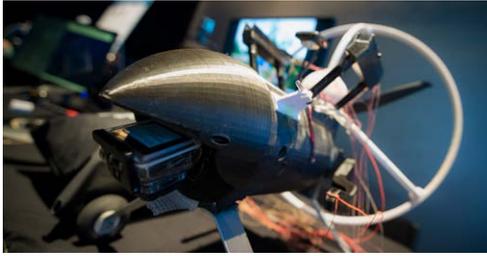


ENGINEERING MAJORS



AEROSPACE ENGINEERING

Curriculum emphasizes engineering fundamentals (materials, solid and fluid mechanics, thermodynamics, computer modeling, computer-aided design, numerical analysis, and controls); aerospace topics (aerodynamics, aerospace structures, flight mechanics, dynamics and control of aerospace vehicles, orbital mechanics, and propulsion); and lab courses that integrate these fundamentals and topics through design of an aerospace system.



BIOENGINEERING: BIOINFORMATICS

An interdisciplinary program with Chemistry, Biology and Computer Science that emphasizes analysis, interpretation and integration of biological and bioinformatics data. Courses include molecular biology and genetics, evolutionary biology, models of disease processes, chemical systems, computer acquisition and management of big data, computational biology, and mathematical modeling and analysis. Graduates are prepared for employment in industries that manage and analyze biomedical data, and for advanced education in graduate and medical schools.



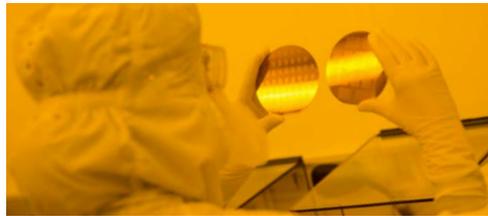
COMPUTER SCIENCE

Courses are offered in the areas of theory, artificial intelligence, software, hardware, computer security and cryptography, computer vision and graphics, databases and XML, systems and networking, bioinformatics, and software engineering. Computer science majors benefit from a strong peer tutoring program. (B.S. or B.A. degree options)



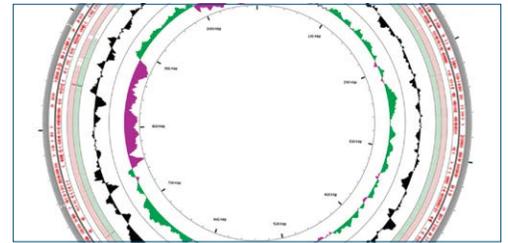
BIOENGINEERING

The use of scientific principles and classical engineering tools applied to biomedical problems. Topics include biomechanics, biotransport, bio-instrumentation, biomaterials, engineering design, and systems and organ physiology. The curriculum has some similarities to mechanical engineering. Graduates are prepared for jobs in the health care and medical device industries, or continue on to medical or graduate schools.



BIOENGINEERING: BIOSYSTEMS

Focuses on the organizational design and interaction of components of complex engineering and biological structures. Topics include analog and digital design, bioinstrumentation, signal processing, feedback control and regulation, imaging systems, biodynamics, and cellular and organ physiology. Emphasis is on the functional integration of multicomponent assemblages and their overall performance. Graduates are prepared for employment in the medical device industry and further study in graduate or medical schools.



COMPUTER SCIENCE: BIOINFORMATICS

Prepares students for careers that involve the design of software systems to further the study of computational molecular biology, bioinformatics, proteomics, approximation algorithms, human genome, human proteome, protein identification, and Expressed Sequence Tags (EST) analysis. Bioinformatics refers to advanced computational and experimental methods that model the flow of information (genetic, metabolic and regulatory) in living systems to enable an integrated understanding of the systems properties of organisms.



BIOENGINEERING: BIOTECHNOLOGY

The application of physicochemical principles and biochemical technologies to benefit human health. Courses include thermodynamics, chemical kinetics, bioreactors, biotransport, bioseparations, tissue engineering, biochemistry, metabolism and cellular physiology, and engineering design. Emphasis on technologies based on molecules, cells and tissues. The program prepares graduates for jobs in the biochemical and pharmaceutical industries or for further education in medical or graduate schools.



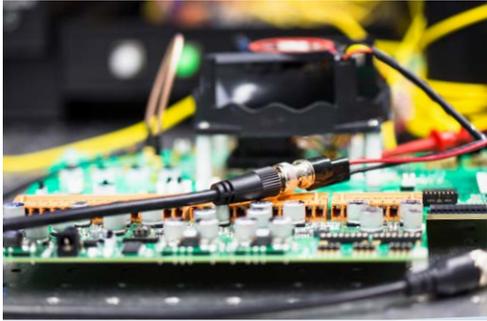
CHEMICAL ENGINEERING

Prepares graduates for careers in a broad spectrum of areas in chemical and petrochemical industries and beyond. By specializing, students can prepare for careers in nanotechnology, environmental technology, microelectronic device fabrication, materials and polymer processing, pharmaceuticals and biotechnology, biomedical engineering, energy and thermal systems, and control and system engineering. (NanoEngineering Dept.)



COMPUTER ENGINEERING

Provides 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, and electronic systems. (Jointly administered by Computer Science and Electrical Engineering Depts.)



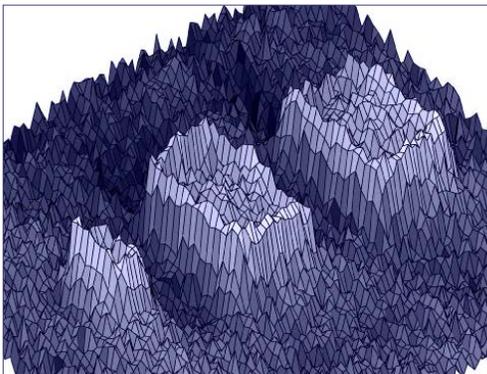
ELECTRICAL ENGINEERING

This major has a common lower division core structure followed by specialization in a depth sequence: Communication Systems; Electronic Circuits and Systems; Electronic Devices and Materials; Machine Learning and Controls; Photonics; Signal and Image Processing; or Computer System Design.



ELECTRICAL ENGINEERING & SOCIETY (B.A.)

In response to the globalization of engineering and technology, this major prepares engineering students in the areas of social sciences and the humanities. This major is broader than other engineering majors and may be of interest to students seeking non-engineering career paths such as in the law, finance, and public policy sectors.



ENGINEERING PHYSICS

Provides a strong background in physics and mathematics, and is intended for students interested in applying theory to applied problems in acoustics, optics, continuum mechanics, and materials science. This Electrical Engineering major is administered in cooperation with the Department of Physics.



MECHANICAL ENGINEERING

Curriculum is focused on mechanics, vibrations, thermodynamics, fluid flow, heat transfer, materials, control theory, and mechanical design. Mechanical design includes conceptual design, drafting with 3-D CAD programs, stress, dynamics, heat transfer or fluid dynamics analyses, and the optimization of the total system for superior performance and customer satisfaction. The mechanical engineering curriculum emphasizes CAD courses, computer courses, laboratory courses, and design courses in addition to providing a strong background in basic science.



ENVIRONMENTAL ENGINEERING

Fundamental engineering courses in mechanics, thermodynamics, physics, chemistry, and mathematics. Curriculum trains students to address environmental engineering and sustainability challenges that require strong quantitative skills. Renewable energy technologies, for example, require skills in materials science and physics; climate change research requires training in fluid mechanics and environmental transport; sustainable building design requires deep knowledge of heat and mass transfer in complex geometries. (Mechanical and Aerospace Engineering Dept.)



NANOENGINEERING

This multidisciplinary major is centered on nanoscale science and technology, incorporating coursework from basic sciences and multiple engineering disciplines. Students choose one focus area in a traditional engineering discipline at UC San Diego. Prepares graduates for careers in a broad spectrum of industries, including: biotechnology, pharmaceuticals and biomedicine; electronics; energy and environmental engineering; materials processing and discovery; optics and photonics.



STRUCTURAL ENGINEERING

Undergraduates can specialize in civil structures, aerospace structures, renewal of structures, or geotechnical engineering. This major includes study of the behavior of solids; 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.



ENGINEERING SCIENCES

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. Students must consult their advisers to develop a sound course of study to fulfill the technical elective requirements of this program.

ADDITIONAL INFORMATION

Undergraduate information from academic departments

JacobsSchool.ucsd.edu/majors

Consult the UC San Diego course catalog for official majors information

bitly.com/engmajors