



The UCI Amp-eaters team at the 2008 SAE Formula Hybrid Competition

The Henry Samueli School of Engineering

Undergraduate Areas of Study

Majors

Aerospace Engineering, B.S.

Biomedical Engineering, B.S.

Specializations:

Biophotonics

Micro and Nano Biomedical Engineering

Biomedical Engineering: Premedical, B.S.

Chemical Engineering, B.S.

Specializations:

Biochemical Engineering

Environmental Engineering

Materials Science

Civil Engineering, B.S.

Concentrations:

Computer Applications

Engineering Management

Infrastructure Planning

Mathematical Methods

Specializations:

General Civil Engineering

Environmental Hydrology and Water Resources

Structural Engineering

Transportation Systems Engineering

Computer Engineering, B.S.

Computer Science and Engineering, B.S.

(offered jointly with the Donald Bren School of Information and Computer Sciences)

Electrical Engineering, B.S.

Specializations:

Electro-Optics and Solid-State Devices

Power Electronics and Power Systems

Systems and Signal Processing

(continued on next page)

School Overview

Engineers use science, imagination, and experience to create products and services that benefit the whole of society. In Western history, milestones in human development have been measured by advances in engineering — from the Stone Age to the Information Age. These advances have allowed society to shift its focus from survival to cultural enrichment. You see the products of engineers around you every day: pharmaceuticals and prosthetics, mass transportation systems and civic works, alternative energy sources, and the Internet.

The Henry Samueli School of Engineering provides students with a comprehensive, effective education, and strives to create leaders in the discipline. Students receive a broad background in basic engineering sciences balanced with training in the application of these principles to approach modern engineering design problems. Advances in technology and science are rapidly incorporated into the curriculum so students will be prepared to apply cutting-edge knowledge in their professional practice. Communication and interpersonal skills are fostered throughout the curriculum, which stresses oral presentation skills, technical writing, and team interaction. Graduates are well-equipped to succeed in today's engineering marketplace or to pursue advanced study.

Academic Offerings

Aerospace Engineering

Aerospace engineers analyze, design, and manufacture aircraft and spacecraft, including the

engines that propel these vehicles. To achieve these goals, aerospace engineers use mathematics, physics, and chemistry together with engineering science and technology in areas such as aerodynamics, fluid mechanics, heat transfer, propulsion, flight mechanics, structural dynamics, controls, and system design. Coursework emphasizes engineering fundamentals and their application to the aerospace field. Laboratory courses provide hands-on experience with wind-tunnel testing, advanced flow diagnostics, structural testing, and control-system design.

Biomedical Engineering

The program in biomedical engineering prepares students for careers in the biomedical industry or for further education in graduate school. Students learn engineering and principles of biology, physiology, chemistry, and physics. They may go on to design devices to diagnose and treat disease, engineer tissues to repair wounds, develop cutting-edge genetic treatments, or create computer programs to understand how the human body works.

The curriculum emphasizes education in the fundamentals of engineering sciences that form the common basis of all engineering subspecialties. Education with this emphasis is intended to provide students with a solid engineering foundation for a career in which engineering practice may change rapidly. In addition, elements of bio-engineering design are incorporated at every level in the curriculum through integration of laboratory experimentation, computer applications, and exposure to actual bio-engineering problems throughout the program. Students also

Engineering (General), B.S.
Environmental Engineering, B.S.
Materials Science Engineering, B.S.

Specializations:

Biomaterials
 Electronics Processing and Materials
 Materials and Mechanical Design

Mechanical Engineering, B.S.

Specializations:

Aerospace Engineering
 Energy Systems and Environmental
 Engineering
 Flow Physics and Propulsion Systems
 Design of Mechanical Systems

Minors

Biomedical Engineering
 Materials Science Engineering

work as teams in senior design project courses to solve multidisciplinary problems suggested by industrial and clinical experience.

Biomedical Engineering: Premedical

This major prepares students for medical school, and is also suitable for those planning to enter graduate school in biomedical engineering, physiology, biology, neurosciences, among others. It has less engineering and more biological sciences content than does the biomedical engineering major, and is one of many majors that can serve as preparation for further training in medical, veterinary, or allied health professions.

The curriculum provides future physicians with a quantitative background in biomechanics, bioelectronics, and biotransport. Such a background is increasingly important because of the heavy utilization of biomedical technology in modern medical practice. The curriculum includes courses in the sciences that satisfy the requirements of most medical schools. The educational experience is enriched through a design course where students work in teams to solve biomedical engineering problems inspired by the clinical arena at UCI Medical Center.

Chemical Engineering

Chemical engineering adds chemistry as a full partner to the traditional engineering sciences of mathematics and physics. Chemical engineers typically concern themselves with the chemical processes that turn raw materials into valuable products. Students choose chemical engineering to gain the broadest scientific and technical skills to apply to chemical, biological, and environmental problems. Chemical engineers have contributed to advances as wide-ranging as nuclear medicine, pharmaceuticals, plastics and other synthetic materials, pollution controls, and improvements to food production.

Civil Engineering

Civil engineering is one of the largest branches of engineering and deals with civil infrastructure systems such as buildings, bridges, roads, transportation and water systems. Students choose civil engineering to be of immediate service to their community and to be involved in a more hands-on, social discipline. Civil engineers plan, design, and supervise the construction of facilities such as high-rise buildings, airports, water-treatment centers, transportation networks, and sanitation plants. Civil engineers play a key role in environmental protection through the study of water resources, air pollution, and solid-waste disposal.

Computer Engineering

Computer engineers deal with all aspects of computer systems, including design, construction, and operation. Some computer engineers specialize in areas like digital systems, operating systems, computer networks, and software.

The computer engineering curriculum addresses the design and analysis of digital computers, including both software and hardware. Computer design includes topics such as computer architecture, VLSI circuits, design automation, system software, data structures and algorithms. Courses include programming in high-level languages, use of software packages for analysis and design, design of system software, and the application of computers in solving engineering problems. Laboratories in both hardware and software experiences are integrated within the curriculum.

Computer Science and Engineering

The goal of the computer science and engineering major is to provide students with an integrated background in both computer science and computer engineering. The program is designed to provide students with the fundamentals of hardware and software computer science and the application of engineering concepts, techniques, and methods to both computer systems engineering and software engineering. The program is administered jointly by the Department of Electrical Engineering and Computer Science, and the Donald Bren School of Information and Computer Sciences.

Electrical Engineering

Electrical engineering is a broad field encompassing such diverse subject areas as computers, controls, electronics, digital systems, communications, signal processing, electromagnetics, and physics of electronic devices. Electrical engineers focus on the behavior of electronic devices and circuits that are the basic building blocks of complex electronic systems: the generation, transmission, and utilization of electrical energy; behavior of complex electronic systems, such as computers, automatic controls, telecommunications, and signal processing; and the applications of these complex systems to other areas, including medicine, biology, geology, and ecology.

Engineering (General)

The engineering major allows upper-division students the opportunity to pursue multidisciplinary programs of study not offered within UCI's engineering departments. The general engineering program creates a flexible environment for high-

achieving students to study complex engineering disciplines such as biochemical engineering, electromechanical engineering, project management, hydrology, engineering mathematics, engineering mechanics, and engineering physics. In consultation with a faculty advisor, students may choose any area of special interest.

Engineering Gateway (Undeclared)

Students who know that they want to major in engineering but are unsure of the specific major should apply for the engineering undeclared major. These students are required to meet with an academic advisor every quarter, and are strongly encouraged to declare a major as soon as possible. This major is not available to transfer students.

Environmental Engineering

Environmental engineers design and integrate technologies that minimize the deterioration of natural resources and promote urban sanitation. Historically, some of the most important milestones that have extended average human life spans can be attributed to environmental engineering achievements. Advances in water-treatment processes, such as disinfection and filtration, have virtually eliminated once widespread diseases, including cholera, typhoid, and dysentery.

Today the challenges facing environmental engineers are even more complex. Physical, chemical, and microbiological approaches are needed to remediate contaminated soils and aquifers. Alternative materials and processing methods must be found to replace the use and release of hazardous chemicals. More effective pollution-control technologies are required for urban waste-water and combustion emissions.

Materials Science Engineering

The major in materials science engineering is designed to provide education and training areas related to the impact of materials on the environment and biotechnology. Its distinctive features include a multi- and interdisciplinary curriculum that develops students' communication and computer skills, and draws from the physical sciences as well as other engineering disciplines such as chemical, civil and mechanical engineering. Students gain a fundamental understanding of structures, properties, processing, and performance, with an emphasis on engineering aspects of materials and the selection of materials to meet design goals.

Mechanical Engineering

Mechanical engineers design, manufacture, and control machines ranging from robots to aircraft and spacecraft, as well as engines and power plants that drive these machines. To achieve their goals, mechanical engineers use mathematics, physics, and chemistry together with engineering science and technology in areas such as fluid mechanics, heat transfer, dynamics, and controls. Mechanical engineering students learn the problem-solving, modeling, and testing skills required to contribute to advances in modern technology.

Minor in Biomedical Engineering

The biomedical engineering minor is designed to provide students with the introductory skills necessary to perform as engineers in the biomedical arena. The interdisciplinary minor combines coursework in engineering, physical sciences, and biological science, and provides students with knowledge of biomedical systems in addition to traditional engineering.

Minor in Materials Science Engineering

The interdisciplinary field of materials science and engineering has become critical to many emerging areas of advanced technology and their applications. As a result, there are needs and opportunities for engineers and scientists with education and training in materials science and engineering. The goal of the minor in materials science engineering (MSE) is to provide students at UCI with education and training that will enable them, upon graduation, to not only participate in projects or programs of an interdisciplinary nature but also address challenging societal needs and complex technological advances.

Concentration in International Engineering

Engineering students have an opportunity to participate in an overseas experience. The Concentration in International Engineering combines UCI coursework centered on the language, culture, and history of your country of interest with a year of coursework in that country, and the possibility of a two-to-three month paid internship.

Special Programs and Opportunities

Comprehensive Design Experience

One example of this is the civil and environmental engineering senior design practicum. Student teams design a land development project, including all infrastructure, environmental, and circulation aspects. Another example is the mechanical and aerospace engineering "Design in Industry" course, which presents the principles of engineering design in the context of an industrial application. Local manufacturing firms define an engineering design project, which students then complete.

Center for Opportunities and Diversity in Engineering (CODE)

CODE develops a community of scholars by providing academic support and professional development services to its students. CODE is also a source of information for scholarships, fellowships, graduate school, research, internships and career opportunities.

Engineering Theme House

The Engineering House is geared toward students majoring in engineering or those who have a strong interest in any of the fields of engineering. The Engineering House provides students with both academic and social development and support. Students will be encouraged to get involved with various aspects of the engineering community including research, engineering student organizations, and volunteering with the MESA program.

Accelerated Status Program

Exceptionally promising UCI undergraduate Engineering students may, during their junior, senior or fifth year, petition for streamlined admission into a graduate program within The Henry Samueli School of Engineering.

Additional Information

The Henry Samueli School of Engineering

Undergraduate Student Affairs Office
University of California
Irvine, CA 92697-2750
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Admissions and Relations with Schools

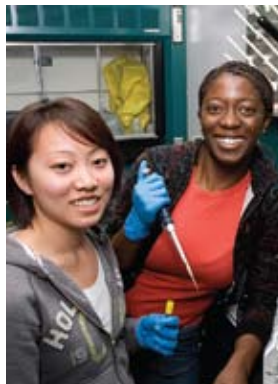
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General Campus Information

Telephone: (949) 824-5011
 www.uci.edu

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.