Biophysics

See "Physics" for more information.

OFFICES:

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Web site: http://physics.ucsd.edu/

The Department of Physics offers an undergraduate and graduate program which prepares students for a career in biophysics and which leads to the following degrees:

B.S. in physics with specialization in biophysics

C.Phil. in physics

Ph.D. in physics (biophysics)

A grade-point average of 2.0 or higher in the upper-division major program is required for graduation. All courses (lower- and upper-division) required for the major must be taken for a letter grade. 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.

The Undergraduate Program

Physics Major with Specialization in Biophysics

This program leads to a bachelor of science degree. 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, 20B, 21C, 21D, 20E, 20F

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-division 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	Chem. 6B
	Math. 20B	Chem. 6BL
	Phys. 4A	Math. 21C
		Phys. 4B
SOPHOMORE YEAR		
Chem. 6C	Math. 20E	Math. 20F
Math. 21D	Phys. 4D	Phys. 4E
Phys. 4C	Phys. 2CL	Phys. 2DL
JUNIOR YEAR		
Phys. 100A	BILD 1	BILD 2
Phys. 105A	Chem. 140A	Phys. 120A
Phys. 110A	Phys. 171	Phys. 130A
SENIOR YEAR		
Phys. 140A	Elec.	Phys. 173
Phys. 172	Elec.	

The Graduate Program

Research in biophysics is being actively pursued in several departments (e.g., physics, chemistry, and biology), which also offer courses in or relevant to biophysics.

Biophysics students will receive their M.S. and C.Phil. degrees in physics. Only their Ph.D. will be in physics (biophysics).

Doctoral Degree Program

The Ph.D. program consists of graduate courses, apprenticeship in research, teaching experience, and thesis research.

Entering students are assigned a faculty adviser 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. 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 adviser. 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 reqirement, and a final defense of the thesis as described below.

1. Departmental Examination

Biophysics students are required to take a departmental examination after completing two years 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
Phys. 200A (Theoretical Mechanics)
Phys. 201 (Mathematical Physics)
Phys. 212A (Quantum Mechanics)

Winter
Phys. 200B (Theoretical Mechanics)
Phys. 203A (Adv. Classical Electrodynamics)
Phys. 212B (Quantum Mechanics)

Spring
Phys. 203B (Adv. Classical Electrodynamics)
Phys. 210A (Equilibrium Statistical Mechanics)
Phys. 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 students take the departmental examination after completing two years of graduate work.

2. Advanced Graduate Courses

Biophysics students are required to pass five courses (with a grade of C or better) from biology, biochemistry, chemistry, or physics in consultation with their adviser no later than the end of the third year of graduate work. At least three of these courses must be graduate courses. A 3.0 average in four of the five courses is required. (In lieu of the course requirement, students may petition to take an oral examination covering three areas of physics.)

3. Qualifying Examination and Advancement to Candidacy

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. Members of the research progress committee are usually included as members of the doctoral committee. The committee conducts the Ph.D. qualifying examination during which students must demonstrate the ability to engage in thesis research. Usually 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 which 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 "Instruction in Physics Teaching" under the supervision of a professor as part of their training for future careers. Students will participate in teaching recitation sections, problem sessions, or laboratory sections. Students are required to take a total of two units of Physics 500.

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

COURSES

Please refer to listings in the Departments of Biology, Chemistry and Biochemistry, and Physics.