Bachelor of Science in Civil Engineering

Civil engineers design, construct, operate and maintain the physical fabric of society. In doing so, civil engineers work toward continuous improvement of the human condition and natural environment, tackling many of the grand challenges that face humankind today. Much of the work of civil engineers is highly visible, such as roadways, bridges, airports, levees, buildings, bike paths, and city parks, while other parts are rarely seen but equally vital to the health of communities, such as the water and wastewater treatment, distribution, and collection systems or the energy infrastructure. Civil engineers keep human beings safe by designing resilient infrastructure that does not fail in extraordinary events, but that is also socially, economically, and environmentally sustainable.

The civil engineering student has the opportunity to obtain a broad background in mathematics and the physical sciences and their applications to all areas of civil engineering. This flexible curriculum allows the student to elect 18 semester hours of approved technical coursework to emphasize the areas of civil engineering of most interest to the student. In addition, courses in the humanities and social sciences are included.

To excel as a civil engineer, a student should have an aptitude for mathematics and science, an interest in the practical application of technical knowledge to societal problems, the motivation to study and prepare for engineering practice, the desire to be a professional, and a desire to work with others to better the lives of humankind. Civil engineering graduates of the University may seek a wide variety of positions in planning, design, and construction with government agencies, industry, and private consulting firms. Those who plan to pursue graduate work in engineering, or in other professions such as business, medicine, law, or journalism, have an excellent base on which to build.

Student Outcomes

Graduates of the civil engineering program should attain the following outcomes:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- An ability to communicate effectively with a range of audiences
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Program Educational Objectives

Graduates of the civil engineering program should solve civil engineering problems within a greater societal context. They should:

- Exhibit character and decision-making skills embodying professionalism and ethical behavior
- Apply knowledge, strong reasoning, and quantitative skills to design and implement creative and sustainable solutions
- Engage in lifelong learning to meet evolving engineering challenges facing society
- Exhibit strong communication, critical thinking, interpersonal, and management skills as leaders and contributors in the civil engineering profession

Portable Computing Devices

Students entering Civil Engineering are required to have a laptop at their disposal. Laptops do not need to be brought to campus on a daily basis, but individual courses may require that a laptop be brought to class or lab sessions. For a list of minimum system requirements see: [www.caee.utexas.edu/students/its](http://www.caee.utexas.edu/students/its).

Curriculum

Course requirements include courses within the Cockrell School of Engineering and other required courses. In addition, each student must complete the University’s Core Curriculum. In some cases, a course required for the Bachelor of Science in Civil Engineering may also be counted toward the core curriculum; these courses are identified below.

In the process of fulfilling engineering degree requirements, students must also complete coursework to satisfy the following flag requirements: one independent inquiry flag, one quantitative reasoning flag, one ethics flag, one global cultures flag, one cultural diversity in the US flag, and two writing flags. The independent inquiry flag, the quantitative reasoning flag, the ethics flag and one writing flag are carried by courses specifically required for the degree; these courses are identified below. Students are advised to fulfill the second writing flag requirement with a course that meets another requirement of the core curriculum. Courses that may be used to fulfill flag requirements are identified in the Course Schedule.

Requirements

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Civil Engineering Courses</td>
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<tr>
<td>C E 301</td>
<td>Civil Engineering Systems</td>
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<tr>
<td>C E 311K</td>
<td>Introduction to Computer Methods</td>
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<tr>
<td>C E 311S</td>
<td>Probability and Statistics for Civil Engineers</td>
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<tr>
<td>C E 319F</td>
<td>Elementary Mechanics of Fluids</td>
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<tr>
<td>C E 321</td>
<td>Transportation Systems</td>
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<tr>
<td>C E 324P</td>
<td>Properties and Behavior of Engineering Materials</td>
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<tr>
<td>C E 329</td>
<td>Structural Analysis</td>
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<tr>
<td>C E 341</td>
<td>Introduction to Environmental Engineering</td>
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<tr>
<td>C E 356</td>
<td>Elements of Hydraulic Engineering</td>
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<tr>
<td>C E 357</td>
<td>Geotechnical Engineering</td>
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<tr>
<td>C E 370P</td>
<td>Engineering Professionalism</td>
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Architectural Engineering

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<tr>
<th>Requirements</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ARE 217</td>
<td>Computer-Aided Design and Graphics</td>
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2. Some sections of the English humanities courses (E 316L, 316M, 316N, 316P) carry a global cultures or cultural diversity flag.
3. Some sections carry a cultural diversity flag.
4. Some sections carry a global cultures and/or cultural diversity flag.

5. In UGS 302, all sections carry a writing flag. In UGS 303, some sections carry a writing flag.

**Technical Electives**

The civil engineering curriculum does not require the student to declare a specific technical area option. However, for the guidance of students with particular interests, technical electives in civil engineering are listed in areas of specialization. The 18 semester hours of technical electives must be chosen from the following civil engineering and architectural engineering courses; in special cases, with the written permission of the department chair, this requirement may be relaxed, provided the student demonstrates in advance that the courses to be substituted for civil engineering or architectural engineering courses are part of a consistent educational plan. To provide a broad general background, at least one technical elective from each of three different areas of specialization must be included in each student’s program.

One, three hour course, from the approved list of math/science/engineering electives may be substituted for a technical elective. This course does not count towards the three different area breadth requirements. The current approved list is available in the departmental undergraduate office.

The following lists reflect current course offerings and are subject to change by the faculty. Current lists are available in the departmental undergraduate office.

- **Construction Engineering and Project Management**
  - Architectural Engineering 335, Materials and Methods of Building Construction
  - Architectural Engineering 358, Cost Estimating in Building Construction
  - Architectural Engineering 366, Contracts, Liability, and Ethics (carries an ethics flag)
  - Architectural Engineering 376, Building Information Modeling for Capital Projects

- **Infrastructure Materials Engineering**
  - Civil Engineering 351, Concrete Materials
  - Civil Engineering 366K, Design of Bituminous Mixtures

- **Environmental Engineering**
  - Civil Engineering 342, Water and Wastewater Treatment Engineering
  - Civil Engineering 346, Solid Waste Engineering and Management
  - Civil Engineering 364, Design of Wastewater and Water Treatment Facilities (carries an independent inquiry flag)
  - Civil Engineering 369L, Air Pollution Engineering
  - Civil Engineering 369R, Indoor Air Quality
  - Civil Engineering 370K, Environmental Sampling and Analysis

- **Geotechnical Engineering**
  - Civil Engineering 360K, Foundation Engineering (carries an independent inquiry flag)
  - Civil Engineering 375, Earth Slopes and Retaining Structures

- **Structural Engineering**
  - Architectural Engineering 345K, Masonry Engineering
  - Architectural Engineering 362L, Structural Design in Wood
  - Civil Engineering 331, Reinforced Concrete Design
  - Civil Engineering 335, Elements of Steel Design
  - Civil Engineering 362M, Advanced Reinforced Concrete Design (carries an independent inquiry flag)
  - Civil Engineering 362N, Advanced Steel Design (carries an independent inquiry flag)
  - Civil Engineering 363, Advanced Structural Analysis
Transportation Engineering
Civil Engineering 367G, Design and Evaluation of Ground-Based Transportation Systems (carries an independent inquiry flag)
Civil Engineering 367P, Pavement Design and Performance
Civil Engineering 367T, Traffic Engineering
Civil Engineering 367R, Optimization Techniques for Transportation Engineers

Water Resources Engineering
Civil Engineering 358, Introductory Ocean Engineering
Civil Engineering 374K, Hydrology
Civil Engineering 374N, Topics in Natural Water Systems Engineering
Civil Engineering 374U, Topics in Urban Water Systems Engineering