



School of Physical Sciences

Undergraduate Areas of Study

Majors

Chemistry, B.S.

Concentrations:

Biochemistry

Chemistry Education

Earth and Environmental Sciences, B.S.

Earth and Environmental Studies, B.A.

Mathematics, B.S.

Concentration:

Mathematics for Economics

Specializations:

Applied and Computational Mathematics

Mathematics for Education

Statistics

Physics, B.S.

Concentrations:

Applied Physics

Biomedical Physics

Computational Physics

Philosophy of Physics

Physics Education

Specialization:

Astrophysics

Minors

Earth and Atmospheric Sciences

Mathematics

Note: Major advising provided by the School of Physical Sciences Undergraduate Counseling Office.

School Overview

Over the course of the past century, revolutionary developments in science and technology have transformed our world. Chemistry, Earth system science, mathematics, physics, and astronomy have played a critical role in this transformation. The concepts, methodology, and language of the physical sciences are indispensable tools for those who address critical technological challenges ranging from medicine and the environment, to computer technology, materials science, and space exploration.

In addition to a distinguished group of senior scholars, including the 1995 Nobel Laureate in Chemistry, many of the school's faculty are young, highly productive scholars who are rapidly becoming leaders in their fields. These faculty are simultaneously committed to the discovery of new knowledge and to giving students a comprehensive education in mathematics and science in the classroom. Physical sciences faculty actively engage students in mastering the theory of these fundamental disciplines; in the laboratory, students learn to apply their skills to the challenging problems of a rapidly evolving technological society.

Academic Offerings

Chemistry

UC Irvine's chemistry faculty work at the forefront of knowledge in every major area of chemistry, and chemistry majors are well prepared to meet the challenges of the modern technological world. Courses are offered at introductory, upper-division, and graduate levels in a broad range of subjects, including physical, organic, inorganic, analytical, biological, atmospheric, and materials chemistry.

In addition to the regular B.S. degree in chemistry, the department offers an American Chemical Society-certified degree and concentrations in both

biochemistry and chemistry education. Chemistry faculty conduct cutting-edge research in such exciting areas as chemical physics, organic synthesis, ultrafast spectroscopy, materials science, rational drug design, organometallic chemistry, polymers, and bio-organic chemistry. Undergraduate research opportunities are abundant, and many chemistry majors are directly involved in the drama of scientific discovery.

Earth and Environmental Sciences

The Department of Earth System Science has brought together some of the most accomplished environmental scientists in the world to study the Earth as a coupled system of atmosphere, ocean, and land. The curriculum for the B.S. degree in Earth and environmental sciences gives students a unique opportunity to work in the classroom, laboratory, and field with a group of teachers and scholars who are playing a critical role in shaping the environmental future. The B.A. in Earth and environmental studies trains and educates students interested in environmental problem solving by linking an understanding of natural science with socioeconomic factors and public policy.

Earth system science faculty conduct start-of-the-art research in the key areas of physical climate, biogeochemical cycling and atmospheric chemistry. Diverse approaches include field and laboratory analysis, computer simulations, and analysis of satellite remote sensing data. A number of faculty are interested in the links between biogeochemistry and Earth's climate. Majors are encouraged to become involved in undergraduate research projects in conjunction with faculty, and to write a senior thesis based on this research.

Mathematics

Mathematicians are frequently asked, "How can you do research in math? Hasn't it all been done before?" The answer is no, there is still much to be discovered; in fact, about 50,000 mathematics research papers are published each year. The rapid growth in scientific

and technological areas that rely on mathematical techniques has led to a dramatic growth in the number and kind of real-world problems confronting the mathematicians of the twenty-first century.

In recognition of these new areas and the need for specifically trained mathematicians, the department offers several program options for mathematics majors. In addition to the traditional B.S. degree, majors can complete formal specializations in applied and computational mathematics, mathematics for education, and mathematical statistics. Another option is a concentration in mathematics for economics, which is designed to prepare students for the world of business and finance or for graduate study in mathematics or economics.

The mathematics faculty includes many members with strong international reputations for their research in a variety of fields such as applied mathematics, geometry, logic, mathematical physics, number theory, and topology. Math majors are able to work with these faculty not only in the classroom, but also on a one-to-one basis through independent study courses.

Physics

Physics lies at the forefront of our understanding of nature. It includes the study of the universe on the largest scales – astronomy and cosmology, and on the smallest – the physics of quarks and leptons. UCI physicists study exciting topics like quantum mechanics, gravitation, the big bang, black holes, magnetism, and superconductivity. In addition, physics provides the background for high technology; lasers, nuclear power, semiconductors, and medical imaging all have their roots in physics.

Physics majors have the opportunity to work closely with faculty throughout their undergraduate years in large introductory courses; small lectures and laboratories are reserved for physics majors only. These special sections promote closer student-faculty interaction, and allow the small community of physics students to work together as they explore this fascinating but demanding field. The curriculum is flexible enough to accommodate a wide variety of interests, including astrophysics, biomedical physics, computational physics, philosophy of physics, business, law, and teaching. Students are guided through the program by faculty advisors who are specialists at working with students in different stages of their academic careers.

Special Resources and Opportunities

Undergraduate Research

Undergraduate research opportunities in all four



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departments are plentiful; typically about half of the graduating students have engaged in research with a faculty member during their time at UCI. Participation in research can lead to presentations at local and national conferences, and publication in scientific journals. The research experience helps students to clarify their educational and occupational goals, and provides valuable preparation for graduate school and careers in industry. Research is available through courses, summer opportunities and programs. In addition, some students are hired on faculty members' grants to engage in paid research.

Science and Mathematics Education

In recognition of the critical educational role played by high school science and mathematics teachers, the physical sciences faculty has developed special degree programs for students interested in teaching careers. The concentration in chemistry education, the mathematics for education specialization, and the concentration in physics education each provide strong grounding in the primary discipline, while emphasizing the breadth in natural sciences needed to help satisfy the requirements for a secondary teaching credential. Each department's curriculum includes specialized instruction in effective methods of science teaching, and provides opportunities for practical fieldwork experience in a secondary school classroom.

Honors Courses and Programs

Courses:

- Honors General Chemistry
- Honors Multivariable Chemistry
- Honors Organic Calculus

Senior Honors Research/Thesis Programs:

- Chemistry
- Earth System Science
- Mathematics
- Physics

Laboratory/Research Facilities

- AENEAS: Array of Enhanced Nodes Supercomputer
- California Institute for Telecommunications and Information Technology
- Center for Interdisciplinary Chemical Synthesis
- Computational and Applied Math (CAM) Laboratory
- Cosmology Center
- Earth System Modeling Facility
- Gravity Laboratory
- High Resolution Atomic Spectroscopy Laboratory
- Integrated Nanosystems Research Facility
- Mass Spectrometry Facility
- Materials Synthesis and Characterization Laboratory
- Molecular Modeling Facility
- Nuclear Magnetic Resonance Facility
- Nuclear Reactor

- Superconductivity Laboratory
- UCI Observatory
- X-Ray Crystallography Facility

Education Abroad Program

The School of Physical Sciences encourages students in all majors to enhance their UCI education by studying abroad. There are programs for every major, and opportunities in more than 50 countries. Early academic planning is encouraged so that you can find the program that is the best match for you and graduate on time. Financial aid, including scholarship, grants and loans, applies to most study abroad programs. Studying abroad helps UCI graduates achieve the academic, personal, and professional skills necessary to be well-informed, engaged members of the global society. For detailed information, go to UCI's Center for International Education: www.cie.uci.edu.

Additional Information

School of Physical Sciences

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General Campus Information

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UCI General Catalogue

UCI Bookstore
Telephone: (949) 824-2665
www.book.uci.edu
www.editor.uci.edu/catalogue (PDF Version)

Accommodations: Upon request, this publication will be made available in alternative formats for people with disabilities. Contact the UCI Disability Services Center; telephone (949) 824-7494, TDD 824-6272. The campus and all buildings are accessible by wheelchair.

Campus Safety: Pursuant to the Federal Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act, UCI annually makes available to the public statistics on reported occurrences of criminal activity on and off campus and at UCI Medical Center at www.police.uci.edu/awareness/jca.html.

Nondiscrimination Policy: The University of California, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy, physical or mental disability, medical condition (cancer related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services. The University also prohibits sexual harassment. This nondiscrimination policy covers admission, access, and treatment in University programs and activities. For more information, call (949) 824-5594.