

THE FIELD

The field of civil engineering is quite broad and encompasses a variety of interrelated disciplines: structural engineering, environmental engineering, hydraulics, transportation, water resources, geotechnical engineering, construction, and surveying. Civil engineering originated as a field involved with civil works—the planning, design, construction, and operation of facilities that serve the general population. Today, the field is still largely centered in the public arena and is a profession dedicated to the needs and progress of humankind.

Civil engineers design and construct the infrastructure that we use every day—roadways, transportation systems, drinking water treatment plants, tunnels, subways, buildings, solid waste landfills, bridges, wastewater treatment plants, canals and waterways, water supply pipe networks, railroads, dams and reservoirs, and even ski lifts and amusement rides. They analyze and solve problems of water, land, and air pollution and oversee the operation of water supply, pollution control, and hazardous waste control facilities. Civil engineers participate in city planning and in planning the uses of natural systems, river basins, and other public areas. They perform reliability and economic feasibility studies to ensure safe and economically efficient outcomes. Using satellite images and global positioning systems, they survey and monitor the environment and assist in overall resource planning and asset management.

The research and expertise of the civil and environmental engineering faculty are focused in the areas of environmental and water resources engineering, geotechnical engineering, structural engineering and mechanics, and transportation engineering. Students are exposed to all these areas during their academic studies at UMass Amherst.

There is no minor available in civil engineering.

THE MAJOR

ADMISSION TO THE MAJOR

Admission to the major is contingent upon a cumulative GPA of 2.0 or higher, a term GPA above 2.00 for the most recent “regular” term (fall or spring), and a grade of C or better in the following courses: PHYSICS 151, CHEM 111 or PHYSICS 152, MATH 131, MATH 132, ENGLWRIT 112, CE ENGIN 121, and ENGIN 100, 110, 111, 112, 113, or 114.

CURRICULUM

In the first three semesters of the major, students take several courses in mathematics, the basic sciences, and engineering, which prepare them for subsequent classes in which fundamental engineering principles are learned. These principles are then applied to the design of civil and environmental engineering facilities starting in the sophomore year. The required courses in the civil engineering major include Civil and Environmental Engineering Measurements, Statics, Programming for Civil Engineers, Strength of Materials I, Systems Analysis and Economics for Civil Engineers, Probability and Statistics, Transportation Systems, Soil Mechanics, Structural Analysis, Thermodynamics, Elementary Fluid Mechanics, Environmental Engineering Principles, Design of Reinforced Concrete Structures or Design of Steel Structures, and Writing in Engineering. The experience culminates in the senior year with two or more courses in which design fundamentals learned in earlier courses are integrated into a design project. Finally, oral and written communication skills and engineering ethics are integrated throughout the curriculum and are synthesized into the Professional Practice Seminar during the senior year.

COOPERATIVE EXPERIENCE

Internships in consulting or design firms, industrial, hospital, or academic settings provide significant advantages to students in their education and in the opportunities available to them upon graduation. Students are encouraged to discuss opportunities with the college’s Career Center as well as with their academic advisor. These opportunities are available to students in order to broaden their educational experience.

HONORS

UMass Amherst honors (Commonwealth Honors College) and departmental honors programs provide engineering students with the opportunity to participate in an honors experience on campus, including honors courses, seminars, undergraduate research projects and a senior research thesis. Students interested in participating in departmental honors and Commonwealth College Honors should contact the honors coordinator in their respective College of Engineering department.

STUDY ABROAD

Engineering students are encouraged to consider study abroad. These experiences take typically one semester, but they could be yearlong experiences taking general education courses, engineering courses, and selected technical electives to fulfill engineering degree requirements. Prior departmental approval is required for engineering and technical elective courses. For more information, contact the International Programs Office (413-545-2710, umass.edu/ipo).

CAREER OPPORTUNITIES

The civil engineering curriculum is designed to prepare graduates for the professional practice of civil engineering and for graduate study in the field. Graduates are also prepared to maintain their state-of-the-art competency in the field throughout their careers. The curriculum provides a solid foundation of engineering principles and current engineering techniques; education in environmental, geotechnical, structural, and transportation engineering and an understanding of the interrelationship of these areas in the practice of civil engineering; an understanding of the civil engineer's responsibility to society for public health, safety, and a high-quality environment; and an understanding of civil engineers' personal responsibility to participate in and contribute to civil engineering professional and community activities throughout their careers.

THE COLLEGE OF ENGINEERING

Modern society is faced with highly complex technological problems for which engineers are asked to provide solutions. These challenges make engineering a fascinating field of study and give prospective engineering students a wonderful opportunity to make a difference in society. Along with theoretical and practical knowledge, engineering students also gain experience by working in labs, collaborating with professors, joining research projects, participating in internships, working in the field, and completing a culminating senior project. In today's high-tech world, the engineering degree is a great foundation for careers in traditional engineering fields as well as careers in management, sales, government, medicine, research, law, teaching, and more.

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