COLLEGE OF ENGINEERING

UC DAVIS
UNIVERSITY OF CALIFORNIA

Aeronautical Science and Engineering • Biochemical Engineering • Biological Systems Engineering
Biomedical Engineering • Chemical Engineering • Chemical Engineering/Materials Science and Engineering
Civil Engineering • Computational Applied Science • Computer Engineering • Computer Science and Engineering
Electrical Engineering • Electrical Engineering/Materials Science and Engineering • Materials Science and Engineering
Mechanical Engineering • Mechanical Engineering/Materials Science and Engineering • Optical Science and Engineering

Engineering is the profession in which the physical and biological sciences are applied in a practical way for the benefit of society. As an engineering student, you will learn to observe and describe technological problems and to seek useful solutions to them. Your skills upon graduation will be useful to you not only as an engineer, but also as a professional in management, sales, operations, manufacturing and other fields.

ENGINEERING MAJORS

Aeronautical Science and Engineering

Majors learn to apply principles of the physical sciences and engineering to vehicles whose motion is determined by aerodynamic forces. Specific objectives include the design, development and manufacture of aircraft and other transportation systems integrating the disciplines associated with aerodynamics, propulsion, structures and guidance/control. ***mae.ucdavis.edu***

Biochemical Engineering

Majors combine chemical engineering studies with studies in the life sciences and bioprocess engineering. Bioprocess engineering is the application of engineering principles to develop, optimize and commercialize manufacturing processes. Specific objectives include pharmaceutical production, environmental repair, industrial chemical production and food production. ***www.chms.ucdavis.edu***

Biological Systems Engineering

Majors combine the science and art of engineering with the science of biology to design systems that influence, control or use biological materials and organisms to improve quality of life. Specific objectives include designing systems to process biological materials into consumer products; designing machines to interact with biological systems in disciplines ranging from agriculture to medicine; managing, recycling and using waste; developing systems to protect and preserve our natural resources and environment; developing and improving processing systems for food; designing equipment and systems that improve nutrition and diet; and minimizing waste discharge to the environment. ***bae.engineering.ucdavis.edu***

Biomedical Engineering

Biomedical engineers advance medical concepts; create knowledge from the molecular to the organ systems levels; and develop innovative biologics, materials processes, implants, devices and informatics approaches. These approaches are applied to the prevention, diagnosis and treatment of disease. Specific objectives include manufacturing of medical assistive devices, human tissue products and therapeutics. This curriculum provides students with a background to pursue professional degrees in medicine and related health fields. ***www.bme.ucdavis.edu***

Chemical Engineering

Majors learn to apply chemical and engineering principles to create useful products ranging from antibiotics to zirconium, from petroleum to plutonium, from agricultural chemicals to plastics. Specific objectives include the design of industrial processes as diverse as integrated circuit materials production, integrated waste management and petroleum refining. ***www.chms.ucdavis.edu***

Chemical Engineering/ Materials Science and Engineering

Majors learn to apply an understanding of the structure and properties of materials to the design of systems for creating useful products. The specific objectives include developing systems for materials processing in integrated circuit manufacture, catalyst production, polymer synthesis and fabrication of bioreactive materials. ***www.chms.ucdavis.edu***

Civil Engineering

Majors learn to apply the principles of the physical, mathematical, chemical and biological sciences and engineering to plan, design, construct and manage systems to improve the quality of modern life while protecting the natural environment. The scope of this major includes all civil infrastructures such as buildings, bridges, transportation networks and water systems. Specific examples include building design, drought and flood mitigation, air and water pollution, hazardous waste, traffic congestion and green engineering design. ***cee.engr.ucdavis.edu***

Computational Applied Science

Offered through the Department of Applied Science, this major encompasses the interplay between the mathematics of models, arising from physical science and engineering, and the numerical techniques for their computational implementation and subsequent solution. The major provides a comprehensive background in mathematics and physical science. The specific objective of the major is to enable students to construct practical numerical solutions to problems in science and engineering. A strong component of the program is the development, analysis and integration of numerical algorithms and an appreciation for the intersection between numerical simulation, theoretical models and experiment. ***das.ucdavis.edu***

Computer Engineering

Majors are provided a broad and well-integrated background in the concepts and methodologies needed for the analysis, design, development, organization, theory, programming and applications of information processing systems. The program presents essential material in electronic circuits, digital logic, discrete mathematics, computer programming, data structures and other topics. Specific objectives include developing the student's ability to design both software and hardware with greater emphasis on hardware in the key hardware/software interaction in computer system design. ***www.ece.ucdavis.edu***

Computer Science and Engineering (CSE)

Majors encompass the organization, design, analysis, theory, programming and application of digital computers and computing systems. This major provides a solid background in math, physics, chemistry, and electronic circuits and systems—all supporting the computer hardware and software courses that form the focus of the curriculum. A key theme is the hardware/software interaction in computer system design. This major requires more general education electives than other college majors, in order to develop the verbal skills and intellectual breadth demanded by today's employers. The CSE program prepares students to do further work in hardware, software, or electronics, either in industry or through postgraduate study. ***cs.ucdavis.edu***

Electrical Engineering

Majors learn to apply the principles of the physical sciences and engineering to the design, analysis, development, production and evaluation of electronic systems. Specific objectives include the provision of systems for communications, control, signal processing, integrated circuit fabrication, opto-electronics, consumer electronics and digital systems. ***www.ece.ucdavis.edu***

Electrical Engineering/ Materials Science and Engineering

The fields of solid-state electronics, opto-electronics, magnetics and superconductors demand new materials that set the pace for progress in these fields. Materials scientists with an electronics background are key to continued progress in these areas. The curriculum provides students with the background to pursue careers in electrical

engineering or materials science, or to go on to graduate study in these fields. ***www.chms.ucdavis.edu***

Materials Science and Engineering

Majors learn to understand the relationships among microscopic structure, properties and behavior of materials in order to produce new and improved materials with capabilities far superior to common metals, alloys and ceramics. Specific objectives include the development of materials for high-speed transportation systems, surgical and dental implants, new generations of power plants and solid-state electronic devices in computer and optical communications technology. ***www.chms.ucdavis.edu***

Mechanical Engineering

Majors learn to apply physical and mechanical principles to the design and manufacture of machines and products, energy conversion systems and equipment for guidance and control. Specific objectives include the provision of products and processes for intelligent manufacturing systems, biomechanical and sports equipment, power generation systems, propulsion for transportation, integration of vehicles and automated highways and applications of computer and automation technologies. ***mae.ucdavis.edu***

Mechanical Engineering/ Materials Science and Engineering

Majors learn to apply an understanding of the structure and properties of materials to the design of mechanical systems. Continuing advances in transportation, manufacturing, energy conversion and biomedical devices require the application of new materials. Specific objectives include integration of material selection, materials performance measurement and modeling and engineering design to develop novel mechanical systems. ***mae.ucdavis.edu***

Optical Science and Engineering

This major is offered through the Department of Applied Science. It encompasses the physical phenomena and technologies associated with the generation, transmission, manipulation, detection and applications of light. The curriculum prepares students to design, analyze and fabricate effective optical systems. Much of the nation's high-technology infrastructure is based upon optics and its applications, the most prominent being optical digital information transmission. Optical systems play a central role in nearly all aspects of modern life including health care and the life sciences, remote optical sensing, lighting, cameras, space and national defense. ***das.ucdavis.edu***

Want to hear from students and faculty in these majors? Visit ***admissions.ucdavis.edu/majors*** *for that and more.*

MAJORS, OPTIONS AND AREAS OF SPECIALIZATION

Aeronautical Science and Engineering, Aeroelasticity; Aeronautical Structures; Aero-thermodynamics; Aircraft Performance; Component and Mechanism Design; Flight Testing; Propulsion Systems; Stability and Control

Biochemical Engineering

Biological Systems Engineering, Agricultural Engineering; Aquacultural Engineering; Biomechanics/Pre-medicine/Pre-veterinary Medicine; Biotechnical Engineering; Ecological Systems Engineering; Food Engineering; Forest Engineering

Biomedical Engineering, Biomolecular Specialization; Imaging; Pre-medical

Chemical Engineering, Advanced Materials Processing; Applied Chemistry; Applied Mathematics; Computers and Automation; Energy Conversion and Fuels Processing; Environmental Engineering; Food Process Engineering; Marketing; Polymer Science; Pre-biomedical Engineering; Premedical Engineering

Civil Engineering, Environmental Engineering; Geotechnical Engineering; Structural Engineering and Structural Mechanics; Transportation Planning and Engineering; Water Resources Engineering

Computational Applied Science

Computer Engineering, Computer Systems and Software; Digital Systems

Computer Science and Engineering, Hardware Design; Software Design

Electrical Engineering, Analog Electronics; Communication Controls and Signal Processing; Digital Electronics; Electromagnetics; Physical Electronics

Materials Science and Engineering, Electrical Behavior, Mechanical Behavior, Structures and Characterization; Thermodynamics and Kinetics

Mechanical Engineering, Biomedical and Engineering Fluid Mechanics; Combustion and the Environment; Ground Vehicle Systems; Heat Transfer, Thermodynamic and Energy Systems; Manufacturing; Mechanical Design; Systems Dynamics and Control; Transportation Systems

Optical Science and Engineering, Imaging; Lasers and Spectroscopy; Opto-electronics and Opto-communications

QUESTIONS?

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