communication*

Greg Freeman, *USP Lecturer*

Kathleen Garcia, *USP Lecturer*

Carlos Graizbord, M Architecture, *USP Lecturer*

Zoltan Hajnal, Ph.D., *Associate Professor, Political Science*

Lawrence Herzog, Ph.D., *Visiting Professor*

James Ingram, Ph.D., *Political Science Lecturer*

David Janssen, Ph.D., *USP Lecturer*

Grace Kim, *Ethnic Studies Lecturer*

Thad Kousser, Ph.D., *Associate Professor, Political Science*

Leslie Lewis, *USP Lecturer*

Jack McGrory, *USP Lecturer*

Susan Peerson, *USP Lecturer*

Denise de Alcantara Pereira, Ph.D., *USP Lecturer*

Wayne Rafflesberger, *USP Lecturer*

Oscar Romo, *USP Lecturer*

Abraham Shragge, Ph.D., *USP Lecturer*

Kenneth E. Sulzer, *USP Lecturer*

Julie Wartell, *USP Lecturer*

K. Wayne Yang, Ph.D., *Assistant Professor, Ethnic Studies*

OFFICE: Social Science Building, Room 315

<http://usp.ucsd.edu>

THE URBAN STUDIES AND PLANNING PROGRAM

The great majority of U.S. citizens, and a growing proportion of people throughout the world, live in cities. Cities provide the environment in which people work, learn, play, and make decisions together. Local governments make critical interventions in the quality of life. At the same time, the cities of the world are increasingly linked in a global economic system, making diverse contributions to the international division of labor.

Urban studies and planning (USP) is an interdisciplinary program providing students with a variety of perspectives for understanding the development, growth, and culture of cities and the communities within them. Course work introduces students to the ways different disciplines understand cities and the societies of which they are a part. Upper-division requirements educate students about the parameters within which urban choices are made.

One of the outstanding features of the Urban Studies and Planning Program is the upper-division research requirement. During a two-quarter sequence designed to be taken in the fall and winter of the senior year, all USP majors are guided through a research internship and writing process. The upper-division field studies sequence allows students to work on specific policy projects in the San Diego region. Eligible students may choose to enroll in USP 190 in the spring to write an honors thesis. The honors option is an opportunity to do advanced research and writing that builds on work already completed in the senior sequence.

Urban studies and planning is an undergraduate community of students with diverse interests and goals. After graduation some majors pursue graduate work in social science disciplines. Others pursue graduate study in public policy, law, planning, or architecture. Urban studies has always also attracted students interested in medicine and public-health issues, who continue to study in these areas at schools of medicine or public health. Urban studies and planning provides students with a solid liberal arts background for graduate study or for professional work in a number of fields. Many students find employment opportunities through their internship placement. More generally, graduates of urban studies and planning will have the analytic skills to think clearly and act creatively about the problems and prospects of the urban environment.

THE URBAN STUDIES AND PLANNING MAJOR

A bachelor of arts degree in urban studies and planning will be given to students who satisfactorily complete the general-education requirements of Muir, Revelle, Marshall, Warren, Roosevelt, or Sixth College in addition to the urban studies and planning courses described below. The undergraduate program in urban studies and planning requires a three-quarter lower-division sequence in urban studies (USP 1-2-3), Political Science 30, and twelve courses in upper-division urban studies and planning. Students are encouraged to complete the lower-division prerequisites before they enroll in the upper-division courses.

In accordance with campus academic regulations, courses used to satisfy the major cannot be applied toward a minor, although some overlap is allowed for double majors. All lower-division and upper-division requirements must be taken for a letter grade. A 2.0 grade point average is required in the major, and students must earn at least C- in each course used for the major. Transfer students should see the USP major affairs advisor to determine whether courses taken elsewhere satisfy USP major requirements. No more than one special studies course, USP 198 or USP 199, will be accepted to count toward the major.

LOWER-DIVISION REQUIREMENTS

Students majoring in urban studies and planning must complete the introductory sequence:

USP 1. History of U.S. Urban Communities (4)

USP 2. Urban World System (4)

USP 3. The City and Social Theory (4)

and

Political Science 30. Political Inquiry (4)

(Psychology 60, Introduction to Statistics or Sociology 60, The Practice of Social Research may be substituted for Political Science 30.)

UPPER-DIVISION REQUIREMENTS

The upper-division requirements in urban studies and planning are

1. three foundation courses
2. one research methods course to be taken junior year
3. two senior sequence courses
4. six upper-division elective courses

Foundation Courses

Foundation courses provide the conceptual tools for the major. Students are to choose three of

USP 102. Urban Economics (Economics 135) (4)

USP 103. U.S. Cities in the Twentieth Century (HIUS 148) (4)

(USP 165/HIUS 147, History of the American Suburb may be substituted for USP 103.)

USP 104. Ethnic Diversity and the City (Ethnic Studies 105) (4)

USP 105. Urban Sociology (Sociology 153) (4)

USP 107. Urban Politics (Political Science 102E) (4)

USP 124. Land Use Planning (4)

(USP 173, History of Urban Planning and Design may be substituted for USP 124.)

Research Methods Courses

Students are to choose one course of

USP 125. The Design of Social Research (4)

USP 129. Research Methods: Studying Racial and Ethnic Communities (Ethnic Studies 190) (4)

USP 130. Field Work in Racial and Ethnic Communities (Ethnic Studies 107) (4)

USP 191. GIS for Urban Community Planning (4)

USP 193. San Diego Community Research (4)

Senior Sequence Requirement

In their senior year, all students must complete the senior sequence: USP 186 in the fall, and USP 187 in the winter. These courses must be taken *in order*. The sequence develops each student's ability to (1) critically review literature research; (2) formulate interesting research questions of their own; (3) design an original research project and investigative strategy; (4) conduct research; and (5) analyze, interpret, and write up findings. The final requirement of USP 186 is a research proposal. By the end of USP 187, each student must complete a Senior Research Project.

Because the senior sequence includes an internship, no other internship or field placement will be counted toward the major.

Honors in Urban Studies and Planning

Candidates for Honors in Urban Studies and Planning are required to take USP 190 Senior Honors Seminar, in which students write a senior thesis. Prerequisites for enrolling in USP 190 are a minimum 3.5 GPA in the major, senior standing, USP 186 and USP 187, and consent of instructor. Majors who plan to enroll in USP 190 must declare their intent fall quarter in USP 186.

USP 190. Senior Honors Seminar (4)

Upper-Division Elective Courses

Students are encouraged to pick an area of concentration, and choose upper-division electives listed under that cluster. Students may also define their own area of concentration and design an appropriate curriculum drawn from courses offered by USP and other related departments. USP 199, Independent Study taken for Pass/Not Pass counts for one USP upper-division elective course.

Urban/Regional Policy and Planning

USP 100. Introduction to Urban Planning

USP 101/Political Science 160AA. Introduction to Policy Analysis

USP 102/Economics 135. Urban Economics

USP 107/Political Science 102E. Urban Politics

USP 109/Political Science 103A. California Government and Politics

USP 110/Political Science 102J. Advanced Topics in Urban Politics

USP 111/Political Science 102JJ. Field Research in Urban Politics

USP 113/Political Science 103B. Politics and Policymaking in Los Angeles

USP 115/Political Science 103C. Politics and Policymaking in San Diego

USP 116. California Local Government: Finance and Administration

USP 120. Urban Planning, Infrastructure, and Real Estate

USP 122. Redevelopment Planning, Policymaking, and Law

USP 124. Land Use Planning

USP 133/Sociology 152. Social Inequality and Public Policy

USP 137. Housing and Community Development Policy and Practice

USP 170. Sustainable Planning

USP 171. Sustainable Development

USP 173. History of Urban Planning and Design

USP 174. Regional Governance and Planning Reconsidered

USP 180. Transportation Planning

USP 181. Public Transportation

USP 191. GIS for Urban and Community Planning

USP 193. San Diego Community Research

Anthropology (ANBI) 132/Biology (BIEB) 176. Conservation and the Human Predicament

Economics 116. Economic Development

Economics 118. Law and Economics: Torts, Property, and Crime

Economics 130. Public Policy

Economics 131. Economics of the Environment

Economics 139. Labor Economics

Economics 150. Economics of the Public Sector: Taxation

Economics 151. Economics of the Public Sector: Expenditures

Economics 155. Political Economics

Envi 102. Selected Topics in Environmental Studies

Envi 130. Environmental Issues: Social Sciences

Political Science 160AB. Introduction to Policy Analysis

Political Science 162. Environmental Policy

Political Science 168. Policy Assessment

Sociology 121. Economy and Society

Sociology 146. Law Enforcement in America

Sociology 155. The City of San Diego

Sociology 169. Citizenship, Community, and Culture

Sociology 179. Social Change

Sociology 180. Social Movements and Social Protest

Urban Design/Built Environment

USP 103/History (HIUS) 148. American Cities in the Twentieth Century

USP 124. Land Use Planning

USP 137. Housing and Community Development Policy and Practice

USP 165/History (HIUS) 147. History of the American Suburb

USP 170. Sustainable Planning

USP 171. Sustainable Development

USP 173. History of Urban Planning and Design

USP 174. Regional Governance and Planning Reconsidered

USP 177. Urban Design Practicum

USP 178. Urban Design for Redevelopment

USP 179. Urban Design, Theory, and Practice

USP 180. Transportation Planning

USP 191. GIS for Urban and Community Planning

USP 193. San Diego Community Research

ENVR 102. Selected Topics in Environmental Studies

ENVR 110. Environmental Law

ENVR 130. Environmental Issues: Social Sciences

Ethnic Studies 103. Environmental Racism

Ethnic Studies 104. Race, Space, and Segregation

History (HISC) 172/272. Building America: Technology, Culture, and the Built Environment in the United States

Political Science 125A. Communities and the Environment

Political Science 162. Environmental Policy

Visual Arts 110 G. The Natural and Altered Environment

Visual Arts 111. Structure of Art

Health, Social Services, and Education

USP 101/Political Science 160AA. Introduction to Policy Analysis

USP 133/Sociology C/152. Social Inequality and Public Policy

USP 143. The U.S. Health Care System

USP 144. Environmental and Preventive Health Issues

USP 145. Aging-Social and Health Policy Issues

USP 147. Case Studies in Health Care Programs/ Poor and Underserved Populations

Economics 130. Public Policy

Economics 139. Labor Economics

Economics 150. Economics of the Public Sector: Taxation

Economics 151. Economics of the Public Sector: Expenditures

Economics 155. Political Economics

Education Studies 130. Introduction to Academic Mentoring of Elementary/School Students

Ethnic Studies 142. Medicine, Race, and the Global Politics of Inequality

Philosophy 163. Biomedical Ethics

Political Science 168. Policy Assessment

Psychology 104. Introduction in Social Psychology

Sociology 112. Social Psychology

Sociology 117/EDS 117. Language, Culture, and Education

Sociology 123. Sociology of Work

Sociology 126/EDS 126. Social Organization of Education

Sociology 132. Gender and Work

Sociology 135. Medical Sociology

Sociology 136E. Sociology of Mental Illness: An Historical Approach

Sociology 136F. Sociology of Mental Illness in Contemporary Society

Sociology 141. Crime and Society

Sociology 159. Special Topics in Social Organizations and Institutions

Urban Diversity

USP 104/Ethnic Studies 105. Ethnic Diversity and the City

USP 129/Ethnic Studies 190. Research Methods: Studying Racial and Ethnic Communities

USP 130/Ethnic Studies 107. Field Work in Racial and Ethnic Communities

USP 132/Ethnic Studies 188. African Americans, Religion, and the City

USP 135/Ethnic Studies 129. Asian and Latina Immigrant Workers in the Global Economy

Anthropology (ANSC) 131. Urban Cultures in Latin America

Ethnic Studies 118. Contemporary Immigration Issues

Ethnic Studies 121. Contemporary Asian-American History

Ethnic Studies 123. Asian-American Politics

Ethnic Studies 131/History (HIUS) 159. Social and Economic History of the Southwest II

Ethnic Studies 151. Ethnic Politics in America

Ethnic Studies 161. Black Politics and Protest Since 1941

Ethnic Studies 184. Black Intellectuals in the 20th Century

History (HILA) 115. The Latin American City, a History

History (HILA) 121. History of Brazil

History (HITO) 180. Housing in the Developing World

History (HIUS) 114. California History

History (HIUS) 117. History of Los Angeles

History (HIUS) 180/Ethnic Studies 134. Immigration and Ethnicity in Modern American Society

Political Science 100H. Race and Ethnicity in American Politics

Political Science 105A. Latino Politics in the U.S.

Political Science 100J. Race in American Political Development

Political Science 150A. Politics of Immigration

Sociology 100. Classical Sociological Theory

Sociology 125. Sociology of Immigration

Sociology 139. Social Inequality: Class, Race, and Gender

Sociology 144. Forms of Social Control

Sociology 148. Political Sociology

Sociology 148E. Inequality and Jobs

Sociology 151. Comparative Race and Ethnic Relations

Cities in Historical and Comparative Perspectives

USP 103/History (HIUS) 148. American Cities in the Twentieth Century

USP 105/Sociology C/153. Urban Sociology

USP 107/Political Science 102E. Urban Politics

USP 165/History (HIUS) 147. History of the American Suburb

USP 166. History of San Diego

USP 167/History 123. History of New York City

USP 173. History of Urban Planning and Design

Anthropology (ANSC) 131. Urban Cultures in Latin America

Economics 116. Economic Development

Ethnic Studies 121. Contemporary Asian-American History

Ethnic Studies 131/History (HIUS) 159. Social and Economic History of the Southwest II

History (HIEU) 129. Paris, Past and Present

History (HILA) 115. The Latin American City, a History

History (HILA) 121. History of Brazil

History (HIUS) 114. California History

History (HIUS) 117. History of Los Angeles

History (HIUS) 124/ETHN 125. Asian American History

History (HIUS) 139. African-American History in the Twentieth Century

History (HIUS) 140/Economics 158A. Economic History

History (HIUS) 141/Economics 158B. Economic History of the United States II

History (HIUS) 154. Western Environmental History

THE MINOR PROGRAM

The urban studies and planning minor consists of seven courses in urban studies and planning, selected with the prior approval of the USP student affairs advisor. Students who wish to minor in urban studies may do so by taking any two courses from among the lower-division sequence and the upper-division foundation courses, and five upper-division courses from among those that serve the USP major. All courses must be taken for a letter grade not lower than a C-. Courses selected need approval from the USP program advisor. Students can declare the minor online.

EDUCATION ABROAD PROGRAM

Students are encouraged to participate in the UC Education Abroad Program (EAP) or Opportunities Abroad Program (OAP) while still making progress toward completing their USP major. For more information on EAP, see the section of this catalog on the Education Abroad Program or visit <http://programsabroad.ucsd.edu>. Students considering this option are advised to discuss their plans with the USP student affairs advisor before going abroad.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

LOWER-DIVISION

1. History of US Urban Communities (4)

This course charts the development of urban communities across the United States both temporally and geographically. It examines the patterns of cleavage, conflict, convergence of interest, and consensus that have structured urban life. Social, cultural, and economic forces will be analyzed for the roles they have played in shaping the diverse communities of America's cities.

2. Urban World System (4)

Examines cities and the environment in a global context. Emphasizes how the world's economy and the earth's ecology are increasingly interdependent. Focuses on biophysical and ethicosocial concerns rooted in the contemporary division of labor among cities, Third World industrialization, and the post-industrial transformation of U.S. cities.

3. The City and Social Theory (4)

An introduction to the sociological study of cities, focusing on urban society in the United States. Students in the course will examine theoretical approaches to the study of urban life; social stratification in the city; urban social and cultural systems—ethnic communities, suburbia, family life in the city, religion, art, and leisure.

87. Freshman Seminar (1)

The Freshman Seminar Program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students, with preference given to entering freshmen.

UPPER-DIVISION

100. Introduction to Urban Planning (4)

This course is designed to provide an introduction to the fundamentals of urban planning. It surveys important topics in urban planning, including economic development, urban design, transportation, environmental planning,

housing, and the history of urban planning. **Prerequisite:** upper-division standing or consent of instructor.

101. Introduction to Policy Analysis (4)

(Same as Political Science 160AA.) This course will explore the process by which the preferences of individuals are converted into public policy. Also included will be an examination of the complexity of policy problems, methods for designing better policies, and a review of tools used by analysts and policy makers. **Prerequisite:** upper-division standing or consent of instructor.

102. Urban Economics (4)

(Same as Economics 135.) Economic analysis of why and where cities develop, problems they cause, and public policies to deal with these problems. Determination of urban land rent/use, reasons for suburbanization. Transportation and congestion in cities, zoning, poverty and housing, urban local government. **Prerequisites:** Economics 1A-B or 1-2 and Mathematics 10A or 20A.

103. American Cities in the Twentieth Century (4)

(Same as HIUS 148.) This course surveys changes in U.S. cities since about 1900. Case studies of individual cities illustrate the social, political, and environmental consequences of rapid urban expansion, as well as the ways in which "urban problems" have been understood historically. **Prerequisite:** upper-division standing or consent of instructor.

104. Ethnic Diversity and the City (4)

(Same as Ethnic Studies 105.) This course will examine the city as a crucible of ethnic identity exploring both the racial and ethnic dimensions of urban life in the U.S. from the Civil War to the present. **Prerequisite:** upper-division standing.

105. Urban Sociology (4)

(Same as Sociology 153.) Introduces students to the major approaches in the sociological study of cities and to what a sociological analysis can add to our understanding of urban processes. **Prerequisite:** upper-division standing or consent of instructor.

107. Urban Politics (4)

(Same as Political Science 102E.) This survey course focuses upon the following six topics: the evolution of urban politics since the mid-nineteenth century; the urban fiscal crisis; federal/urban relationships; the "new" politics; urban power structure and leadership; and selected contemporary policy issues such as downtown redevelopment, poverty, and race.

109. California Government and Politics (4)

(Same as Political Science 103A.) This survey course explores six topics: 1) the state's political history; 2) campaigning, the mass media, and elections; 3) actors and institutions in the making of state policy; 4) local government; 5) contemporary policy issues; e.g., Proposition 13, school desegregation, crime, housing and land use, transportation, water; 6) California's role in national politics. **Prerequisite:** upper-division standing.

110. Advanced Topics in Urban Politics (4)

(Same as Political Science 102J.) Building upon the introductory urban politics course, the advanced topics course explores issues such as community power, minority empowerment, and the politics of growth. A research paper is required. Students wishing to fulfill the paper requirement with field research should enroll in the subsequent Political Science 102JJ course offered Summer Session II. **Prerequisites:** upper-division standing, consent of instructor.

111. Field Research in Urban Politics (4)

(Same as Political Science 102JJ.) To be taken with the approval of the Political Science 102J instructor, this course allows students to do original field research on topics in urban politics. This course is offered in Summer Session II subsequent to a spring 102J course. May not be used to fulfill any major or minor requirements in politics science or urban studies and planning. **Prerequisites:** USP 110/Political Science 102J and consent of instructor.

113. Politics and Policymaking in Los Angeles (4)

(Same as Political Science 103B.) This course examines politics and policymaking in the five-county Los Angeles region. It explores the historical development of the city,

suburbs, and region; politics, power, and governance; and major policy challenges facing the city and metropolitan area. **Prerequisite:** upper-division standing.

115. Politics and Policymaking in San Diego (4)
(Same as Political Science 103C.) This course examines how major policy decisions are made in San Diego. It analyzes the region's power structure (including the roles of non-governmental organizations and the media), governance systems and reform efforts, and the politics of major infrastructure projects. **Prerequisite:** upper-division standing or consent of instructor.

116. California Local Government: Finance and Administration (4)
This course surveys public finance and administration. It focuses upon California local governments—cities, counties, and special districts—and also examines state and federal relationships. Topics explored include revenue, expenditure, indebtedness, policy responsibilities, and administrative organization and processes. **Prerequisite:** upper-division standing.

120. Urban Planning, Infrastructure, and Real Estate (4)
This course will explore the interrelationships of urban planning, public infrastructure, and real estate development. These three issues are critical to an examination of the major challenges facing California's and America's major metropolitan centers. **Prerequisite:** upper-division standing or consent of instructor.

122. Redevelopment Planning, Policymaking, and Law (4)
This course examines key elements of land use, planning, and law as related to urban redevelopment. It focuses on San Diego case studies, including the Petco Park/East Village redevelopment project and the Naval Training Center (NTC) Redevelopment Area (Liberty Station). **Prerequisite:** upper-division standing or consent of instructor.

124. Land Use Planning (4)
Introduction to land use planning in the United States: zoning and subdivision, regulation, growth management, farmland preservation, environmental protection, and comprehensive planning. **Prerequisite:** upper-division standing or consent of instructor.

125. The Design of Social Research (4)
Research methods are tools for improving knowledge. Beginning with a research question, students will learn to select appropriate methods for sampling, collecting, and analyzing data to improve their research activities and research results. **Prerequisite:** upper-division standing or consent of instructor.

129. Research Methods: Studying Racial and Ethnic Communities (4)
(Same as ETHN 190.) The course offers students the basic research methods with which to study ethnic and racial communities. The various topics to be explored include human and physical geography, transportation, employment, economic structure, cultural values, housing, health, education, and intergroup relations. **Prerequisite:** upper-division standing or consent of instructor.

130. Field Work in Racial and Ethnic Communities (4)
(Same as ETHN 107.) This is a research course examining social, economic, and political issues in ethnic and racial communities through field work. Topics are examined through a variety of research methods which may include interviews and archival, library, and historical research. **Prerequisite:** upper-division standing.

132. African Americans, Religion, and the City (4)
(Same as Ethnic Studies 188.) This course details the history of African-American migration to urban areas after World War I and World War II and explores the role of religion in their lives as well as the impact that their religious experiences had upon the cities in which they lived. **Prerequisite:** upper-division standing.

133. Social Inequality and Public Policy (4)
(Same as SOC 152.) Primary focus on understanding and analyzing poverty and public policy. Analysis of how current debates and public policy initiatives mesh with alterna-

tive social scientific explanations of poverty. **Prerequisite:** upper-division standing.

135. Asian and Latina Immigrant Workers in the Global Economy (4)
(Same as ETHN 129.) This course will explore the social, political, and economic implications of global economic restructuring, immigration policies, and welfare reform on Asian and Latina immigrant women in the United States. We will critically examine these larger social forces from the perspectives of Latina and Asian immigrant women workers, incorporating theories of race, class, and gender to provide a careful reading of the experiences of immigrant women on the global assembly line. **Prerequisite:** upper-division standing.

137. Housing and Community Development Policy and Practice (4)
History, theory, and practice of U.S. housing and community development. Public, private, and nonprofit sectors shape and implement planning and policy decisions at the federal, state, local and neighborhood levels. **Prerequisite:** upper-division standing.

143. The U.S. Health Care System (4)
This course will provide an overview of the organization of health care within the context of the community with emphasis on the political, social, and cultural influences. It is concerned with the structure, objectives, and trends of major health and health-related programs in the United States to include sponsorship, financing, training and utilization of health personnel. **Prerequisite:** upper-division standing or consent of instructor. (Offered winter quarter.)

144. Environmental and Preventive Health Issues (4)
This course will analyze needs of populations, highlighting current major public health problems such as chronic and communicable diseases, environmental hazards of diseases, psychiatric problems and additional diseases, new social mores affecting health maintenance, consumer health awareness and health practices, special needs of economically and socially disadvantaged populations. The focus is on selected areas of public and environmental health, namely: epidemiology, preventive services in family health, communicable and chronic disease control, and occupational health. **Prerequisite:** upper-division standing or consent of instructor. (Offered fall quarter.)

145. Aging—Social and Health Policy Issues (4)
This course will provide a brief introduction to the nature and problems of aging, with emphasis on socioeconomic and health status; determinants of priorities of social and health policies will be examined through analysis of the structure and organization of selected programs for the elderly. Field visits will constitute part of the course. **Prerequisite:** upper-division standing.

147. Case Studies in Health Care Programs/ Poor and Underserved Population (4)
The purpose of this course is to identify the special health needs of low income and underserved populations and to review their status of care, factors influencing the incidence of disease and health problems, and political and legislative measures related to access and the provision of care. Selected current programs and policies that address the health-care needs of selected underserved populations such as working poor, inner city populations, recent immigrants, and persons with severe disabling mental illnesses will be studied. Offered in alternate years. **Prerequisite:** upper-division standing or consent of instructor. (Offered spring quarter.)

165. History of the American Suburb (4)
(Same as HIUS 147.) This lecture course explores the development of suburbs in America, from the early nineteenth century to the contemporary era. Topics include suburban formation, class, ethnic and racial dimensions, government influences, social life, and cultural responses to suburbia. The class will explore competing theories of suburbanization as it surveys the major literature. **Prerequisite:** upper-division standing.

166. History of San Diego (4)
Course surveys the social, political, economic, cultural and environmental history of the San Diego region from pre-colonial times to the present, with an emphasis on

the urban development that has occurred since 1900. **Prerequisite:** upper-division standing.

167. History of New York City (4)
(Same as HIUS 123.) New York City breathes history. Whether it is in the music, the literature, or the architecture, the city informs our most basic conceptions of American identity. This course examines the evolution of Gotham from the colonial era to today. **Prerequisite:** upper-division standing or consent of instructor.

170. Sustainable Planning (4)
This course will explore the different factors and processes that shape a sustainable city. Contemporary green planning techniques and values will be evaluated. The course will also discuss planning, designing, and implementation of sustainable facilities that will reduce sprawl. **Prerequisite:** upper-division standing or consent of instructor.

171. Sustainable Development (4)
Sustainable development is a concept invoked by an increasingly wide range of scholars, activists, and organizations dedicated to promoting environmentally sound approaches to economic development. This course critically examines the diverse, often contradictory, interests in sustainability. It provides a transdisciplinary overview of emergent theories and practices. **Prerequisite:** upper-division standing.

173. History of Urban Planning and Design (4)
The analysis of the evolution of city designs over time; study of the forces that influence the form and content of a city: why cities change; comparison of urban planning and architecture in Europe and the United States. **Prerequisite:** upper-division standing.

174. Regional Governance and Planning Reconsidered (4)
Regional planning and local governance in California, focusing upon San Diego. Current system, the state/local relationship, and the incentives and disincentives for restructuring regional and local governance and planning. **Prerequisite:** upper-division standing.

177. Urban Design Practicum (4)
This course is designed to introduce the student to the theory and practice of urban design, the form of the built environment, and how it is created. There is an emphasis on the development within a larger urban context. **Prerequisite:** upper-division standing or consent of instructor.

178. Urban Design for Redevelopment (4)
This course addresses inner-city and suburban redevelopment focusing on urban design, ecological, and ethnic issues using advanced physical planning and urban design methods. Also included will be the environmental-impact assessments of redevelopment projects. **Prerequisite:** upper-division standing.

179. Urban Design, Theory, and Practice (4)
Roles of the urban designer, preparing schematic proposals and performance statements, identifying opportunities for and constraints on designers. Each student will prepare a practical exercise in urban design using various urban design methods. **Prerequisite:** upper-division standing.

180. Transportation Planning (4)
Introduction to the history and current state of urban transportation planning, including the relationship between transportation and urban form; role of automotive, mass transit, and alternative modes; methods for transportation systems analysis; decision-making, regulatory, and financing mechanisms; and public attitudes. **Prerequisite:** upper-division standing.

181. Public Transportation (4)
Livable cities rely on balanced transportation systems that can mitigate the negative impacts of a car-oriented environment and society. This course will explore the role of public transit in creating a balanced transportation system. A variety of public transportation systems will be analyzed. **Prerequisite:** upper-division standing or consent of instructor.

186. Senior Sequence Research Proposal (6)

Introduces students to the theory and practice of social research including the challenges of writing a scholarly proposal. Students are required to complete 100 hours of an internship experience while critically examining the relations between social science and society. **Prerequisites:** upper-division standing, USP major.

187. Senior Sequence Research Project (6)

An intensive research, internship, and writing experience that culminates in an original senior research project. Students learn about the theoretical, ethical, and technical challenges of scholarly research and publication. **Prerequisite:** USP 186.

190. Senior Honors Seminar (4)

Each student enrolled will be required to write an honors essay, a substantial research paper on a current urban policy issue, under the supervision of a member of the faculty. Most often the essay will be based on their previous fieldwork courses and internship. This essay and other written exercises, as well as class participation, will be the basis of the final grade for the course. The seminar will rotate from year to year among the faculty in urban studies and planning. **Prerequisites:** USP 186, USP 187, major GPA 3.5, and permission of instructor.

191. GIS for Urban and Community Planning (4)

Introduction to Geographic Information Systems and using GIS to make decisions: acquiring data and organizing data in useful formats, demographic mapping, geocoding. Selected exercises examine crime data, political campaigns, banking and environmental planning, patterns of bank lending and finance. **Prerequisites:** upper-division standing, USP major.

193. San Diego Community Research (4)

Using the San Diego region as a case study, students will be introduced to the process of collecting, evaluating, and presenting urban and regional data using a variety of methods, including aggregate data analysis, historical research, and ethnography. **Prerequisite:** upper-division standing.

194. Research Seminar in Washington, D.C. (4)

(Same as Cognitive Science 194, Communication 194, Earth Science 194, History 193, Political Science 194, Sociology E/194.) Course attached to six-unit internship taken by students participating in the UCDC program. Involves weekly seminar meetings with faculty and teaching assistant and a substantial research paper. **Prerequisites:** department approval and participating in UCDC program.

195. Teaching Apprentice—Undergraduate (2–4)

Introduction to teaching activities associated with course. Responsibilities include preparing reading materials assigned by the instructor, attending course lectures, meeting at least one hour per week with the instructor, assisting instructor in grading, and preparing a summary report to the instructor. **Prerequisites:** consent of instructor and an A in the course in which the student plans to assist.

198. Directed Group Study (2–4)

Directed group study on a topic or in a field not included in the regular departmental curriculum by special arrangement with a faculty member. **Prerequisites:** upper-division standing and consent of instructor.

199. Independent Study (2–4)

Reading and research programs and field-study projects to be arranged between student and instructor, depending on the student's needs and the instructor's advice in terms of these needs. **Prerequisites:** upper-division standing and consent of instructor.

Visual Arts

PROFESSORS

David Antin, M.A., *Emeritus*
Eleanor Antin, B.A., *Emerita*
Sheldon G. Brown, M.F.A.
Norman Bryson, Ph.D.
Harold Cohen, *Diploma of Fine Arts, Emeritus*
Steve Fagin, M.A.
Anya Gallaccio, B.A.
Jean-Pierre Gorin, *Licence de Philosophie*
Helen Mayer Harrison, M.A., *Emerita*
Newton A. Harrison, M.F.A., *Emeritus*
Louis J. Hock, M.F.A.
Fred S. Lonidier, M.F.A.
Kim R. MacConnel, M.F.A., *Emeritus*
Babette M. Mangolte
Lev Manovich, Ph.D.
Sheldon A. Nodelman, Ph.D.
Rubén Ortiz-Torres, M.F.A.
Patricia A. Patterson, *Emerita*
Faith Ringgold, M.A., *Emerita*
Jerome Rothenberg, M.A., *Emeritus*
Kuiyi Shen, Ph.D.
Ernest R. Silva, M.F.A.
Haim Steinbach, M.F.A.
Lesley F. Stern, Ph.D.
John C. Welchman, Ph.D.

ASSOCIATE PROFESSORS

Amy Adler, M.F.A.
Amy J. Alexander, M.F.A.
Benjamin Bratton, Ph.D.
Jordan Crandall
Edwin Teddy Cruz, M.Des.S.
Ricardo Dominguez, M.A.
Jack M. Greenstein, Ph.D.
Grant Kester, Ph.D.
Standish D. Lawder, Ph.D., *Emeritus*
Elizabeth Newsome, Ph.D.
Kyong Park, B.S.
Jennifer Pastor, M.F.A.
Cauleen Smith, M.F.A., *Acting*
Susan L. Smith, Ph.D.
Phel Steinmetz, *Academic Senate Distinguished Teaching Award*

LECTURERS WITH SECURITY OF EMPLOYMENT

Claudio Fenner-Lopez, M.A., *Emeritus*
Brett Stalbaum, M.F.A.

LECTURER WITH POTENTIAL FOR SECURITY OF EMPLOYMENT

Michael Trigilio, M.F.A.
OFFICE: 216 Mandeville Center for the Arts
<http://visarts.ucsd.edu>

The Department of Visual Arts offers courses in painting, drawing, sculpture, performance, computing in the arts, film, video, photography, and art history/criticism (including that of film and video). A bachelor's degree from this department provides

students with a solid liberal arts background and is preparatory training for careers as artists, art historians, filmmakers, video artists, photographers, digital media artists, and art critics. It also provides students the initial skills required for teaching and work in museums, television, and the commercial film, photography, and internet industries.

By its composition, the Department of Visual Arts is biased in the direction of actively producing artists and critics whose presence at the center of the contemporary art world necessitates reconsideration and reevaluation of artistic productions, their information structure, and significance. Consequently, a flexible introductory program of historically based courses has been devised mainly to provide the student an opportunity to concentrate on areas involving significantly different aesthetic and communication structures. A series of studio courses, in which painting and sculpture are included, is presented to bring the student into direct contact with the real contingencies compelling redistribution of aesthetic attitudes and reinterpretation of genres. Because of the exploratory nature of our program, the department is prepared to emphasize new media that would traditionally be considered to have scant relation to the visual arts. Thus, courses in theatrical events, linguistic structures, etc., are provided. In this context, theoretical courses with a media orientation, as in film, video, photography, or computing, are also offered.

The Department of Visual Arts is located in the Mandeville Center for the Arts. In addition, the master of fine arts program office, as well as faculty and graduate students' studios/research spaces are located in the Visual Arts Facility sited in Sixth College. Ph.D. student offices are located in the Literature Building. Facilities and equipment are available to undergraduates in both the Mandeville Center and at the campuswide Media Center, providing the opportunity to study painting, drawing, photography, computing in the arts, 16mm film, performance, sculpture, and video. Facilities at the Media Center include portable video recording equipment, video and audio editing suites, non-linear editing, and production studios. Additional film equipment available includes an animation stand, optical printer, two sound-mixing studios, and numerous film editing suites. Courses in computing in the arts take place in the Silicon Graphics/Mac/NT lab located at the Visual Arts Facility, the INTEL-shared lab in the Applied Physics and Mathematics building, and a dedicated ICAM lab in building 201 University Center.

The University Art Gallery displays a continually changing series of exhibitions, and the Mandeville Annex Gallery, located on the lower level, is directed by visual arts undergraduate students. A gallery and performance space, located in the Visual Arts Facility, are directed by graduate students.

THE UNDERGRADUATE PROGRAM

COLLEGE REQUIREMENTS

The Department of Visual Arts teaches courses applicable toward the Muir, Sixth, and Warren general-education requirements, the Marshall humanities requirement, the Eleanor Roosevelt and Revelle fine arts requirements. Optional minors may be taken within any college.

MINOR IN VISUAL ARTS

The Department of Visual Arts offers minors in seven areas of study: studio painting/drawing/sculpture, photography, computing, art history, history and criticism of film and video, digital video and film production, and ICAM. A minor consists of seven specific courses, of which at least five must be upper-division. Because the requirements differ for each minor, prospective visual arts minors should consult with the departmental advisor for a complete list of appropriate classes acceptable for the minor.

Students are advised to begin their program in the second year; otherwise, they cannot be guaranteed enough time to complete the classes required for a minor.

Art History (VA26)

Required Courses

20. Introduction to Art History

Choose one from

21A. Introduction to Art of the Americans or Africa and Oceania

21B. Introduction to Asian Art

Choose one course from three of the five Distribution areas A–E.

Please refer to the Art History major for the course options in each area:

- European Pre-Modern: Ancient and Medieval
- European early Modern: Renaissance and Baroque
- Modern and Contemporary
- Arts of the Americas
- Arts of Asia

Choose two additional Art History courses from any area A–E.

Studio Minor (VA28)

Required Courses

22. Formations of Modern Art

111. Structure of Art

Choose one course from

1. Introduction to Art-Making: Two-Dimensional Practices
2. Introduction to Art-Making: Motion- and Time-Based Art
3. Introduction to Art-Making: Three-Dimensional Practices

Choose four courses from:

- 104A. Performing the Self
- 104BN. Verbal Performance
- 104CN. Personal Narrative
- 105A. Drawing: Representing the Subject
- 105B. Drawing: Practices and Genre
- 105C. Drawing: Portfolio Projects
- 105D. Aesthetics in Chinese Calligraphy
- 105E. Chinese Calligraphy Installation
- 106A. Painting: Image Making
- 106B. Painting: Practices and Genre
- 106C. Painting: Portfolio Projects
- 107A. Sculpture: Making the Object
- 107B. Sculpture: Practices and Genre
- 107CN. Sculpture: Portfolio Projects

ICAM: Interdisciplinary Computing and the Arts (VA29)

Required Courses

- ICAM 40/VIS 40. Introduction to Computing in the Arts
ICAM 110. Computer Arts: Current Practice
ICAM 150/VIS 159. History of Art and Technology
Choose one from
1. Introduction to Art-Making: Two-Dimensional Practices
2. Introduction to Art-Making: Motion and Time-Based Art
3. Introduction to Art-Making: Three-Dimensional Practices
MUS 4. Introduction to Western Music
Choose one from
ICAM 101/VIS 140. Digital Imaging: Image and Interactivity
ICAM 103/MUS 170. Musical Acoustics
Choose two from
ICAM 102/VIS 145A. Time and Process Based Digital Media I
145B. Time and Process Based Digital Media II
ICAM 120. Virtual Environments
ICAM 130/VIS 149. Seminar in Contemporary Computer Topics
MUS 171. Computer Music I
MUS 172. Computer Music II
MUS 176. Music Technology Seminar
132. Installation Production and Studio
141A. Computer Programming for the Arts I
141B. Computer Programming for the Arts II
147A. Electronic Technologies for Art I
147B. Electronic Technologies for Art II

Computing (MO53)

Required Courses

22. Formations of Modern Art
VIS 40/ICAM 40. Introduction to Computing in the Arts
111. Structure of Art
VIS 159/ICAM 150. History of Art and Technology
Choose three upper-division Computing courses:
ICAM 101/VIS 140. Digital Imaging: Image and Interactivity
ICAM 102/VIS 145A. Time and Process Based Digital Media I
145B. Time and Process Based Digital Media II
147A. Electronic Technologies for Art I
147B. Electronic Technologies for Art II

Photography (MO54)

Required courses

22. Formations of Modern Art
60. Introduction to Digital Photography
111. Structure of Art
158. Histories of Photography
VIS 159/ICAM 150. History of Art and Technology
164. Photographic Strategies
165. Camera Techniques

History and Criticism of Film and Video (MO72)

Required courses

- 70N. Introduction to Media
84. History of Film
111.* Structure of Art
Choose four upper-division courses in the history and/or criticism of film and video. (Courses numbered 150–157 except 156N)
*Five unique upper-division courses in media history/criticism are required if you are also completing a Visual Arts major or minor.

Digital Video and Film Production (MO71)

Required courses

- 70N. Introduction to Media
84. History of Film
111.* Structure of Art
174. Media Sketchbook
Choose one upper-division course in digital video and film production listed below:
171. Digital Cinema: Theory and Production
175. Editing: Theory and Production
176. 16 mm Filmmaking
177. Scripting Strategies
178. Sound: Theory and Production
Choose two upper-division courses in the history and/or criticism of film and video listed below:
150. History of Silent Cinema
151. History of Experimental Film
152. Film in Social Context
153. The Genre Series
154. Hard Look at the Movies
155. The Director Series
157. Video History and Criticism
194S. Fantasy in Film
*Five unique upper-division courses in media are required if any of these courses overlap with your major or minor.
**Students may not major in Visual Arts Media (VA27) and minor in Digital Video and Film Production.

EDUCATION ABROAD PROGRAM

Students are often able to participate in the UC Education Abroad Program (EAP) and UC San Diego's Opportunities Abroad Program (OAP) while still making progress toward completing their major. Financial aid is applicable to study abroad and special study abroad scholarships are readily available. Students considering this option should discuss their plans with an Education Abroad advisor before going abroad, and courses taken abroad must be approved by the departmental faculty advisor. More information on EAP/OAP is detailed in the Education Abroad Program of the *UC San Diego General Catalog* or on their Web site <http://programsabroad.ucsd.edu/pao/>. Interested students should contact the Programs Abroad Office in the International Center.

RESIDENCY REQUIREMENTS

A minimum of two-thirds of the course work completed for the major must be taken at UCSD. Students who transfer to UCSD in their second or third year may petition to substitute courses

taken at other colleges and universities for major requirements.

Visual Arts 111, Structure of Art, must be taken at UCSD by all students, including transfer students, in the art history, media, and studio majors.

HONORS PROGRAMS

The department offers honors programs in art history, in media, and in studio for outstanding students.

The **art history** honors program will provide outstanding students with pre-professional experience. It consists of an issue-oriented seminar followed by a directed group study and will result in an exhibition with catalogue, a scholarly conference with a mock publication and/or series of research papers. Students who meet the criteria may, with permission of the art history faculty advisor or the art history honors seminar instructor, enroll in the art history honors program during the last quarter of their junior year or as a senior. This program is open to juniors and seniors who meet eligibility requirements: minimum major GPA of 3.5 (3.3 overall), completion of all lower-division art history requirements, completion of all upper-division art history distribution requirements, and completion of Art Historical Methods (VIS 112) and at least one additional art history seminar. The level of distinction will be determined by the faculty committee on the basis of work in the honors seminar and on the research project.

The **media** honors program will help students develop high-quality professional portfolios. The honors thesis project is a sequence of individual studies that runs the length of an academic year to provide sufficient time for ideas to develop and critically aware work to be produced. Students may arrange to work with different faculty advisors each term or may engage a single advisor for the year. To be eligible for the honors thesis sequence, students must have at least a 3.5 GPA in the major and have approval of all the advisors with whom they will work. Qualified students may begin their sequence the last quarter of their junior year or during their senior year. At the end of the third quarter, all involved media faculty will meet to critique the overall quality of the final thesis work to determine level of distinction.

Through exhibition, verbal and written presentations and course work, the studio honors program is intended to give the student as strong a technical, critical, and theoretical base as possible. The program is open to juniors and seniors with a minimum 3.5 GPA in the major (3.0 overall), who have completed all lower-division studio requirements and all upper-division groups I, II, III, and IV (subgroup A) requirements.

Students interested in participating in an honors program should consult with the departmental advisor.

DOUBLE MAJOR WITHIN THE DEPARTMENT

There are three double majors within the Department of Visual Arts: Art History/Theory/Criticism paired with either studio, media, or ICAM. Students interested in a double major within the department must have at least ten upper-division

courses that are unique to each departmental major and the remaining courses may overlap with other major requirements. Students should consult with the departmental advisor for additional information.

MAJOR REQUIREMENTS

Twenty courses are required in studio, media, and ICAM and eighteen courses in art history for the attainment of the bachelor of arts degree. A minimum of twelve of these courses must be upper-division, however, some majors may require more upper-division courses.

All courses taken to satisfy major requirements must be taken for a letter grade, and only grades of C– or better will be accepted in the visual arts major.

STUDIO MAJOR

The studio major is aimed at producing a theoretically based, highly productive group of artists. Lower-division courses are structured to expose students to a variety of ideas in and about the visual arts. Introductory skills are taught, but their development will occur at the upper-division level in conjunction with the student's increasing awareness of the range of theoretical possibilities in the field. The curriculum includes courses in drawing, painting, sculpture, performance, photography, video, 16mm film, many offerings in art history/criticism, as well as new courses in digital imaging and electronics.

Group I: Lower-Division

Foundation Level

Five courses required.

1. Introduction to Art Making: Two-Dimensional Practices
2. Introduction to Art Making: Motion and Time Based Art
3. Introduction to Art Making: Three-Dimensional Practices
22. Formations of Modern Art
Choose one from
20. Introduction to Art History
- 21A. Introduction to the Arts of the Americas or Africa and Oceania
- 21B. Introduction to Asian Art
84. History of Film

Group II: Upper-Division

Entry Level

Five courses required.

111. Structure of Art

Choose four from

- 40/ICAM 40.* Introduction to Computing in the Arts
- 60.* Introduction to Digital Photography
- 70N.* Introduction to Media
- 104A. Performing the Self
- 105A. Drawing: Representing the Subject
- 106A. Painting: Image Making
- 107A. Sculpture: Making the Object

Note: Required for Visual Arts studio, media, and art history majors.

*VIS 40, 60, or 70N can be taken to fulfill Group II entry level studio requirements, but will not count toward the fifteen upper-division courses needed to fulfill the major requirements.

Group III: Upper-Division

Intermediate Level

Two courses required.

- 104BN. Verbal Performance
- 105B. Drawing: Practices and Genre
- 105D. The Aesthetics of Chinese Calligraphy
- 106B. Painting: Practices and Genre
- 107B. Sculpture: Practices and Genre
- 140/ICAM 101. Digital Imaging: Image and Interactivity
- 147A. Electronic Technologies for Art I

Group IV: Upper-Division

Advanced Level

Five courses required.

Group A

Choose two from

- 104CN. Personal Narrative
- 105C. Drawing: Portfolio Projects
- 105E. Chinese Calligraphy as Installation
- 106C. Painting: Portfolio Projects
- 107CN. Sculpture: Portfolio Projects
- 147B. Electronic Technologies for the Art II

Group B

Group A must be completed before Group B can be taken.

Choose three from

108. Advanced Projects in Art
- 110A. Contemporary Issues and Practices
- 110B. New Genres/New and Old Technologies
- 110C. Proposals, Plans, Presentations
- 110D. Visual Narrative/Tableau
- 110E. Art in Public Places/Site Specific Art
- 110F. Installation: Cross-Disciplinary Projects
- 110G. The Natural and Altered Environment
- 110H. Image and Text Art
- 110I. Performing for the Camera
- 110J. Ritual Performance
- 110K. Installation Performance
130. Special Projects in Visual Arts
132. Installation Production and Studio

Group V: Upper-Division

Non-Studio

Three courses required.

- Upper-division art history, film history, and theory/ criticism courses such as
- 113CN.* History of Criticism III: Contemporary (1950–Present)
 - 117B.* Theories of Representation
 - 117I.* Western and Non-Western Rituals and Ceremonies
 - 124CN. Nineteenth-Century Art
 - 125A. Twentieth-Century Art
 - 125BN. Contemporary Art
 152. Film in Social Context

154. Hard Look at the Movies
157. Video History and Criticism
158. Histories of Photography
- 159/ICAM 150. History of Art and Technology
- 194S. Fantasy in Film
*seminar

Honors Program in Studio

110M. Studio Honors I

110N. Studio Honors II

The Studio Honors I and the attached Studio Honors II count as one course towards the fulfillment of a Group IV requirement.

ART HISTORY/THEORY/CRITICISM MAJOR

The major in art history, theory, and criticism is designed both for students who desire a broadly based education in the humanities and for those who plan to pursue a career in an art-related profession. In both cases, the foundation for study is proficiency in the languages of artistic expression. Through the study of art history, students learn to treat works of art as manifestations of human belief, thought, and experience in Western and non-Western societies from prehistory to the present day. Courses in criticism review the theoretical approaches that are used to understand artistic achievement. By combining art historical and critical study, the program promotes in the student an awareness of the cultural traditions that have shaped his or her intellectual outlook and provides a framework for informed judgment on the crucial issues of meaning and expression in contemporary society.

Majors are encouraged to take relevant courses in allied disciplines such as history, communication, anthropology, and literature, and in such area programs as classics and Italian studies. In addition, students who plan to apply to graduate schools are strongly advised to develop proficiency in one or more foreign languages, as is dictated by their area of specialization.

FOUNDATION LEVEL—Lower-Division

Five courses required.

20. Introduction to Art History
22. Formations of Modern Art
23. Information Technologies in Art History
Choose one from 21A. Introduction to the Art of the Americas or Africa and Oceania
- 21B. Introduction to Asian Art

Choose one from

- 1, 2, 3. Introduction to Art-Making
60. Introduction to Digital Photography
- 70N. Introduction to Media

Note: VIS 23 should be completed by the end of the sophomore year or taken the first time it is offered after a junior declares an art history major or transfers into the program. VIS 23 is a prerequisite for VIS 112.

ADVANCED LEVEL—Upper-Division

Thirteen courses required.

GROUP I—Required Courses

Two courses.

These two courses are required for all art history and criticism majors:

111. Structure of Art*

112. Art Historical Methods

Note: Majors must complete VIS 112 by the end of their junior year and are strongly advised to do so earlier.

*Required of Visual Arts art history, media, and studio majors.

GROUP II—Distributional Requirement

Six courses.

Choose one course from each of the following areas:

A. European Pre-Modern: Ancient and Medieval

120A. Greek Art

120B. Roman Art

120C. Late Antique Art

120D. Prehistoric Art

121AN. The Idea of Medieval Art

121B. Castles, Cathedrals, and Cities

121D.* The Illuminated Manuscript in the Middle Ages

128A. Topics in Pre-Modern Art History

129A.* Seminar in Pre-Modern Art History

B. European Early Modern: Renaissance and Baroque

122AN. Renaissance Art

122CN. Defining High Renaissance Art

122D. Michelangelo

122GS. The City in Italy

122F.* Leonardo's La Gioconda

123AN. Between Spirit and Flesh: Northern Art of the Early Renaissance

123BN.* Jan van Eyck

124AN. Baroque Art

128B. Topics in Early Modern Art History

129B.* Seminar in Early Modern Art History

C. Modern and Contemporary

124BN. Art and the Enlightenment

124CN. Nineteenth Century Art

125A. Twentieth Century Art

125BN.* Contemporary Art

125DN.* Marcel Duchamp

125F. Latin American Film

128C. Topics in Modern Art History

129C.* Seminar in Modern Art History

158. Histories of Photography

159/ICAM 150. History of Art and Technology

D. Arts of the Americas

126AN. Pre-Columbian Art of Ancient Mexico and Central America

126BN. The Art and Civilization of the Ancient Maya

126C.* Problems in Mesoamerican Art History

126D.* Problems in Ancient Maya Iconography and Inscriptions

126HN. Pacific Coast American Indian Art

126I. Southwest American Indian Art

126J. African and Afro-American Art

126K. Oceanic Art

126P. Latin American Art, 1890–1950

126Q. Latin American Art, 1950–Present

126R. Latin American Photography

128D. Topics in Art History of the Americas

129D.* Seminar in Art History of the Americas

E. Arts of Asia

127B. Arts of China

127C. Arts of Modern China

127D.* Early Chinese Painting

127E.* Later Chinese Painting

127F.* Japanese Buddhist Art

127G.* Twentieth-Century Chinese Art

127N. Twentieth-Century Art in China and Japan

127P. Arts of Japan

127Q.* Japanese Paintings and Prints

128E. Topics in Art History of Asia

129E.* Seminar in Art History of Asia

F. Theory

113BN.* History of Criticism II: Early Twentieth Century (1900–1950)

113CN.* History of Criticism III: Contemporary (1950–Present)

117A.* Narrative Structures

117B.* Theories of Representation

117E.* Problems in Ethnoaesthetics

117F. Theorizing the Americas

117G. Critical Visual Theory and Practice since 1980

117H. Constructing Gender in Fifth-Century BC Athens and Eighteenth-Century France

117I.* Western and Non-Western Rituals and Ceremonies

128F. Topics in Art Theory and Criticism

129F.* Seminar in Art Theory and Criticism

*seminar

Students must take at least three upper-division seminars in addition to VIS 112. These three additional seminars may come from any area and be taken in fulfillment of the distribution requirements or as open electives.

In accordance with standard university policy, the department requires that students take two-thirds of the upper-division courses in their major at UCSD. The distribution requirement must be fulfilled with courses taken at UCSD. Courses taken abroad or at other U.S. institutions do not count towards, and will not be substituted for, the six-course distribution requirement.

GROUP III—Electives

Five courses.

Students are required to take five upper-division courses in addition to VIS 111, VIS 112, and those used to fulfill the distribution requirements. At least three of these must be courses in art history or theory. For the remaining two, choose from the following:

- Any upper-division art history course(s) in history or theory
- any upper-division course(s) in media history and criticism (e.g., VIS 150, 151, 152, 153, 154, 155, 156N, 157);
- up to two upper-division courses in studio or media production; or
- with permission of art history faculty advisor, one upper-division course in a related department or program such as anthropology, history, literature, or critical gender studies.

- two two-unit curatorial practices workshop courses (VIS 128P) count as one course towards the fulfillment of an elective.

Honors Program in Art History

129G.* Art History Honors Seminar

129H.* Art History Honors Directed Group Study
*seminar

The completion of both the Art History Honors Seminar and the Art History Honors Directed Group Study counts as one course towards the fulfillment of the Group III requirement.

Students who meet the criteria may, with permission of the art history faculty advisor or the Art History Honors Seminar instructor, enroll in the Art History Honors Program during the last quarter of their junior year or as a senior. This program is open to juniors and seniors who meet eligibility requirements. Please consult with the departmental advisor for these requirements.

MEDIA MAJOR

With a visual arts foundation, the program is designed for students who want to become creative videomakers, filmmakers, photographers, and computer artists, encouraging the hybridity of media. The curriculum combines hands-on experience of making with practical and theoretical criticism, provides historical, social, and aesthetic backgrounds for the understanding of modern media, and emphasizes creativity, versatility, and intelligence over technical specializations. It should allow students to go on to more specialized graduate programs in the media arts, to seek careers in film, television, computing, or photography, or to develop as independent artists. All media majors should see the Visual Arts Undergraduate advisor upon entrance into UCSD.

FOUNDATION LEVEL—Lower-Division

Six courses required.

Group A

1 or 2 or 3. Introduction to Art Making

22. Formations of Modern Art

84. History of Film

Group B

40/ICAM 40. Introduction to Computing in the Arts

670. Introduction to Digital Photography

70N. Introduction to Media

All six courses listed under Groups A and B above are required. VIS 70N is prerequisite for use of the Media Center facilities; no further production courses may be taken until VIS 70N is completed.

INTERMEDIATE LEVEL—Upper-Division

Nine courses required: six from Group A and three from Group B.

Group A

Two courses required. Required courses for all emphases:

111. Structure of Art

174. Media Sketchbook

Choose One Emphasis

Four courses required.

Computing Emphasis

Three courses plus one from photography or video and digital cinema.

140/ICAM 101. Digital Imaging: Image and Interactivity

145A/ICAM 102. Time- and Process-Based Digital Media I

147A. Electronic Technologies for Art I

Photography Emphasis

Two courses plus two from computing or video and digital cinema.

164. Photographic Strategies

165. Camera Techniques

Video and Digital Cinema Emphasis

Three courses plus one from computing or photography.

171. Digital Cinema—Theory and Production

175. Editing—Theory and Production

176. 16mm Filmmaking

177. Scripting Strategies

178. Sound—Theory and Production

GROUP B—History, Criticism, and Theory

Three courses required.

113BN. History of Criticism II: Early Twentieth Century (1900–1950)

113CN. History of Criticism III: Contemporary (1950–Present)

117B. Theories of Representation

150. History of Silent Cinema

151. History of Experimental Film

152. Film in Social Context

153. The Genre Series

154. Hard Look at the Movies

155. The Director Series

156N. Special Problems in Film History and Theory

157. Video History and Criticism

158. Histories of Photography

159/ICAM 150. History of Art and Technology

Note: Any courses in the art history distributional requirement may be taken to fulfill the Group B requirement.

VIS 158 is required for all students with a photography emphasis.

VIS 159/ICAM 150 is required for all students with a computing emphasis.

ADVANCED LEVEL—Upper Division

Five courses required.

180A. Documentary Evidence and the Construction of Authenticity in Current Media Practices

180B. Fiction and Allegory in Current Media Practices

183A. Strategies of Self

183B. Strategies of Alterity

Three of the above are required for the photography and video and digital cinema emphases and two are required for the computing emphasis. The A and B portion of VIS 180 and VIS 183 courses cannot be taken concurrently.

Electives

Three courses required.

Computing Emphasis

Three courses required.

145B. Time- and Process-Based Digital Media II

147B. Electronic Technologies for Art II

149/ICAM 130. Seminar in Contemporary Computer Topics

Photography Electives

Two courses required.

166. Advanced Camera Techniques

167. Social Engagement in Photography

168. Color Techniques in Photography

Video and Digital Cinema Electives

Two of the courses below required.

181. Sound and Lighting

182. Advanced Editing

184. Advanced Scripting

If not taken previously, one of the 180A, 180B, 183A, or 183B courses may be used toward the upper-division elective requirement.

Students must have senior standing before any of the following four courses may be taken and instructor approval is required to enroll.

109. Advanced Projects in Media

131. Special Projects in Media

132. Installation Production and Studio

197. Media Honors Thesis

Note: Enrollment in production courses is limited to two per quarter. Production courses are numbered VIS 109, 131, 132, 140/ICAM 101, 145A/ICAM 102, 145B, 147A-B, 164–184.

INTERDISCIPLINARY COMPUTING AND THE ARTS (ICAM)

The Interdisciplinary Computing and the Arts major in the Departments of Music and Visual Arts draws upon, and aims to bring together, ideas and paradigms from computer science, art, and cultural theory. It takes for granted that the computer has become a metamedium and that artists working with computers are expected to combine different media forms in their works. All of this makes the program unique among currently existing computer art or design programs which, on the one hand, usually focus on the use of computers for a particular media (for instance, specializing in computer animation, or computer music, or computer design for print) and, on the other hand, do not enter into a serious dialogue with current research in computer science, only teaching the students “off-the-shelf” software.

The program also recognizes that creating sophisticated artistic works with computers requires a new model of the creative process, one which combines traditional artistic procedures with the experimental research characteristic of the sciences. All in all, it aims to train a new type of cultural producer, who is familiar with art and media history, who is equally proficient with computer programming and artistic skills, who is always ready to learn new technologies, and who is comfortable interacting with scientists and computer industry resources.

The goals of the program are

- to prepare the next generation of artists who will be functioning in a computer-mediated culture

- to give students necessary technical, theoretical, and historical backgrounds so they can contribute to the development of new aesthetics for computer media
- to prepare students to mediate between the worlds of computer science and technology, the arts, and the culture at large by being equally proficient with computing and cultural concepts
- to give students sufficient understanding of the trajectories of development in computing so they can anticipate and work with the emerging trends, rather than being locked in particular software currently available on the market

Lower-Division

Eight courses required.

Arts

Four courses required.

MUS 4. Introduction to Western Music

VIS 1. Introduction to Art-Making: Two-dimensional Practices

VIS 22F. Formations of Modern Art

VIS 77N. Introduction to Media

Computer Science

One course required.

CSE 11. Introduction to Computer Science: JAVA

Note: CSE 11 is an accelerated course in the JAVA programming language. CSE 8A/8L and 8B, which cover the same material in a non-accelerated format, may be substituted.

Mathematics

Two courses required.

Math. 20A. Calculus for Science and Engineering

Math. 20B. Calculus for Science and Engineering

Note: MATH 20A and 20B are accelerated calculus courses for Science and Engineering. MATH 10A, 10B, and 10C, which cover similar material in a non-accelerated format, may be substituted.

Computing and the Arts

One course required.

ICAM 40/VIS 40. Introduction to Computing in the Arts

Upper-Division

Twelve courses required.

Survey

One course required.

ICAM 110. Computing in the Arts: Current Practice Foundation

Three courses required.

ICAM 101/VIS 140. Digital Imaging: Image and Interactivity

ICAM 102/VIS 145A. Time- and Process-Based Digital Media I

ICAM 103/MUS 170. Musical Acoustics

Advanced

Four courses required.

Choose three from

ICAM 120. Virtual Environments

ICAM 130/VIS 149. Seminar in Contemporary Computer Topics

VIS 109. Advanced Projects in Media

VIS 131. Special Projects in Media

VIS 132. Installation Production and Studio

VIS 141A. Computer Programming for the Arts I

VIS 147A. Electronic Technologies for Art I

VIS 174. Media Sketchbook

MUS 171. Computer Music I

MUS 173. Audio Production: Mixing and Editing

MUS 174A-B-C. Recording/MIDI Studio Techniques

MUS 175. Musical Psychoacoustics

MUS 176. Music Technology Seminar

Choose one from

VIS 141B. Computer Programming for the Arts II

VIS 145B. Time- and Process-Based Digital Media II

VIS 147B. Electronic Technologies for Art II

MUS 172. Computer Music II

Theory and History

Two courses required.

ICAM 150/VIS 159. History of Art and Technology

and one of

VIS 150. History of Silent Cinema

VIS 151. History of the Experimental Film

VIS 152. Film in Social Context

VIS 153. The Genre Series

VIS 154. Hard Look at the Movies

VIS 155. The Director Series

VIS 156N. Special Problems in Film History and Theory

VIS 157. Video History and Criticism

VIS 158. Histories of Photography

VIS 194. Fantasy in Film

MUS 111. Topics/World Music Traditions

MUS 114. Music of the Twentieth Century

Senior Project

Two courses required.

ICAM 160A. Senior Project in Computer Arts I

ICAM 160B. Senior Project in Computer Arts II

Note: Enrollment in production courses is limited to two per quarter. Production courses are numbered VIS 109, 131, 132, 140/ICAM 101, 141A-B, 145A/ICAM 102, 145B, 147A-B, 174. ICAM 120, 160A-B.

MASTER OF FINE ARTS PROGRAM

The program is designed to provide intensive professional training for the student who proposes to pursue a career within the field of art—including art making, criticism, and theory. The scope of the UC San Diego program includes painting, sculpture, performance, installation art, public art, photography, film, video, and digital media. The program is unique in that the course of study provides for and encourages student mobility within this range of traditional and media-based components. It also offers opportunities for collaborative work.

The educational path of students is focused around their particular interests in art. The department seeks to provide an integrated and comprehensive introduction to the possibilities of contemporary art production, the intellectual structures that underlie them, and the “world view” which they entail. All art-making activities are considered serious intellectual endeavors, and all students in the program find themselves confronted by the need

to develop their intellectual and critical abilities in working out their artistic positions. A body of theory-oriented courses is required. Therefore, we have no craft-oriented programs or facilities; nor do we have any courses in art education or art therapy. The courses offered are intended to develop in the student a coherent and informed understanding of the past and recent developments in art and art theory. The program also provides for establishing a confident grasp of contemporary technological possibilities, including those involved in film, video, photography, and the electronic media.

The program includes formal education in lecture and seminar courses as well as study groups, studio meetings, independent studies, and quarterly departmental critiques. Course work is intended to place art making in critical and intellectual context but doesn't underestimate the central importance of the student's own work. In fact, this aspect of the student's activity is expected to be self-motivated and forms the core around which the program of study operates and makes sense.

No two students will necessarily follow the same path through the degree program, and the constitution of individual programs will depend upon the analysis of their individual needs and interests, worked out by students in collaboration with their individual faculty advisors.

Admission Requirements

Grade-Point Average—An overall GPA of 3.00 and a 3.50 in a student's undergraduate major is required.

Art History—Students are expected to have had at least four semester courses or six quarter courses in art history and/or film history/criticism at the undergraduate level. Those who have a broader art history background will have a better chance of being awarded teaching assistantships. Students without this requirement can be admitted, but they may be expected to make up the six courses in excess of the seventy-two units required for the degree. If there are questions concerning this requirement, check with the department student affairs advisor.

Statement—Students are required to submit an essay of one-to-three pages on the direction of their work and its relationship to contemporary art. This essay should be critical in nature, refer explicitly to the student's own work, and may refer to other artists, recent events in art history, and issues in domains other than art that have bearing on the student's process, thought, and work.

Work—Students are asked to submit documentation of their best work and upload images and files into our online portfolio Web site. Access to the website is given once a UCSD online application has been filed through the Office of Graduate Studies.

REGULAR UNIVERSITY ADMISSION POLICIES

Please note that no application will be processed until all required information has been received. Students should submit applications with the application fee to the graduate admissions office using the UCSD online application on or before Tuesday, January 18, 2011. Official transcripts should be sent directly to the department and postmarked no later than January 18, 2011. The statement of purpose

and letters of recommendation must be sent electronically through the online application.

REQUIREMENTS FOR THE DEGREE

The M.F.A. is considered a terminal degree in studio work, and is a two- to three-year program. The following requirements must be completed in order to receive the M.F.A.:

First Year Review—This review takes place in the third quarter in residence. Students make a formal presentation of their work to a faculty committee; this includes a position paper and an oral examination. This presentation is considered a departmental examination, and if at its conclusion the student's work is judged to be inadequate, the student may be dismissed regardless of GPA, or may be reviewed again in the fourth quarter.

Seventy-two units of course work, including a four-unit apprentice teaching course, are required. Students may select sixteen of these units (four courses) from upper-division undergraduate course offerings. (See listings in this catalog.) There are six required Visual Arts core seminars:

- Contemporary Critical Issues (VIS 201)
- Art Practice Seminar (VIS 202)
- Working Critique Seminar (VIS 203)
- Introduction to Graduate Studies in Art Practice (VIS 205)
- one course in either Art Practice/Theory group or the Art History/Theory/Criticism group
- one additional seminar in Art Practice/Theory group (VIS 210-219)

Specific information on other course distribution requirements can be obtained from the department. One additional graduate course is required and must be taken in another department.

Students who remain registered in the third (optional) year must average one graduate course per quarter.

THE M.F.A. FINAL PRESENTATION

Presentation of Work—During the last quarter in residence, each student is required to present to the public a coherent exhibition or screening of his or her work.

Oral Examination—A committee of three Department of Visual Arts faculty members and one faculty member from another department will administer an oral examination to each student covering the student's work and its relationship to the field of art.

Thesis—Students are required to submit some form of written work for the M.F.A. degree. Four options are available:

1. Catalog—The student would design and have printed an actual catalog. This would include a critical essay of approximately 1,500 words.
2. Critical paper—The student would write a critical paper of 3,000 words analyzing his or her process and the relationship of his or her work to recent art history, with references to contemporary styles and specific artists.
3. Analytical essay on some phase of art—Students who have focused on both art production and art

criticism would write a 3,000 word critical essay on any current art position. A brief discussion (750 words) of the student's work would also be included.

4. Critical thesis—Students whose emphasis is essentially criticism and who do not present an M.F.A. exhibition would write a forty- to fifty-page thesis—the topic to be decided by the student and his or her advisor.

Additional information can be obtained from the graduate office of the Department of Visual Arts.

PH.D. PROGRAM

The Department of Visual Arts offers the Ph.D. degree in art history, theory, and criticism with concentrations in any of the areas in which faculty do research (see below). Offering a distinct alternative to existing Ph.D. programs in art history, the program centers on a unique curriculum that places art objects and practice at the center of inquiry, both past and present, and encompassing fine art, media, and mass culture, even as it encourages examination of the larger frameworks—historical, cultural, social, intellectual, and theoretical—within which the category “art” has been contextualized in the most recent developments in the discipline.

This program is also distinctive in that it is housed within a department that has been for many years one of the nation's leading centers of art practice and graduate education in studio, media, and—most recently—digital media. The offering of the Ph.D. and M.F.A. degrees is based on the department's foundational premise that the production of art and the critical, theoretical, and historical reflection upon it inherently and necessarily participate in a single discursive community. This close integration of art history and art practice is reflected in the inclusion of a concentration in art practice within the Ph.D. in art history, theory, and criticism.

The innovative character of this program is most evident in a unique curricular structure that is broadly organized into three groups of seminars. The importance of critical theory to the field today is reflected in the seminars under the **Theories/New Visions** group, while the study of art in its concrete historical, social, and cultural contexts, across different cultures and media, is emphasized in time, place, and media specific seminars listed under **Times/Terrains**.

The program builds most distinctively on recent developments in the field in the seminars under the heading **Categories/Constructs**. These seminars address the core questions about artworks and practices that the department believes every doctoral student in art and media history, whatever his or her area of specialization, should engage. How is the category “art” itself produced, now and in the past, in the urbanized West and in other cultures, in the context of ever-changing technologies? How are artistic identities constructed across distinct epochs and societies, and with reference to categories such as gender and ethnicity? What are the circumstances and contexts (social, intellectual, institutional, and the like) within which art is both produced and disseminated? What are the alternative modes of engaging art objects and practices and what are the histories and theoretical assumptions of the

specialized discourses used to describe and analyze them?

Seminars in the **Categories/Constructs** group are unique in the degree to which they foreground the self-critical turn in recent art and media history by making reflection upon the central concepts, constructs, categories, and languages of art historical inquiry a key programmatic concern. They are also distinctive in that they are designed to cut across traditional categories of history and contemporaneity, art and media (film, video, photography, digital media), history and theory, and to promote cross-cultural inquiry insofar as they center on questions crucial to the study of art of diverse cultures as well as diverse art forms and historical epochs.

ADMISSION

Applicants may apply to the Ph.D. program only. The policy of UCSD is to admit in the fall quarter only. Applications for admission must be postmarked January and selections will be made by April 1. For circumstances under which the M.A. is granted, see below. Prior to matriculation, students must have obtained a bachelor's or master's degree in art history, art practice, or another field approved by the departmental committee on graduate studies, such as (but not limited to) history, literature, anthropology, or philosophy.

Applicants must submit their academic transcripts, scores on the Graduate Record Examination, three letters of recommendation, a statement of purpose (no more than 750 words), and a sample of written work (e.g., senior honors thesis, M.A. thesis, or other research or critical paper, preferably in art or media history). An overall GPA of 3.00 and a 3.50 in a student's undergraduate major are required. The Test of English as a Foreign Language (TOEFL) is required for international applicants. Applicants must have a good reading knowledge of at least one foreign language at the time they enter the program.

Please note that no application will be processed until all required information has been received. Students should submit applications with the application fee to the graduate admissions office on or before Tuesday, January 11, 2011. The Statement of Purpose and letters of recommendation must be submitted online along with the application. Official transcripts should be sent directly to the department and postmarked no later than Tuesday, January 11, 2011. Students are asked to upload their writing samples and images (for art practice concentration) into our online portfolio Web site. Access to the Web site is given once a UCSD online application has been filed through the Office of Graduate Studies.

AREAS OF CONCENTRATION

During the first year of study, each student must declare an area of major concentration in consultation with his or her individual faculty advisor and with the approval of the Ph.D. graduate advisor. The major concentration may be selected from the following: ancient art; medieval art; Renaissance art; early modern art; modern art (nineteenth and twentieth centuries); contemporary art; media studies (film, video, photograph, digital media); Meso-American art; and art practice. A student may also choose, in consultation with his or her advisor and the Ph.D. graduate advisor, a field of emphasis that

cuts across the areas within the department (e.g., art or media theory and criticism) or, with appropriate approvals, one that involves another department (e.g., early modern art history and history). Once the field of emphasis is established, it will be the responsibility of the student and his or her advisor to devise a program of courses, independent study and outside reading, over and above the required program, that will ensure that the student will attain command of the major field of emphasis.

COURSE WORK

A normal full-time program consists of twelve units per quarter. Prior to the qualifying examination, students will be expected to complete eighty-four units, equivalent to twenty-one four-unit courses (normally accomplished in seven to nine quarters). This twenty-one-course requirement will normally be satisfied by a combination of graduate seminars, reading courses, independent studies, and apprentice teaching. No more than three may be apprentice teaching; no more than two may be reading courses; and no more than two may be graduate seminars in art practice or art practice/theory. By reading course, we mean an upper-division undergraduate course that a student takes with additional reading and writing requirements. Full-time study is expected. Graduate seminars in art history, theory, and criticism should comprise the bulk of the student's twenty-one-course requirement.

All students are required to take VIS 204, *Rethinking Art History*, in their first year of study. For students in the art practice concentration, VIS 206, *Seminar in Art Practice Research*, must also be taken in their first year of study. Students must also take, at some point, two seminars from the Art Practice/Theory group, VIS 210-VIS 219. One four-unit apprentice teaching course, VIS 500, is also required.

In order to ensure that students attain a reasonable measure of historical and cultural breadth, all students are required to take one seminar from at least four of the following areas: 1) ancient or medieval art; 2) Renaissance or early modern art; 3) modern or contemporary art; 4) media studies; 5) non-Western art.

If a student has completed some graduate work in art history, theory, and criticism before entering UCSD, there may be some appropriate adjustments in course work as approved by petition to the Ph.D. graduate advisor and the department chair.

FOREIGN LANGUAGE REQUIREMENTS

Students will be required to demonstrate reading knowledge of at least two of the foreign languages required for advanced study in art history, theory, and criticism. One should be the language most directly relevant to the student's area of specialization. The student and his or her individual advisor will jointly determine the examination languages.

Foreign language requirements will normally be satisfied by passing examinations requiring sight translation of texts in art history, theory, and criticism. Students are required to pass their entering language examination in order to be advanced to their second year in the program. The first-year language examination will be offered during the fall quarter of the entering year. The second required language examination will be offered during the fall

quarter of the second year in the program. Students must pass both language examinations by the end of their second year to continue in the program.

EXAMINATIONS

No later than the first quarter of the third year, the student, in consultation with his or her individual advisor, will form a qualifying examination committee that will consist of four members drawn from the visual arts department faculty and one tenured faculty member outside the department. The composition of the qualifying examination committee and the dissertation defense for students in the Art Practice degree program is: four department faculty (two art history, theory, and criticism faculty, and at least one tenured studio faculty) and one tenured faculty member outside the department. This committee will conduct the qualifying examination required by university policy and oversee completion of the dissertation. The membership of the committee must be approved by the Ph.D. graduate advisor and ultimately the dean of Graduate Studies. The qualifying examination will consist of a three-hour written examination, followed within the next two days by a two-hour oral examination, in the student's major field. A student must have completed all required course work and passed all language examinations before taking the qualifying examination, which will be held no later than the end of the third year. Upon successful completion of the qualifying examination, the student will be advanced to candidacy.

A student who fails either the written or the oral examination may petition the committee and Ph.D. graduate advisor to repeat the examination. Any student who fails a second time will not be advanced to candidacy. In some cases, the committee and graduate program director may judge such student eligible to receive a terminal M.A. (see below).

DISSERTATION

Following successful completion of the qualifying examinations, the student will complete a doctoral dissertation in his or her field of emphasis. Upon selection of the dissertation topic, a colloquium will be held at which the student will present a prospectus that outlines the topic and program of research for discussion by the graduate group and for approval by his or her committee. After the committee has reviewed the finished dissertation, the student will defend his or her thesis orally. Students in the Art Practice concentration will submit a written dissertation that observes the same regulations and conventions, except that its length may be reduced by one quarter. In addition, the student will present the visual component, the nature of which will be decided by the student and his or her committee.

NORMATIVE TIME FROM MATRICULATION TO DEGREE

The student will normally advance to candidacy in two and one-half to three years and must be advanced to candidacy by the end of four years. He or she will normally complete the research for and writing of the dissertation by the end of his or her sixth year of study. Total university support may not exceed seven years, and total registered time at UCSD may not exceed eight years.

M.A. DEGREE

All students will apply for and be admitted to the Ph.D. Program. An M.A. degree may be awarded to continuing Ph.D. students upon successful completion of the following: (1) at least twelve four-unit courses, including VIS 204, *Re-Thinking Art History*, and two seminars from the group VIS 210–219; (2) a three-hour written examination in a designated field of emphasis (see “Examinations” above); (3) one language examination; and (4) an M.A. thesis. The M.A. is not automatically awarded; students must apply in advance to the Ph.D. graduate advisor and in accordance with university procedures, no later than the first two weeks of the quarter in which they expect to receive the degree.

Students interested in an M.A. only are not admitted to our program.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

Note: The following list of courses represents all visual arts offerings; not all courses offered each year.

LOWER-DIVISION

1. Introduction to Art-Making: Two-Dimensional Practices (4)

An introduction to the concepts and techniques of art making with specific reference to the artists and issues of the twentieth century. Lectures and studio classes will examine the nature of images in relation to various themes. Drawing, painting, found objects, and texts will be employed. **Prerequisite:** none. This course is offered only one time each year.

2. Introduction to Art-Making: Motion and Time Based Art (4)

An introduction to the process of art making utilizing the transaction between people, objects, and situations. Includes both critical reflection on relevant aspects of avant-garde art of the last two decades (Duchamp, Cage, Rauschenberg, Gertrude Stein, conceptual art, happenings, etc.) and practical experience in a variety of artistic exercises. **Prerequisite:** none. This course is offered only one time each year.

3. Introduction to Art-Making: Three-Dimensional Practices (4)

An introduction to art making that uses as its base the idea of the “conceptual.” The lecture exists as a bank of knowledge about various art world and non-art world conceptual plays. The studio section attempts to incorporate these ideas into individual and group projects using any “material.” **Prerequisite:** none. This course is offered only one time each year.

20. Introduction to Art History (4)

This course examines history of Western art and architecture through such defining issues as the respective roles of tradition and innovation in the production and appreciation of art; the relation of art to its broader intellectual and historical contexts; and the changing concepts of the monument, the artist, meaning, style, and “art” itself. Representative examples will be selected from different periods, ranging from Antiquity to Modern. Content will vary with the instructor. **Prerequisite:** none.

21A. Introduction to the Art of the Americas or Africa and Oceania (4)

Course offers a comparative and thematic approach to the artistic achievements of societies with widely divergent structures and political organizations from the ancient Americas to Africa and the Pacific Islands. Topics vary with

the interests and expertise of instructor. **Prerequisites:** none. Student may not receive credit for VIS 21 and VIS 21A.

21B. Introduction to Asian Art (4)

Survey of the major artistic trends of India, China, and Japan, taking a topical approach to important developments in artistic style and subject matter to highlight the art of specific cultures and religions. **Prerequisites:** none. Student may not receive credit for VIS 21 and VIS 21B.

22. Formations of Modern Art (4)

Wide-ranging survey introducing the key aspects of modern art and criticism in the nineteenth and twentieth centuries, including Neo-Classicism, Romanticism, Realism, Impressionism, Post-Impressionism, Symbolism, Fauvism, Cubism, Dada and Surrealism, Abstract Expressionism, Minimalism, Earth Art, and Conceptual Art. **Prerequisite:** none.

23. Information Technologies in Art History (4)

This seminar introduces fundamentals of art historical practice such as descriptive and analytical writing, compiling annotated bibliographies with traditional and online resources, defining research topics, and writing project proposals. **Prerequisite:** none. Art history majors only.

Note: Prerequisite for VIS 112 and highly recommended for all other seminars. Must be taken within a year of declaring major or transferring into the art history program.

40. Introduction to Computing in the Arts (4)

(Cross-listed with ICAM 40.) An introduction to the conceptual uses and historical precedents for the use of computers in art making. Preparation for further study in the computer arts area by providing overview of theoretical issues related to the use of computers by artists. Introduces the students to the program's computer facilities and teaches them basic computer skills. **Prerequisite:** none. Materials fee required.

60. Introduction to Digital Photography (4)

An in-depth exploration of the camera and image utilizing photographic digital technology. Emphasis is placed on developing fundamental control of the processes and materials through lectures, field, and lab experience. Basic discussion of image making included. **Prerequisite:** none. Materials fee required.

70N. Introduction to Media (6)

Operating as both a lecture and production course, this introductory class provides a technical foundation and theoretical context for all subsequent production-oriented film and video studies. In the laboratory, the student will learn the basic skills necessary to initiate video production. Completion of Visual Arts 70N is necessary to obtain a media card. **Prerequisite:** none. Materials fee required.

84. History of Film (4)

A survey of the history and the art of the cinema. The course will stress the origins of cinema and the contributions of the earliest filmmakers, including those of Europe, Russia, and the United States. **Prerequisite:** none. Materials fee required. This course is offered only one time each year.

87. Freshman Seminar (1)

The Freshman Seminar program is designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Freshman seminars are offered in all campus departments and undergraduate colleges, and topics vary from quarter to quarter. Enrollment is limited to fifteen to twenty students with preference given to entering freshmen. **Prerequisite:** none.

UPPER-DIVISION

104A. Performing the Self (4)

Using autobiography, dream, confession, fantasy, or other means to invent one's self in a new way, or to evoke the variety of selves in our imagination, the course experiments with and explores the rich possibilities available to the contemporary artist in his or her own persona. **Prerequisites:** two from VIS 1, 2, 3 and 111.

104BN. Verbal Performance (4)

The course is designed to introduce the student to the part played by language in contemporary performance art.

Monologues, musically derived sound poetry, vocalizations, verbally inscribed installations, and the uses of language and voice in film and video are some of the areas explored. **Prerequisite:** VIS 104A.

104CN. Personal Narrative (4)

The course will explore primary experiential materials to more fully understand the relationship of voice, style, language, and personality, to issues of memory, identity, self-awareness, and desire. Instructor and student will discuss student work as well as published personal narrative. **Prerequisite:** VIS 104BN.

105A. Drawing: Representing the Subject (4)

A studio course in beginning drawing covering basic drawing and composition. These concepts will be introduced by the use of models, still life, landscapes, and conceptual projects. **Prerequisites:** two from VIS 1, 2, 3 and 111.

105B. Drawing: Practices and Genre (4)

A continuation of VIS 105A. A studio course in which the student will investigate a wider variety of technical and conceptual issues involved in contemporary art practice related to drawing. **Prerequisite:** VIS 105A.

105C. Drawing: Portfolio Projects (4)

A studio course in drawing, emphasizing individual creative problems. Class projects, discussions, and critiques will focus on issues related to intention, subject matter, and context. **Prerequisite:** VIS 105B.

105D. The Aesthetics of Chinese Calligraphy (4)

This course examines Chinese calligraphy as an art form. This conceptually based introductory course combines fundamental studio exercises with creative explorations. Students are exposed to traditional and contemporary forms of Chinese calligraphy while encouraged to experiment with basic aesthetic grammars. **Prerequisite:** VIS 105A.

105E. Chinese Calligraphy as Installation (4)

This course concerns East-West aesthetic interactions. What are the conceptual possibilities when calligraphy, an ancient form of Chinese art, is combined with installation, a contemporary artistic Western practice? Emphasis is placed on such issues as cultural hybridity, globalization, multiculturalism, and commercialization. **Prerequisite:** VIS 105D.

106A. Painting: Image Making (4)

A studio course focusing on problems inherent in painting—transferring information and ideas onto a two-dimensional surface, color, composition, as well as manual and technical procedures. These concepts will be explored through the use of models, still life, and landscapes. **Prerequisites:** two from VIS 1, 2, 3 and 111.

106B. Painting: Practices and Genre (4)

A continuation of VIS 106A. A studio course in which the student will investigate a wider variety of technical and conceptual issues involved in contemporary art practice related to painting. **Prerequisite:** VIS 106A.

106C. Painting: Portfolio Projects (4)

A studio course in painting emphasizing individual creative problems. Class projects, discussions, and critiques will focus on issues related to intention, subject matter, and context. **Prerequisite:** VIS 106B.

107A. Sculpture: Making the Object (4)

A studio course focusing on the problems involved in transferring ideas and information into three-dimensions. Course will explore materials and construction as dictated by the intended object. Specific problems to be investigated will be determined by the individual professor. **Prerequisites:** two from VIS 1, 2, 3 and 111.

107B. Sculpture: Practices and Genre (4)

A studio course in which the student will investigate a wider variety of technical and conceptual issues as well as materials involved in contemporary art practice related to sculpture. **Prerequisite:** VIS 107A.

107CN. Sculpture: Portfolio Projects (4)

A studio course in sculpture emphasizing individual creative problems. Class projects, discussions, and critiques will focus on issues related to intention, subject matter, and context. **Prerequisite:** VIS 107B.

108. Advanced Projects in Art (4)

A studio course for serious art students at the advanced level. Stress will be placed on individual creative problems. Specific orientation of this course will vary with the instructor. Topics may include film, video, photography, painting, performance, etc. May be repeated twice for credit. **Prerequisite:** consent of instructor, department stamp required.

109. Advanced Projects in Media (4)

Individual or group projects over one or two quarters. Specific project organized by the student(s) will be realized during this course with instructor acting as a close advisor/critic. Concept papers/scripts must be completed by the instructor prior to enrollment. **Prerequisites:** VIS 180A and VIS 180B for media majors, or consent of instructor for ICAM majors. Open to media and ICAM majors only. Two production course limitation.

110A. Contemporary Issues and Practices (4)

An examination of contemporary studio art practice. The course is divided among research, discussion, and projects. Field trips to galleries and discussions with artists will combine with the students moving their work into a dialogue with the issues raised. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN and 147B.

110B. New Genre/New and Old Technologies (4)

Advances the idea of different materials, methods, and practices raised at the intermediate level in drawing, painting, and sculpture, and explores and utilizes new and traditional media in studio production of work. Emphasis on multiple media, combining traditional and electronic media, as well as different genres, in an attempt to create new directions for the student's ideas. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN and 147B.

110C. Proposals, Plans, Presentations (4)

Explores the use of the maquette, or sketch, in the process of developing, proposing and planning visual works in various media for public projects, site specific works, grants, exhibition proposals, etc. The student will work on synthesizing ideas and representing them in alternate forms that deal with conception, fabrication and presentation. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN and 147B.

110D. Visual Narrative/Tableau (4)

Examination and use of multimedia in exploring narrative issues in art making. The identification of subject leads to the determination of choice or mix of media and construction of narrative. Traditional studio practice surrounding narrative painting and sculpture, forms such as comic drawing or story boards, and the use of photo, video, and computing. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN, or 147B, or consent of instructor

110E. Art in Public Space/Site-Specific Art (4)

Course takes painting, sculpture, and related media out of the studio/gallery and into the public sphere by examining the contemporary history of public artworks with traditional and nontraditional site-specific work, focusing on production, critical discussion, and writing. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN, or 147B, or consent of instructor.

110F. Installation: Cross-Disciplinary Projects (4)

Attempts to expand the idea contained in a singular work, or object, into the use of multiple objects, images, and media that redefines the idea as well as the space for which it is intended. Examination of historic, modern, and contemporary works would be brought into discussion of project development and execution. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN and 147B.

110G. The Natural and Altered Environment (4)

Explores the natural and altered environment as a basis for subject as well as placement of work pertaining to the environment. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN and 147B.

110H. Image and Text Art (4)

Devoted to the study and practice of the multiple ways in which writing and other forms of visible language have been incorporated into contemporary and traditional artworks, including artists' books, collaging and poster art, visual and concrete poetry, typographical experiments, and

calligraphies. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN and 147B.

110I. Performing for the Camera (4)

The dematerialization of the performer into a media based image—video, film, slides, still photographs, using the camera as a spy, a co-conspirator, a friend or a foe—employing time lags, spatial derangement, image deconstruction, along with narrative, text, history, to invent time based pieces that break new ground while being firmly rooted in an understanding of the rich body of work done in this area over the last three decades. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN and 147B.

110J. Ritual Performance (4)

The course will explore forms of art making that use dream and myth, body art, dance, social drama, happenings, story telling, and enactments of contemporary and traditional forms of performance art that involve a crossing of the lines between different arts and genres. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN and 147B.

110K. Installation Performance (4)

The artist as performer working with materials, objects, props, technology, to create multi-layered, experimental, interesting three-dimensional art spaces in which the artist's body, voice, actions, or memory, moves through, enlivens, or haunts the physical space. **Prerequisites:** two from VIS 104CN, 105C, 106C, 107CN and 147B.

110M. Studio Honors I (4)

An advanced studio course intended for the productive, motivated, and self-disciplined student with a clear and unified body of work. The intent is to help refine and expand the student's work and ideas towards an exhibition and verbal written position. **Prerequisite:** consent of the instructor, department stamp required. Note: The Studio Honors I and the attached Studio Honors II count as one course toward the fulfillment of a Group IV requirement.

110N. Studio Honors II (4)

The second advanced studio course in the Honors Program in Studio, the successful completion of which will lead towards an honors degree in the studio major. The course builds on the critical and technical issues raised in Studio Honors I. **Prerequisite:** VIS 110M.

111. The Structure of Art (4)

This course will address the structure of signification in art. We will consider the modes of signification in a wide range of representational and nonrepresentational artworks from architecture through drawing, painting, sculpture, photography, video, and film to performance. Examples will be selected from various places and epochs. This course is required for transfer students. This course is offered during winter quarter only.

112. Art Historical Methods (4)

A critical review of the principal strategies of investigation in past and present art-historical practice, a scrutiny of their contexts and underlying assumptions, and a look at alternative possibilities. The various traditions for formal and iconographic analysis as well as the categories of historical description will be studied. Required for all art history and criticism majors. **Prerequisites:** VIS 23 and one upper-division art history course; two recommended.

113AN. History of Criticism I: Early Modern (4)

Introducing Classical, Medieval, and Renaissance theories of the image, we concentrate on developments in the eighteenth and nineteenth centuries: Neo-Classicism, Romanticism, Realism, and Symbolism. **Prerequisite:** one from VIS 20, VIS 21A, VIS 21B, VIS 22 or upper-division standing.

113BN. History of Criticism II: Early Twentieth Century (1900–1950) (4)

The principal theories of art and criticism from Symbolism until 1945: formalism and modernism, abstraction, Surrealism, Marxism, and social art histories, phenomenology, existentialism. **Prerequisite:** none; VIS 112 or two upper-division courses in art history strongly recommended.

113CN. History of Criticism III: Contemporary (1950–Present) (4)

Recent approaches to the image in art history and visual culture: structuralism, semiotics, psychoanalysis,

post-structuralism, post-modernism, feminism, post-colonialism, cultural studies. **Prerequisite:** none; VIS 112 or two upper-division courses in art history strongly recommended.

117A. Narrative Structures (4)

How can a fixed image represent events in time? The strategies of storytelling and their consequences for the meaning of works of art will be investigated. Content of the course will vary. May be repeated twice for credit with permission of the instructor. **Prerequisite:** none; VIS 112 or two upper-division courses in art history strongly recommended.

117B. Theories of Representation (4)

A discussion of major Western theories of representation with a critique of their applicability to art. Material is drawn from a wide variety of historical periods from Antiquity to Modern. Emphasis is given to theories special significance for art history, but some attention is given to representation theories in other contexts. Readings may include selections from such modern theorists as Peirce, Panofsky, Gombrich, Bernheimer, Barfield, Barthes, Goodman, Foucault, Bryson, Summers, and Mitchell and from classic texts by Plato, Aristotle, John of Damascus, Alberti, and Leonardo. **Prerequisite:** none; one or more upper-division courses in art history strongly recommended. Note: Majors must have taken VIS 23.

117E. Problems in Ethnoaesthetics (4)

This seminar will address and critique various approaches to studying the art of non-Western societies with respect to their own aesthetic and cultural systems. Students are encouraged to explore comparative philosophies of art and test paradigms of Western aesthetic scholarship. **Prerequisite:** none; VIS 21A or 21B or 112 or two upper-division courses in art history strongly recommended.

117F. Theorizing the Americas (4)

Examines the philosophical debates that locate the Americas in relation to the modern world. **Prerequisite:** upper-division standing.

117G. Critical Theory and Visual Practice since 1980 (4)

This seminar will examine key moments in the interaction between the world of art and the world of ideas: the goal is to get you thinking about the whole theory/practice relation, as it connects with your own projects and research. **Prerequisite:** upper-division standing.

117H. Constructing Gender in Fifth-Century BC Athens and Eighteenth-Century France (4)

Ideas concerning gender and sexuality are crucial in every human society, but there are enormous shifts between cultures and historical periods. This course examines the changing cultural constructions of sexuality by examining in detail two very different epochs. **Prerequisite:** upper-division standing.

117I. Western and Non-Western Rituals and Ceremonies (4)

This course will examine the process of image-making within specific ceremonies and/or rituals. Selected ceremonies from West Africa, Melanesia, Nepal, and the United States, including both Christian and non-Christian imagery, will be considered. Performance art and masquerade will be analyzed within a non-Western framework. **Prerequisite:** upper-division standing. VIS 21A recommended. Student may not receive credit for VIS 126F and VIS 117I.

120A. Greek Art (4)

Greek classical civilization was a turning point in the history of humanity. Within a new kind of society, the idea of the individual as free and responsible was forged, and with it the invention of history, philosophy, tragedy, and science. The arts which expressed this cultural explosion were no less revolutionary. The achievements of Greek art in architecture, sculpture, and painting will be examined from their beginnings in the archaic period, to their epoch-making fulfillment in the classical decades of the fifth century B.C., to their diffusion over the entire ancient world in the age of Alexander and his successors. **Prerequisite:** none; VIS 20 recommended.

120B. Roman Art (4)

Roman art was the "modern art" of antiquity. Out of their Italic tradition and the great inheritance of Greek classic and Hellenistic art, the Romans forged a new language

of form to meet the needs of a vast empire, a complex and tumultuous society, and a sophisticated, intellectually diverse culture. An unprecedented architecture of shaped space used new materials and revolutionary engineering techniques in boldly functional ways for purposes of psychological control and symbolic assertion. Sculpture in the round and in relief was pictorialized to gain spatial effects and immediacy of presence, and an extraordinary art of portraiture investigated the psychology while asserting the status claims of the individual. Extreme shifts of style, from the classicism of the age of Augustus to the expressionism of the third century A.D., are characteristic of this period. The new modes of architecture, sculpture, and painting, whether in the service of the rhetoric of state power or of the individual quest for meaning, were passed on to the medieval and ultimately to the modern West. **Prerequisite:** none; VIS 20 recommended.

120C. Late Antique Art (4)

During the later centuries of the Roman Empire, the ancient world underwent a profound crisis. Beset by barbarian invasions, torn by internal conflict and drastic social change, inflamed with religious passion which was to lead to a transformed vision of the individual, the world, and the divine, this momentous age saw the conversion of the Roman world to Christianity, the transfer of power from Rome to Constantinople, and the creation of a new society and culture. Out of this ferment, during the centuries from Constantine to Justinian, there emerged new art forms fit to represent the new vision of an otherworldly reality: a vaulted architecture of diaphanous space, a new art of mosaic which dissolved surfaces in light, a figural language both abstractly symbolic and urgently expressive. The great creative epoch transformed the heritage of classical Greco-Roman art and laid the foundations of the art of the Christian West and Moslem East for the next thousand years. **Prerequisite:** none; VIS 20 or 120B recommended.

120D. Prehistoric Art (4)

Tens of thousands of years before the dawn of history, the hunting peoples of Ice Age Europe invented the first language of visual images. Their painted cave sanctuaries, such as Lascaux and Altamira, are dazzling in their expressive vitality and mystifying in meaning. This course links cave art with what is known about contemporary conditions of nature, society, and human life. **Prerequisite:** none; VIS 20 recommended.

121AN. The Idea of Medieval Art (4)

This course introduces the art and architecture of Western Europe from the fourth through the thirteenth centuries. A leading theme is the changing idea of what "medieval" has come to mean, from the coining of the terms "Middle Ages" and "Dark Ages" by Renaissance humanists, to the Romantic fascination with Gothic ruins, and finally to the fantasy medievalisms of twentieth century popular culture and current approaches to medieval art in art historical scholarship. **Prerequisite:** none; VIS 20 recommended.

121B. Castles, Cathedrals, and Cities (4)

This course explores European art and architecture of the twelfth through the fourteenth centuries against the background of the rituals of chivalry, church, and civic life that made a dazzling spectacle of art and life in the High Middle Ages. **Prerequisite:** upper-division standing; VIS 20 recommended.

121D. The Illuminated Manuscript in the Middle Ages (4)

This seminar charts the changing pictorial problematics presented by the illuminated manuscript from its origins in late antiquity to the disintegration of the manuscript tradition under the impact of the first printed books. Works such as the Book of Kells and the Tres Riches Heures of the Duke of Berry, among the most brilliant achievements of Western painting, are among those considered. **Prerequisite:** none; VIS 112 or two upper-division courses in art history strongly recommended.

122AN. Renaissance Art (4)

Italian artists and critics of the fourteenth through sixteenth centuries were convinced that they were participating in a revival of the arts unparalleled since Antiquity. Focusing primarily on Italy, this course traces the emergence in painting, sculpture and architecture, of an art based on

natural philosophy, optical principles, and humanist values, which embodied the highest intellectual achievement and deepest spiritual beliefs of the age. Artists treated include Giotto, Donatello, Masaccio, Brunelleschi, Jan van Eyck, Mantegna, Botticelli, Leonardo da Vinci, Michelangelo, Raphael, Bramante, Durer, and Titian. **Prerequisite:** none; VIS 20 recommended.

122CN. Defining High Renaissance Art (4)

Since the sixteenth century, the names of Leonardo da Vinci, Raphael, and Bramante have conjured up images of the highest artistic achievement. This course shows the intellectual concerns common to the artist and scientific productions of Leonardo help illuminate the distinctive character of the art of two of his greatest contemporaries. **Prerequisite:** none; VIS 20, 122AN, or 122BN recommended.

122D. Michelangelo (4)

This course offers new approaches to understanding Michelangelo's greatest creations. By considering how each work relates to the setting for which it was intended, by regarding critical literature and artistic borrowings as evidence about the works, and by studying the thought of the spiritual reformers who counseled Michelangelo, new interpretations emerge which show the artist to be a deeply religious man who invested his works with both public and private meanings. **Prerequisite:** upper-division standing; or one of the following courses: VIS 20, 21, 22 or 23; or any upper-division course in art history and criticism or in European history.

122F. Leonardo's La Gioconda (4)

A critical, art historical look at the world's most famous painting and its interpretations. **Prerequisite:** VIS 23. One upper-division course in art history (113AN-129F) is recommended.

123AN. Between Spirit and Flesh: Northern Art of the Early Renaissance (4)

The art of the Early Renaissance in Northern Europe is marked by what appears to be striking conflict: on the one hand, a new love of nature and of the pleasures of court society; and on the other, an intensified spirituality and focus on personal devotion. This course explores these provocative cross-currents in works by master painters like Jan van Eyck and Hieronymus Bosch as well as in lesser known mass-produced objects of everyday use. **Prerequisite:** none; VIS 20, 121AN, and/or 122AN recommended.

123BN. Jan van Eyck (4)

Intensive study of the career of Jan van Eyck, whose magical paintings have always fascinated viewers with their microscopically detailed naturalism and subtly disguised spiritual meanings. Masterpieces such as the Arnolfini Wedding are emphasized. **Prerequisite:** none; VIS 112 or two upper-division courses in art history recommended.

124AN. Baroque Art (4)

This course discusses the achievement of such major artists as Caravaggio, Gentileschi, Bernini, Borromini, Rubens, Rembrandt, Velasquez, and Vermeer within a culture marked by increasing intellectual specialization, the entrenchment of modern national boundaries, the co-existence of rival religious organizations, the formations of artistic academies, and the rise of an art market serving the flourishing middle class. **Prerequisite:** none; VIS 20 recommended.

124BN. Art and the Enlightenment (4)

Eighteenth century artists and critics were convinced that art could be a force to improve society. This course places Rococo and Neo-Classical artists such as Watteau, Fragonard, Tiepolo, Hogarth, Reynolds, Vigee Lebrun, Blake, and David, within the context of art academies, colonialism, the Grand Tour, Enlightenment conceptualizations of history and nature, and the American and French Revolutions. **Prerequisite:** none; VIS 20 or 22 recommended.

124CN. Nineteenth-Century Art (4)

A critical survey discussing the crisis of the Enlightenment, Romanticism, Realism and Naturalism, Academic Art and History Painting, representations of the New World, the Pre-Raphaelites, Impressionism, international Symbolism, Post-Impressionism, and the beginnings of Modernism. **Prerequisite:** none; VIS 20 or 22 recommended.

125A. Twentieth-Century Art (4)

A critical survey outlining the major avant-gardes after 1900: Fauvism, Cubism, Metaphysical Painting, Futurism, Dada, Surrealism, Neo-Plasticism, Purism, the Soviet avant-garde, Socialist Realism, and American art before Abstract Expressionism. **Prerequisite:** none; VIS 20 or 22 recommended.

125BN. Contemporary Art (4)

Art after Abstract Expressionism: Happenings, Post-painterly Abstraction, Minimalism, Performance, Earth Art, Conceptual Art, Neo-Expressionism, Post-Conceptualism and development in the 1990s, including non-Western contexts. We also explore the relation of these tendencies to Postmodernism, Feminism, and ideas of Postcoloniality. **Prerequisite:** none; VIS 20 or 22 recommended.

125DN. Marcel Duchamp (4)

A critical examination of the work of one of the most radical twentieth century artists. In Duchamp's four dimensional perspective, the ideas of art-object, artist, and art itself are deconstructed. The Large Glass and Etant Donnees . . . are the twin foci of an oeuvre without boundaries in which many twentieth-century avant-garde devices such as chance techniques, conceptual art, and the fashioning of fictive identities, are invented. **Prerequisite:** none.

125F. Latin American Film (4)

An overview of film and filmmaking in Latin America and its reception in a national context and beyond. **Prerequisite:** upper-division standing.

126AN. Pre-Columbian Art of Ancient Mexico and Central America (4)

An introduction to the cities and monuments of the ancient civilizations which flourished in Mexico and Central America before the Spanish Conquest. This course will cover the major cultures of Mesoamerica, including the Olmec, Aztec, and neighboring groups. **Prerequisite:** none; VIS 21 recommended.

126BN. The Art and Civilization of the Ancient Maya (4)

This course offers a history of Maya society from its formative stages to the eve of the Spanish Conquest through an investigation of its art and archeology. Special attention is given to its unique calendar and writing systems. **Prerequisite:** none; VIS 21 recommended.

126C. Problems in Mesoamerican Art History (4)

Topics of this seminar will address special problems or areas of research related to the major civilizations of ancient Mexico and Central America. Course offerings will vary to focus upon particular themes, subjects, or interpretive problems. **Prerequisite:** upper-division standing. VIS 21A recommended. Student may not receive credit for VIS 126B and VIS 126C.

126D. Problems in Ancient Maya Iconography and Inscriptions (4)

This seminar focuses upon the art, architecture, and inscriptions of the ancient Maya. Topics will vary within a range of problems that concern hieroglyphic writing, architecture, and visual symbols the Maya elite used to mediate their social, political, and spiritual words. **Prerequisite:** upper-division standing. VIS 21A recommended.

126HN. Pacific Coast American Indian Art (4)

Explores the art and expressive culture of American Indians of far western United States, including California and Pacific Northwest. Social and cultural contexts of artistic traditions and their relations to the lifeways, ceremonialism, beliefs, and creative visions of their makers. **Prerequisite:** upper-division standing. VIS 21A recommended. Student may not receive credit for VIS 126CN and VIS 126HN.

126I. Southwest American Indian Art (4)

Examines the history, art, and architecture of Navajo, Hopi, Zuni, and other Native American communities of New Mexico and Arizona; the origins of their civilization; and how their arts survived, adapted, and changed in response to Euro-American influences. **Prerequisite:** upper-division standing. VIS 21A recommended. Student may not receive credit for VIS 126D and VIS 126I.

126J. African and Afro-American Art (4)

The dynamic, expressive arts of selected West African societies and their subsequent survival and transformation in the New World will be studied. Emphasis will be placed on Afro-American modes of art and ceremony in the United States, Haiti, Brazil, and Suriname. **Prerequisite:** upper-division standing. VIS 21A recommended. Student may not receive credit for VIS 126DN and VIS 126J.

126K. Oceanic Art (4)

An examination of the relation of art to ritual life, mythology, and social organization in the native Polynesian and Melanesian cultures of Hawaii, New Guinea, the Solomon Islands, and Australia. **Prerequisite:** upper-division standing. VIS 21A recommended. Student may not receive credit for VIS 126E and VIS 126K.

126P. Latin American Art: Modern to Postmodern, 1890–1950 (4)

A survey of major figures and movements in Latin American art from the late-nineteenth century to the mid-twentieth century. **Prerequisite:** upper-division standing.

126Q. Latin American Art: Modern to Postmodern, 1950–Present (4)

A survey of major figures and movements in Latin American art from the mid-twentieth century to the present. **Prerequisite:** upper-division standing.

126R. Latin American Photography (4)

An overview of the history of photography, concentrating on developments in Latin America. **Prerequisite:** upper-division standing.

127B. Arts of China (4)

Course will survey major trends in the arts of China from a thematic point of view, explore factors behind the making of works of art, including political and religious meanings, and examine contexts for art in contemporary cultural phenomena. **Prerequisite:** upper-division standing. VIS 21B recommended.

127C. Arts of Modern China (4)

Course will explore Chinese art of the twentieth century. By examining artworks in different media, we will investigate the most compelling of the multiple realities that Chinese artists have constructed for themselves. **Prerequisite:** upper-division standing. VIS 21B recommended.

127D. Early Chinese Painting (4)

Explore representations of figures and landscapes from the dawn of Chinese painting through the Yuan dynasty, with stress on developments in style and subject matter and relationships to contemporary issues in philosophy, religion, government, society, and culture. **Prerequisite:** upper-division standing. VIS 21B recommended.

127E. Later Chinese Painting (4)

Explores major schools and artists of the Ming and Qing periods, including issues surrounding court patronage of professional painters, revitalization of art through reviving ancient styles, commercialization's challenges to scholar-amateur art, and the influences of the West. **Prerequisite:** upper-division standing. VIS 21B recommended.

127F. Japanese Buddhist Art (4)

Explore the development of Buddhist art and architecture in Japan. Focus on the role of art in Buddhist practice and philosophy and the function of syncretic elements in Japanese Buddhist art. **Prerequisite:** upper-division standing. VIS 21B recommended.

127G. Twentieth-Century Chinese Art (4)

Through examining artworks in different media, theoretical writings and documentary data, will explore the ways in which Chinese artists of the twentieth century have defined modernity and their own tradition against the complex background of China's history. **Prerequisite:** upper-division standing. VIS 21B recommended.

127N. Twentieth-Century Art in China and Japan (4)

Surveys the key works and developments in the modern art and visual culture of Japan from Edo and Meiji to the present and of China from the early twentieth century to contemporary video, performance, and installation art. **Prerequisite:** upper-division standing. VIS 21B recommended.

127P. Arts of Japan (4)

Course is a survey of the visual arts of Japan, considering how the arts developed in the context of Japan's history and discussing how art and architecture were used for philosophical, religious, and material ends. **Prerequisite:** upper-division standing. VIS 21B recommended.

127Q. Japanese Painting and Prints (4)

Explore major trends in Japanese pictorial art from the seventh century to the nineteenth century, with focus on function, style and subject matter, and with particular emphasis on the relationship between Japanese art and that of continental Asia. **Prerequisite:** upper-division standing. VIS 21B recommended.

128A–F. Topics in Art History and Theory (4)

These lecture courses are on topics of special interest to visiting and permanent faculty. Topics vary from term to term and with instructor and many will not be repeated. These courses fulfill upper-division distribution requirements. As the courses under this heading will be offered less frequently than those of the regular curriculum, students are urged to check for availability and descriptions of these supplementary courses in the annual catalogue listings. Like the courses listed under VIS 129, below, the letters following the course number designate the general area in which the courses fall. Students may take courses with the same number but of different content, with consent of instructor and/or program advisor. May be taken three times for credit. **Prerequisite:** none; courses in art history recommended.

128A. Topics in Pre-Modern Art History (4)

A lecture course on a topic of special interest in ancient or medieval art. **Prerequisites:** upper-division standing; courses in art history (VIS 113AN–129F) are recommended.

128B. Topics in Early Modern Art History (4)

A lecture course on a topic of special interest in Renaissance or Baroque art. May be taken three times for credit. **Prerequisites:** upper-division standing; courses in art history (VIS 113AN–129F) are recommended.

128C. Topics in Modern Art History (4)

A lecture course on a topic of special interest on Modern or Contemporary art. May be taken three times for credit. **Prerequisites:** upper-division standing; courses in art history (VIS 113AN–129F) are recommended.

128D. Topics in Art History of the Americas (4)

A lecture course on the topic of special interest in the Ancient Americas or Africa and the Pacific Islands. **Prerequisite:** upper-division standing. Courses in art history (VIS 113AN–129F) are recommended.

128E. Topics in Art History of Asia (4)

A lecture course on the topic of special interest in India, China, and Japan. **Prerequisites:** upper-division standing. Courses in art history (VIS 113AN–129F) are recommended.

128F. Topics in Art Theory and Criticism (4)

A lecture course on a topic of special interest in art theory, art criticism, or the history of literature on art. May be taken three times for credit. **Prerequisites:** upper-division standing. Courses in art history (VIS 113AN–129F) are recommended.

128P. Curatorial Practices Workshop (2)

Students will be exposed to the professional context of institutional art research, preparation, exhibition and publication. The content of the course will revolve around the curatorial experience of the particular faculty member. May be repeated once for credit. Two two-unit curatorial practices workshop courses count as one course towards the fulfillment of a Group III Elective requirement in the major. **Prerequisites:** VIS 112 or two upper-division courses in art history (VIS 113AN–129F).

129A–F. Seminar in Art Criticism and Theory (4)

These seminar courses provide the opportunity for in-depth study of a particular work, artist, subject, period, or issue. Courses offered under this heading may reflect the current research interests of the instructor or treat a controversial theme in the field of art history and criticism. Active student research and classroom participation are expected. Enrollment is limited and preference will be given to majors. The letters following 129 in the course

number designate the particular area of art history or theory concerned. Students may take courses with the same number but of different content more than once for credit, with consent of the instructor and/or the program advisor. May be taken three times for credit. **Prerequisite:** VIS 112 or two upper-division courses in art history.

129A. Seminar in Pre-Modern Art History (4)

A seminar on an advanced topic of special interest in ancient or medieval art. **Prerequisites:** VIS 112 or two upper-division courses in art history (VIS 113AN–129F).

129B. Seminar in Early Modern Art History (4)

A seminar on an advanced topic of special interest in Renaissance or Baroque art. **Prerequisites:** VIS 112 or two upper-division courses in art history (VIS 113AN–129F).

129C. Seminar in Modern Art History (4)

A seminar on an advanced topic of special interest in Modern or Contemporary art. **Prerequisites:** VIS 112 or two upper-division courses in art history (VIS 113AN–129F).

129D. Seminar in Art History of the Americas (4)

A seminar on an advanced topic of special interest in the Ancient Americas to Africa and the Pacific Islands. **Prerequisites:** VIS 112 or two upper-division courses in art history (VIS 113AN–129F).

129E. Seminar in Art History of Asia (4)

A seminar on an advanced topic of special interest in India, China, and Japan. **Prerequisites:** VIS 112 or two upper-division courses in art history (VIS 113AN–129F).

129F. Seminar in Art Theory and Criticism (4)

A seminar on an advanced topic of special interest in art theory, art criticism, or the history of literature on art. **Prerequisites:** VIS 112 or two upper-division courses in art history (VIS 113AN–129F).

129G. Art History Honors Seminar (4)

This research seminar, centered on a series of critical, thematic, theoretical, and/or historical issues that cut across disciplinary specializations, provides outstanding advanced students with the opportunity to undertake graduate-level research. The first part of a two-part sequence completed by Art History Honors Directed Group Study (VIS 129H). **Prerequisite:** consent of instructor or art history faculty advisor, department stamp required. Note: The Art History Honors Seminar and the attached Art History Honors Directed Group Study counts as one course towards the fulfillment of the Group III requirement.

129H. Art History Honors Directed Group Study (4)

The second part of the honors program sequence, this course provides a forum for students engaged in research and writing to develop their ideas with the help of a faculty advisor and in conjunction with similarly engaged students. **Prerequisite:** consent of instructor or art history faculty advisor, department stamp required.

130. Special Projects in Visual Arts (4)

Specific content will vary each quarter. Areas will cover expertise of visiting faculty. May be repeated twice for credit. **Prerequisite:** two from (VIS 104CN, 105C, 106C, 107CN, and 147B) or one from (VIS 180A, 180B, 183A, and 183B) or consent of instructor/department stamp required. Visual arts/media, studio, ICAM majors only.

131. Special Projects in Media (4)

Specific content will vary each quarter. Areas will cover expertise of visiting faculty. May be repeated twice for credit. **Prerequisites:** two from (VIS 104CN, 105C, 106C, 107CN, or 147B) or one from (VIS 180A, 180B, 183A, and 183B) or consent of instructor. Open to studio, visual arts/media, and ICAM majors only.

132. Installation Production and Studio (4)

Through discussions and readings, the class will examine the issues and aesthetics of installation art-making. Using media familiar to them, students will produce several projects. May be repeated once for credit. Studio and visual arts/media majors only. **Prerequisites:** two from (VIS 104CN, 105C, 106C, 107CN, or 147B) or one from (VIS 180A, 180B, 183A, and 183B) or consent of instructor. Open to studio, media majors only.

140. Digital Imaging: Image and Interactivity (4)

(Cross-listed with ICAM 101.) Introduction to digital image involving images, texts, and interactive display and operates both within computer-mediated space (i.e., Web site) and in physical space (i.e., artist book). Interactive narrative and computer programming are explored. Materials fee required. **Prerequisite:** VIS 40 or ICAM 40. Open to media, ICAM, and studio majors; computing and ICAM minors only. Two production course limitation.

141A. Computer Programming for the Arts I (4)

Introduces external API's currently of interest in the arts (example: OpenGL, J2ME, Servlet/JSP, Java3D) extending a common programming language such as C++ or Java. Students gain API fluency through planning and coding software or software mediated art projects. CSE 11 or equivalent recommended. Materials fee required. **Prerequisites:** (VIS 40 or ICAM 40) and (VIS 140 or ICAM 101). Open to ICAM majors and minors only. Two production-course limitation.

141B. Computer Programming for the Arts II (4)

Students extend their programming capabilities to include the creation of reusable software libraries, packages, database API's, tools, utilities, and applications intended to be publishable and useful to other practicing artists, or as preparatory work for the student's senior thesis sequence. Materials fee required. **Prerequisite:** VIS 141A. Open to ICAM majors and minors only. Two production-course limitation.

145A. Time- and Process-Based Digital Media I (4)

(Cross-listed with ICAM 102.) Introduces time- and process-based digital media artmaking. Contemporary and historical works across time- and process-based media will be studied and projects produced. Topics may include software art, software and hardware interfacing, interaction, and installation in an art context. CSE 5A or equivalent programming experience recommended. Materials fee required. **Prerequisites:** (VIS 40 or ICAM 40) and (VIS 140 or ICAM 101). Open to media and ICAM majors and ICAM minors only. Two production-course limitation.

145B. Time- and Process-Based Digital Media II (4)

Students will implement time- and process-based projects under direction of faculty. Projects such as software and hardware interfacing, computer mediated performance, software art, installation, interactive environments, data visualization and sonification will be produced as advanced study and portfolio project. Materials fee required. **Prerequisite:** VIS 145A or ICAM 102. Open to media and ICAM majors; ICAM minors only. Two production course limitation.

147A. Electronic Technologies for Art I (4)

Develop artworks and installations that utilize digital electronics. Techniques in digital electronic construction and computer interfacing for interactive control of sound, lighting, and electromechanics. Construction of devices which responsively adapt artworks to conditions involving viewer participation, space activation, machine intelligence. Purchase of components kit required. **Prerequisite:** VIS 1. Open to media, studio, and ICAM majors; ICAM minors only. Two production course limitation.

147B. Electronic Technologies for Art II (4)

Continuation of the electronics curriculum. Design of programmable microcontroller systems for creating artworks that are able to respond to complex sets of input conditions, perform algorithmic and procedural processing, and generate real time output. Purchase of components kit required. **Prerequisite:** VIS 147A. Open to media, studio, and ICAM majors; computing and ICAM minors only. Two production course limitation.

149. Seminar in Contemporary Computer Topics (4)

(Cross-listed with ICAM 130.) Topics relevant to computer-based art- and music-making, such as computer methods for making art/music, design of interactive systems, spatialization of visual/musical elements, critical studies. Topics will vary. May be repeated twice. Materials fee required. **Prerequisite:** VIS 140 or ICAM 101, VIS 145A or ICAM 102, and MUS 170 or ICAM 103 recommended. Open to media and ICAM majors; ICAM minors only. Two production course limitation.

150. History of Silent Cinema (4)

An investigation of silent films from early cinema to the development of a classical style in the twenties, exploring issues of spectatorship, analyzing differences between American and European cinema, and highlighting the interaction between film and other arts. Materials fee required. **Prerequisites:** VIS 84 or consent of instructor.

151. History of the Experimental Film (4)

An inquiry into a specialized alternative history of film, consisting of experimental works made outside the conventions of the movie industry and which in their style and nature are closer to modernist painting, poetry, etc., than to the mainstream theatrical cinema. Works by such film artists as Man Ray, Salvador Dali, Maya Deren, Stan Brakhage, and Michael Snow will be examined in depth. Materials fee required. **Prerequisite:** VIS 84 or consent of instructor.

152. Film in Social Context (4)

This collection of courses gathers, under one cover, films that are strongly marked by period, geography, and the culture within which they received their dominating local quality. These courses pay particular attention to the stamp of place—climate, dress, habitation, language, music, politics—as well as the filmic moves that helped color such works as environmental. The series takes in the following subjects: Third World films, the Munich films (the new wave of Germans who made their first features in Munich following 1967), Japanese movies, films of the American thirties and their relationship to current thought, American Westerns, Ethnographic Film, Brazil's Cinema Novo, etc. Specific topics to be covered will vary with the instructor. May be repeated twice for credit. Materials fee required. **Prerequisite:** VIS 84 or consent of instructor.

153. The Genre Series (4)

A group of related courses exploring the conventions within such generic and mythic forms as the cowboy, shamus, chorus girls, and vampire films. May be repeated twice for credit. Materials fee required. **Prerequisite:** none; VIS 84 recommended.

154. Hard Look at the Movies (4)

Examines a choice of films, selected along different lines of analysis, coherent within the particular premise of the course. Films are selected from different periods and genres among Hollywood, European, and Third World films. May be repeated once for credit. Materials fee required. **Prerequisite:** VIS 84 or consent of instructor.

155. The Director Series (4)

A course that describes the experiences, looks, and structure of director-dominated films. A different director will be studied each quarter. The student will be required to attend the lecture in the course and to meet with the instructor at least once each week. May be repeated three times for credit. Materials fee required. **Prerequisite:** VIS 84 or consent of instructor.

156N. Special Problems in Film History and Theory (4)

Seminar on an advanced topic in the history and theory of film. Content will vary from quarter to quarter. **Prerequisite:** VIS 84 or consent of instructor. Note: Materials fee required.

157. Video History and Criticism (4)

A lecture course that examines video as an art form, its relationship to the development from television and other art forms, and surveys current work in the medium. Materials fee required. **Prerequisites:** VIS 22, 84, and 111.

158. Histories of Photography (4)

Photography is so ubiquitous a part of our culture that it seems to defy any simple historical definition. Accordingly, this course presents a doubled account of the medium; it explores both the historical and cultural specificity of a singular photography as well as some of the multitude of photographs that inhabit our world. Will examine a number of the most important photographic themes from the past 200 years. **Prerequisite:** none.

159. History of Art and Technology (4)

(Cross-listed with ICAM 150.) Aims to provide historical context for computer arts by examining the interaction between the arts, media technologies, and sciences in different historical periods. Topics vary (e.g., Renaissance perspective, futurism and technology, and computer art of

the 1950s and 1960s). **Prerequisite:** none. Note: Materials fee required.

164. Photographic Strategies (4)

Introduction to the aesthetic problems in photography. Both historical and contemporary art practices will be examined. Students will create photo pieces to engage these conceptual issues. Materials fee required. **Prerequisites:** VIS 60 and consent of instructor. Open to media majors and photography minors only. Two production-course limitation.

165. Camera Techniques (4)

An intermediate course designed to teach students to develop fiber-based black and white printing skills, to introduce the fundamentals of digital photography, and to address the issues of text in relation to image in art practice. Materials fee required. **Prerequisites:** VIS 60 and consent of instructor. Open to media majors and photography minors only. Two production-course limitation.

166. Advanced Camera Techniques (4)

Advanced-level course working with refined techniques in traditional and digital photographic art practices. The student will also be instructed in the development of a portfolio for use in post-graduation career development. Materials fee required (photo lab). **Prerequisites:** VIS 164, 165, and consent of instructor. Open to media majors only. Two production-course limitation.

167. Social Engagement in Photography (4)

This course will explore the use of photography to examine social issues. Working in both the documentary and fictional modes, students will produce projects on social concerns to present for critical feedback in class. **Prerequisites:** VIS 158, VIS 164, VIS 165.

168. Color Techniques in Photography (4)

Instruction in color photography and printing. Lectures on theory and demonstration in shooting and printing color negatives. Materials fee required. **Prerequisites:** VIS 60, 164, 165. Open to media majors only. Note: Portfolio required for admission. Two production-course limitation.

171. Digital Cinema—Theory and Production (4)

A digital image is not a film image, and this reality and its technological and conceptual implications are what this course will attempt to map out, exploring its possibilities and the massive overhaul of media aesthetics it implies. **Prerequisites:** (VIS 40/ICAM 40), VIS 60, VIS 70N and VIS 174, plus one from VIS 1, VIS 2, VIS 3, VIS 22 or VIS 84. Open to media majors only. Two production-course limitation.

174. Media Sketchbook (4)

Video medium used both as production technology and as device to explore the fundamental character of film-making and time-based computer art practices. Students perform all aspects of production with attention to developing ideas and building analytical/critical skills. **Prerequisite:** VIS 70N. Open to media and ICAM majors only. Two production-course limitation.

175. Editing—Theory and Production (4)

The evolving aims and grammars of editing practice in film and digital media will be examined. These histories will create a context for exploring contemporary editing strategies. The production projects will be centered on digital editing practice. **Prerequisites:** (VIS 40/ICAM 40), VIS 60, VIS 70N, and VIS 174 plus one from VIS 1, VIS 2, VIS 3, VIS 22, or VIS 84. Open to media majors only. Two production-course limitation.

176. 16mm Filmmaking (4)

A technical foundation and creative theoretical context for film production will be provided. Students will produce a short film with post-synchronized sounds and final mixed-track. **Prerequisites:** (VIS 40/ICAM 40), 60, 70N and 174, plus one from VIS 1, VIS 2, VIS 3, VIS 22 or VIS 84. Open to media majors only. Two production-course limitation.

177. Scripting Strategies (4)

Script writing, reading, and analysis of traditional and experimental media productions. The emphasis will be on the structural character of the scripting process and its language. Students will write several short scripts along with analytical papers. **Prerequisites:** VIS 70N and VIS 174. Open to media majors only. Two production-course limitation.

178. Sound—Theory and Production (4)

Sound design plays an increasing role in media production and has opened up new structural possibilities for narrative strategies. A critical and historical review of sound design and a production methodology component. Critical papers and soundtracks for short film projects will be required. **Prerequisites:** VIS 70N and VIS 174. Open to media majors only. Two production-course limitation.

180A. Documentary Evidence and the Construction of Authenticity in Current Media Practices (4)

Exploration of concepts in representational artworks by critically examining “found” vs. “made” recorded material. Advanced film/video, photography, computing work. Issues of narrative and structure; attention to formal aspects of media work emphasized. Cannot be taken same quarter as VIS 180B. **Prerequisites:** VIS 174 and one from VIS 140/ICAM 101, 145A/ICAM 102, 145B, 164, 165, 172, 175, 176, 177; VIS 177 strongly recommended. Open to media majors only. Two production-course limitation.

180B. Fiction and Allegory in Current Media Practices (4)

Exploration of choices in invention, emphasizing “made” over “found.” Advanced film/video, photography, and computing. Issues of narrative and structure, and formal aspects of media work emphasized. Cannot be taken same quarter as VIS 180A. **Prerequisites:** VIS 174 and one from VIS 140/ICAM 101, 145A/ICAM 102, 145B, 164, 165, 172, 175, 176, 177; VIS 177 strongly recommended. Open to media majors only. Two production-course limitation.

181. Sound and Lighting (4)

Advanced course to gain sophisticated control of lighting and sound recording techniques with understanding of theoretical implications and interrelation between production values and subject matter. Interactions between sound and image in various works in film, video, or installation. **Prerequisite:** VIS 174, and three of the following courses depending on emphasis: VIS 164, 165, 172, 175, 176, 177. Open to media majors only. Two production-course limitation.

182. Advanced Editing (4)

Film/video editing and problems of editing from theoretical and practical points-of-view. Films and tapes analyzed on a frame-by-frame, shot-by-shot basis. Edit stock material and generate own materials for editing final project. Aesthetic and technical similarities/differences of film/video. **Prerequisites:** VIS 175 and two courses from the 180 and 183 series. Open to media majors only. Two production-course limitation.

183A. Strategies of Self (4)

Looks at the way that self-identity is reflected and produced through various media practices. Focus is on rhetorical strategies of biography and autobiography in media, comparing and contrasting these strategies with those drawn from related cultural forms. Cannot be taken the same quarter as VIS 183B. **Prerequisites:** VIS 174 and one from (VIS 140/ICAM 101), (VIS 145A/ICAM 102), VIS 147A, VIS 164, VIS 165, VIS 175, VIS 176, VIS 177; VIS 177 strongly recommended. Open to media majors only. Two production-course limitation.

183B. Strategies of Alterity (4)

Looks at difference as it is reflected and constructed in various media practices. Course will examine a wide range of forms and genres such as ethnography, science fiction, crime narratives, documentary film, political drama, and animated shorts. Cannot be taken same quarter as VIS 183A. **Prerequisites:** VIS 174 and one from (VIS 140/ICAM 101), (VIS 145A/ICAM 102), VIS 147A, VIS 164, VIS 165, VIS 175, VIS 176, VIS 177; VIS 177 strongly recommended. Open to media majors only. Two production course limitation.

184. Advanced Scripting (4)

Film/video production will be framed through the script writing process, focusing on the problems of longer duration, density, and adaptation from other media. Students will both read and analyze both historical and contemporary scripts and produce a thirty- to sixty-minute script. **Prerequisites:** VIS 177 and two courses from VIS 180A, VIS 180B, VIS 183A, VIS 183B. Open to media majors only. Two production-course limitation.

194S. Fantasy in Film (4)

This course will explore the path of the deliberately “un-real” in movies. Fantasy in film will be considered both in terms of its psychological manifestations and also in terms of imaginary worlds created in such willfully anti-realistic genres as science-fiction, horror, and musical films. Materials fee required. **Prerequisite:** upper-division standing. Offered in summer session only.

197. Media Honors Thesis (4)

This advanced-level sequence coordinates three consecutive independent research courses to culminate in a completed thesis project in the third quarter of study. After the project’s public presentation, the faculty involved in the project will determine whether the student will graduate with departmental honors. **Prerequisite:** consent of instructor. **Note:** Requires a written proposal, 3.5 GPA in the major, prior consent from all involved, and approvals by the department chair and provost.

198. Directed Group Study (2–4)

Directed group study on a topic or in a group field not included in regular department curriculum, by special arrangement with a faculty member. **Prerequisite:** consent of instructor. **Note:** Open only to upper-division students. Requires instructor’s, department chair’s, and provost’s approval. Pass/Not Pass grades only.

199. Special Studies in the Visual Arts (4)

Independent reading, research, or creative work under direction of a faculty member. **Prerequisite:** consent of instructor. **Note:** Open only to upper-division students. Requires instructor’s, department chair’s, and provost’s approval. Pass/Not Pass grades only.

ICAM 103. Musical Acoustics (4)

(Cross-listed with MUS 170.) An introduction to the acoustics of music with particular emphasis on contemporary digital techniques for understanding and manipulating sound. **Prerequisites:** MUS 1A, 2A, or 4.

ICAM 110. Computing in the Arts: Current Practice (4)

Designed around the presentations by visiting artists, critics, and scientists involved with contemporary issues related to computer arts. Lectures by the instructor and contextual readings provide background material for the visitor presentations. **Prerequisite:** none. **Note:** Materials fee required.

ICAM 120. Virtual Environments (4)

Students create virtual reality artworks. Projects may be done individually or in groups. Exploration of theoretical issues involved will underlie acquisition of techniques utilized in the construction of virtual realities. Materials fee required. **Prerequisites:** VIS 145A or ICAM 102; CSE 11 recommended. Open to ICAM majors and minors only. Two production course limitation.

ICAM 160A. Senior Project in Computer Arts I (4)

Students pursue projects of their own design over two quarters with support from faculty in a seminar environment. Project proposals are developed, informed by project development guidelines from real-world examples. Collaborations are possible. Portfolio required for admission. **Prerequisites:** VIS 141B or VIS 145B or VIS 147B or MUS 172. Open to ICAM majors only. Department stamp required.

ICAM 160B. Senior Project in Computer Arts II (4)

Continuation of ICAM 160A. Completion and presentation of independent projects along with documentation. **Prerequisites:** ICAM 160A. Open to ICAM majors only. Department stamp required.

ICAM 198. Directed Group Study (2–4)

Directed group study on a topic or in a group field not included in regular department curriculum by special arrangement with a faculty member. May be repeated twice for credit. **Prerequisites:** consent of instructor. **Note:** Only open to upper-division students. Requires instructor approval. Pass/Not Pass grades only.

ICAM 199. Special Studies (2/4)

Independent reading, research or creative work under direction of faculty member. **Prerequisites:** department stamp and upper-division standing and consent of instructor required.

GRADUATE

CORE SEMINARS

201. Contemporary Critical Issues (4)

An exploration of a range of issues important on the contemporary critical scene through readings and writing assignments. Topics will vary from year to year. Offered every fall. (Required, M.F.A.)

202. Art Practice (4)

A workshop/seminar devoted to a particular materials practice (e.g., media, painting, digital media, etc.) that engages with critical questions arising within that discipline. Content will vary from quarter to quarter. May be repeated once for credit. (Required, M.F.A.)

203. Working Critique (4)

Workshop in which students engage in an extensive evaluation of each others' ongoing work in preparation for either the First Year Review or MFA Review. Offered every winter. May be repeated once for credit. (Required, M.F.A.)

204. Re-Thinking Art History (4)

Critical evaluation of the methods, practices, and disciplinary commitments of art history, encompassing both revisionist interventions of the late twentieth century and earlier paradigms, in order to envision new discipline-specific and interdisciplinary directions for the future of art history and visual culture. (Required, Ph.D.)

205. Introduction to Graduate Studies in Art Practice (4)

This seminar introduces art practice students to the graduate program in a workshop environment. Emphasis is on the production of new work and on situating that work in relation to a larger art context. (Required, M.F.A.) Offered every fall and required of all first-year M.F.A. students.

206. Seminar in Art Practice Research (4)

Seminar examines the interrelationship between theory and practice and the nature of artistic production as a form of research. **Prerequisites:** none. (Required for Ph.D. in art practice concentration.)

ART PRACTICE/THEORY

210. Narrative (4)

Examination of narrative issues in contemporary art-making. Traditional and experimental narrative practices in painting, drawing, sculpture, and performance are explored alongside narrative strategies in media and digital media.

211. Fact and Fiction (4)

This seminar addresses the space between narrative work generated from a factual base and that generated from a fictional one. Special attention will be given to discussing work that confounds the assumed gap between the two.

212. History and Memory (4)

This seminar will engage the space between personal and larger histories. How is one's own past both intertwined with and determined by larger social histories?

213. Public Space (4)

An exploration of what public space is and how it operates, with a view toward an expanded context for considering how public artwork can operate within it. Included are areas such as mass media, activism, community action, computer networks, ecology, and alternative forums.

215. Human Interface (4)

Examines human interface as it informs or transforms how we read and participate in culture at large. Concepts such as subject/author/object relationships, abstraction, metaphor, analogy, visualization, and complexity are discussed to establish context.

216. The Object (4)

An investigation of the world of artifacts ("works of art" and others) and how they function as agents of communication and modifiers of consciousness. Contemporary perspectives drawn from the fields of art theory, anthropology, contemporary art, and semiotics will be utilized.

217. Communities and Subcultures (4)

A critical examination of the practices of self-defined communities (e.g., Bauhaus, Shaker, Surrealists), which have attempted to change the social and spiritual quality of life by aesthetic means and of communities and subcultures defined by other means.

218N. Imaging Selves and Others (4)

Explores various strategies exhibited in a wide range of contemporary art practices engaging in the representation of personality, spirituality, and the physical self.

219. Special Topics in Art Practice/Theory (4)

Examines a topic of special interest to permanent and visiting faculty that is not addressed in the regular curriculum. As in other Art Practice/Theory seminars, students will both produce work and read and write critically about the topic. Topics will vary.

HISTORY/THEORY/CRITICISM

Categories/Constructs

230. "Art" as Category (4)

Explores the complex and changing criteria by which certain (categories of) objects and practices are designated as "art" in culturally and historically diverse societies.

231N. Confronting the Object (4)

Investigates the nature and status of art objects and practices and the forms of engagement with them through topics such as the practice and metaphysics of description; phenomenological analysis; film analysis; and ekphrasis and visual analysis.

232. Artistic Identities (4)

Explores the historical, theoretical, and cross-cultural concepts of the artist/auteur and his/her varied and shifting identities as inscribed in works of art, recorded in biography and critical literature, and enacted through social roles.

234N. Frames of View (4)

Critical and historical analysis of the institutions, social networks, and communicative media through which art is presented to its audiences. May also address theories of vision and visibility, spectatorship, public space, originality and reproduction, and public space.

235N. Frames of Analysis (4)

Historical critique and philosophical analysis of the central terminology and constructs of art history, theory, and criticism. May address such key terms as style, genre, and periodization or a topic such as theories of representation and narrative. **Prerequisite:** graduate standing or consent of instructor.

Theories/New Visions

240. Histories of Theory and Criticism:

Plato to Post-Modernism (4)

Historical and cross-cultural investigations of art theory and criticism, antiquity to the present. May be taught as an historical overview or focus on a particular topic, e.g., Critical Currents Since World War II, Renaissance Foundations, From Culture to Popular Culture.

241. Topics in Contemporary Critical Theory (4)

Focused studies, changing from year to year, in contemporary theoretical positions and perspectives (e.g., New Social Theory, Post-Colonialism, Gender Theory) and one or more leading theorists (e.g., Deleuze, C. S. Peirce, Steinberg).

242. Theories of Media and New Media (4)

Critical study of the ways in which media (film, video, photography) and new media have been theorized. May be taught from an historical or comparative perspective or focus on a single topic or theorist.

243. Aesthetic Theory (4)

Study of the philosophical concepts of the function of art and visual culture and the criteria for its evaluation in diverse epochs and cultures. May be taught as an historical overview or comparative study or focus a single topic or theorist.

244. Studies in the Relationship of Theory and Practice (4)

Investigations of one or more artist-theorists or movements, contemporary or historical, that put in issue the interface between theory and practice. May also focus on a topic such as perspective, color, or narrative, or genre such as film or new media.

Times/Terrains

250N. Seminar in Ancient Art (4)

The arts of Greece, Rome, and allied cultures in the ancient world. Topics will vary, e.g., Roman Portraiture: Self and Social Mask; The Invention of Perspective and Revolution in Two-Dimensional Representation; The "Modern" Art of Antiquity (late third to early fourth century A.D.). May be taken three times for credit. **Prerequisite:** graduate standing or consent of instructor.

251. Seminar in Medieval Art (4)

European art from late antiquity through the fourteenth century and the historical processes by which "medieval" art has been constructed as a category. Topics may include Devotional Vision and the Sacred Image; Medieval Comic Genres; Neo-Medievalisms, Fifteenth Century to Today. May be taken three times for credit. **Prerequisite:** graduate standing or consent of instructor.

252. Seminar in Renaissance Art (4)

Concentrates on the art of the Renaissance in Italy and the North through a changing series of topics, e.g., Vision and Composition in Perspective; The Sistine Chapel; Envisioning Jan Van Eyck; Renaissance Print-Making; Leonardo da Vinci's La Gioconda. May be taken three times for credit. **Prerequisite:** graduate standing or consent of instructor.

253. Seminar in Early Modern Art (4)

European and American art, 1580s to 1850. Topics might include Deconstructing the Enlightenment: Images of Disorder; Escaping History: Genre Painting, Rococo to Impressionism; Politics and Love in the Art of Jacques-Louis David; Art and Urbanism in Baroque Rome. May be taken three times for credit. **Prerequisite:** graduate standing or consent of instructor.

254. Seminar in Modern Art (4)

European and American art, ca. 1850 to 1960. Questions in Impressionism and Post-Impressionism; The Cubist Revolution: Marcel Duchamp and the Anti-Formalist Tradition; American Modernism; Reckoning with Abstract Art; Issues of Dada and Surrealism; Soviet Avant-Gardes. May be taken three times for credit. **Prerequisite:** graduate standing or consent of instructor.

255. Seminar in Contemporary Art (4)

Thematic and critical discussions of recent U.S. and international art, 1960s to the present. Art/Text; Mixed Media Practices; Conceptual Art; Art After Appropriation; Global Art at the Millennium; New Genres of Public Art; Mike Kelly and the Conceptual Vernacular: Art and Activism. May be taken three times for credit. **Prerequisite:** graduate standing or consent of instructor.

257. Seminar in Meso-American Art (4)

Topics relating to the art and civilizations of Precolumbian Mexico and Central America, either specifically art historical (such as iconographic, formal, and stylistic analysis) or encompassing a spectrum of interdisciplinary and cultural/historical problems. May be taken three times for credit. **Prerequisite:** graduate standing or consent of instructor.

258. Seminar in Chinese Art (4)

Advanced studies in the secular and religious art traditions of China. From year to year, the seminar may focus on early China (Neolithic to the end of the T'ang dynasty), on later dynasties (Sung, Yuan, Ming) or on art of the People's Republic. May be taken three times for credit. **Prerequisite:** graduate standing or consent of instructor.

259. Seminar in Latin American Art (4)

Historical and theoretical problems in the art of Mexico, Central, and South America art from the colonial period to today, as well as from the Hispanic traditions of the American Southwest. May be taken three times for credit. **Prerequisite:** graduate standing or consent of instructor.

260. Seminar in North American Indian Art (4)

Topics for this seminar concern Native American art history from ancient to contemporary times. Seminars may focus on archaeological and art historical approaches, philosophy and aesthetics, archaeoastronomy, and cultural contexts. Issues of globalization and transculturation may be examined as well.

269. Contextual Studies: Special Topics (4)

Studies in the art of cultures and time periods not covered in the currently published curriculum (e.g., African Art, Japanese Art, Byzantine Art, Islamic Art) or of issues and genres crossing epochal, cultural, and media boundaries.

OTHER**280. Workshop in Critical Writing (4)**

Practice in writing about art (both one's own and others) accompanied by analysis of selected contemporary critical writings.

281. Curatorial Practice (4)

Methodological investigation of and training in the practices of art museums, galleries, film and digital environments, public arts organizations, and the like. Instruction by museum and gallery curators and opportunities for participation in ongoing programs at local art institutions.

282. Special Projects in Art Practice (4)

Advanced workshop in specialized areas of art practice (e.g., Sound and Lighting, Editing).

295. Individual Studies for Graduate Students (1–12)

Individual research with the student's individual faculty advisor in preparation for their comprehensive exhibitions for the M.F.A. degree or qualifying exam for the Ph.D. These units are intended to be with the chair of the student's review committee. For the M.F.A. degree, these units can only be taken after completing the First Year Review. (Required, M.F.A., Ph.D.)

298. Directed Group Study (1–12)

Directed group study on specific topics not covered at present in the normal curriculum. Used as an experimental testing of courses that may be given regular course numbers if proved successful. Special arrangement with faculty member. **Prerequisite:** consent of department.

299. Graduate Research (1–4)

Graduate-level research under the direct guidance of a faculty member. **Prerequisite:** consent of instructor.

500. Apprentice Teaching (1–4)

Apprentice teaching in undergraduate courses given by the Department of Visual Arts. Graduate students are required to teach a minimum of one quarter (four units) within the department to fulfill degree requirements.

501. Apprentice Teaching in Culture, Art, and Technology (CAT) (4)

Consideration and development of pedagogical methods appropriate to undergraduate teaching in the interdisciplinary Sixth College Core Sequence, Culture, Art and Technology. Supervised by the Core Program faculty, director and associate directors for the Writing and Thematic Programs. **Prerequisites:** graduate student and consent of instructor.

Warren College

OFFICE: Warren College Administration, EBU 3B,
Computer Science and Engineering Building
<http://warren.ucsd.edu/>

THE WRITING PROGRAM

Within four quarters following successful completion of the UC Entry Level Writing Requirement, all students entering as freshman must complete a two-course sequence at UC San Diego in Warren Writing (10A and 10B). The purpose of the sequence is to teach and thereby enable students, through intensive practice, to read critically and write appropriately in a variety of academic contexts. Classes are seminar-size and center on discussion of student work.

In both 10A and 10B, student writing is duplicated and discussed by the class in a workshop setting. Instructors hold conferences with students individually during the quarter and provide written and oral commentaries on student work. The minimum writing requirement is 8,000 words per quarter.

ETHICS AND SOCIETY

All Warren students entering as freshmen must take two core courses in Ethics and Society. The courses are cross-listed as Political Science 27 and 28 and Philosophy 27 and 28 (see departmental listings). A student may enroll in these courses through either department. The courses are to be taken immediately following completion of Warren Writing 10A-B (or Scholars Seminar 11A-B). Poli./Phil. 27 must be taken before Poli./Phil. 28.

THE WRITING CENTER

OFFICE: EBU 3B, Computer Science and Engineering Building, Room 1109

The Writing Center, staffed by trained undergraduate mentors, provides academic support for all Warren College student writers. The center offers individual peer mentoring sessions on a one-time or ongoing basis. The center director also provides group workshops addressing specific writing tasks, such as application essays and timed essay exams. Writing mentors enroll in Warren 189 to receive training and supervision.

WARREN COLLEGE HONORS PROGRAM

OFFICE: EBU 3B, Computer Science and Engineering Building, Room 1102

The Warren College Honors Program offers students educational, cultural, and social experiences designed to broaden their intellectual interests. The activities vary each quarter and are planned to foster student interaction and promote a sense of community.

Entering freshmen with a high school GPA of 3.8 or above and SAT I scores of 700 reading/700

math/700 writing, or the ACT equivalent, are eligible to participate in the Honors Program. To remain in the program, students must maintain a cumulative GPA of 3.7 on all graded units completed at UC San Diego.

Students who do not qualify for the Honors Program at the time of admission and all transfer students may join as soon as a cumulative GPA of 3.7 is attained on twelve or more graded units completed at UC San Diego. In all subsequent quarters, students must maintain a cumulative GPA of 3.7 on all graded units completed at UC San Diego to remain in the program. Students in the Warren College Honors Program are not required to apply to the program or produce research projects in order to continue in the program.

Any Warren Honors student who writes a research paper for a departmental honors course may submit his or her paper to the Warren College Provost's Office for consideration for the Michael Addison Award. The award is presented annually at commencement to the Warren Honors student who is judged to have written the most distinguished research paper. The submission must be accompanied by a letter of support from the faculty departmental honors advisor.

For more information, please contact the program coordinator at (858) 534-1709 or warren-honors@ucsd.edu.

WARREN SCHOLARS SEMINAR

The Warren Scholars Seminar offers an interdisciplinary curriculum that is designed to help students broaden their intellectual interests and prepare them for rigorous academic inquiry. Students enroll in two seminars, Warren 11A-B, which fulfill the college writing requirement. The seminars are taught by a Warren College lecturer and feature distinguished guest speakers from a variety of disciplines.

Entering first-year Honors Program students are admitted to the Warren Scholars Seminar by application and invitation.

Students in the Honors Program may serve as undergraduate assistants in Warren 11A-B (Warren 195, Apprentice Teaching). Undergraduate assistants participate in planning class meetings, introducing guest speakers, facilitating small-group discussions, and supporting students in the paper-writing process.

COURSES

For course descriptions not found in the UC San Diego General Catalog, 2010–11, please contact the department for more information.

10A. The Writing Course A (4)

A workshop course in reading and writing required of all Warren College students. The course emphasizes argumentation and critical writing based on sources. (Letter grade only.) **Prerequisites:** satisfaction of the university entry level writing requirement and must be a Warren College student.

10B. The Writing Course B (4)

A workshop course in reading and writing required of all Warren College students who have completed 10A. The course continues the emphasis on argumentation and critical writing based on sources. (Letter grade only.) **Prerequisites:** completion of WCWP 10A and must be a Warren College student.

11A. Warren Scholars Seminar A (4)

The Warren College Scholars Seminar A allows students to develop and refine their expressive and analytical skills. The seminar offers an interdisciplinary approach to topics on the relation of individuals and society, and the function of evidence and observation in the formation of theories. The course emphasizes argumentation and critical thinking. (Letter grade only.) **Prerequisites:** limited to freshman Warren College Honors Program students upon approval of a submitted writing sample.

11B. Warren Scholars Seminar B (4)

The Warren Scholars Seminar B allows students to develop and refine their expressive and analytical skills by exploring a topic that offers viewpoints from a wide range of disciplines. The seminar emphasizes argumentation and critical writing. The topic will vary each year. (Letter grade only.) **Prerequisite:** Warren 11A or by consent of instructor.

189. Academic Mentoring and the Writing Process (2)

Students will gain a fundamental understanding of all stages of the writing process and will develop the necessary skills to serve as productive mentors for their peers. **Prerequisites:** students must have completed WCWP 10A and 10B (or WARR 11A and 11B) and Phil./Poli. 27 with B grade or higher, have upper-division standing, and a minimum GPA of 3.0. Enrollment is restricted to Warren students only. Submission of a writing portfolio and departmental authorization is required to enroll.

195. Apprentice Teaching (1)

Undergraduate instructional assistance. Responsible both in area of learning and instruction. Student must prepare reading materials assigned by the professors and lead student discussions in Warren 11A or 11B. (P/NP grade only.) **Prerequisite:** student must be in the Warren College Honors Program.