

Civil Engineering (BSCE)

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.

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 daily, but individual courses may require that a laptop be brought to class or lab sessions. For a list of minimum system requirements see: <https://www.cae.utexas.edu/undergraduate/laptop-requirement>.

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

Total Hours Required: 124

Plan of Study

The Plan of Study is a suggested four-year course sequence to support academic planning and serves as a helpful guide. Currently enrolled students should meet with their academic advisor to tailor their course selections and timelines to their individual goals and circumstances.

Course	Title	Hours
Year 1		
Semester 1		
C E 301	Civil Engineering Systems	3
CH 301	Principles of Chemistry I	3
M 408C	Differential and Integral Calculus	4
RHE 306	Rhetoric and Writing	3
<u>First-Year Signature Course (090)</u>		3
Hours		16
Semester 2		
CH 302	Principles of Chemistry II	3
ARE 217	Computer-Aided Design and Graphics	2
M 408D	Sequences, Series, and Multivariable Calculus	4
PHY 303K	Engineering Physics I	3
PHY 105M	Laboratory For Physics 302K, 303K, and 317K	1
<u>Social and Behavioral Sciences (080)</u>		3
Hours		16
Year 2		
Semester 1		
C E 311K	Introduction to Computer Methods	3
E M 306	Statics	3
M 427J	Differential Equations with Linear Algebra	4
PHY 303L	Engineering Physics II	3
PHY 105N	Laboratory For Physics 302L, 303L, and 317L	1
<u>U.S. History (060)</u>		3
Hours		17
Semester 2		
C E 311S	Probability and Statistics for Civil Engineers	3
E M 319	Mechanics of Solids	3
C E 319F	Elementary Mechanics of Fluids	3
E S 333T	Engineering Communication	3
<u>U.S. History (060)</u>		3
Hours		15

Year 3		
Semester 1		
C E 324P	Properties and Behavior of Engineering Materials	3
Base level course		3
Base level course		3
Base level course		3
Humanities (040)		3
Hours		15
Semester 2		
E M 311M or M E 310T	Dynamics or Applied Thermodynamics	3
Base level course		3
Base level course		3
Base level course		3
Visual and Performing Arts (050)		3
Hours		15
Year 4		
Semester 1		
Technical Elective		3
Technical Elective		3
Technical Elective		3
Science elective		3
American and Texas Government (070)		3
Hours		15
Semester 2		
C E 370P	Engineering Professionalism	3
Technical Elective		3
Technical Elective		3
Technical Elective		3
American and Texas Government (070)		3
Hours		15
Total Hours		124

Requirements

All requirements are listed below, starting with the most specialized moving to the most general. Additional requirements may follow the table, so be sure to read the entire page. Some required courses listed below may also satisfy General Education requirements, including Core Curriculum.

Code	Title	Hours
Civil Engineering		
C E 301	Civil Engineering Systems	3
C E 311K	Introduction to Computer Methods	3
C E 311S	Probability and Statistics for Civil Engineers	3
C E 319F	Elementary Mechanics of Fluids	3
C E 321	Transportation Systems	3
C E 324P	Properties and Behavior of Engineering Materials	3
C E 329	Structural Analysis	3
C E 341	Introduction to Environmental Engineering	3
C E 356	Elements of Hydraulic Engineering	3
C E 357	Geotechnical Engineering	3
C E 370P	Engineering Professionalism	3
Architectural Engineering		
ARE 217	Computer-Aided Design and Graphics	2
ARE 323K	Project Management and Economics	3
Chemistry		
CH 301	Principles of Chemistry I	3
CH 302	Principles of Chemistry II	3
Engineering Mechanics		
E M 306	Statics	3

E M 319	Mechanics of Solids	3
Mathematics		
M 408C	Differential and Integral Calculus	4
M 408D	Sequences, Series, and Multivariable Calculus	4
M 427J	Differential Equations with Linear Algebra	4
Physics		
PHY 105M	Laboratory For Physics 302K, 303K, and 317K	1
PHY 105N	Laboratory For Physics 302L, 303L, and 317L	1
PHY 303K	Engineering Physics I	3
PHY 303L	Engineering Physics II	3
Additional Coursework		
E M 311M or M E 310T	Dynamics Applied Thermodynamics	3
E S 333T	Engineering Communication	3
Approved science elective		3
Technical Electives		18
Free electives: Additional coursework to reach total hours required.		0
<i>Subtotal</i>		<i>97</i>
General Education		
Remaining Core Curriculum (42 hours total)		27
Foreign Language other than English, Beginning Proficiency		
<i>Subtotal</i>		<i>27</i>
College Requirements - Engineering		
General University Requirements		
Total Hours		124

Additional Requirements and Policies

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 course lists tab reflects 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

Code	Title	Hours
ARE 335	Materials and Methods of Building Construction	3
ARE 358	Cost Estimating in Building Construction	3
ARE 366	Contracts, Liability, and Ethics	3
ARE 376	Building Information Modeling for Capital Projects	3

Infrastructure Materials Engineering

Code	Title	Hours
C E 351	Concrete Materials	3
C E 366K	Design of Bituminous Mixtures	3

Environmental Engineering

Code	Title	Hours
ARE 346N	Building Environmental Systems	3
C E 342	Water and Wastewater Treatment Engineering	3
C E 346	Solid Waste Engineering and Management	3
C E 364	Design of Wastewater and Water Treatment Facilities	3
C E 369L	Air Pollution Engineering	3
C E 369R	Indoor Air Quality	3
C E 370K	Environmental Sampling and Analysis	3
C E 370L	Climate Change Mitigation	3

Geotechnical Engineering

Code	Title	Hours
C E 360K	Foundation Engineering	3
C E 375	Earth Slopes and Retaining Structures	3

Structural Engineering

Code	Title	Hours
ARE 345K	Masonry Engineering	3
ARE 362L	Structural Design in Wood	3
C E 331	Reinforced Concrete Design	3
C E 335	Elements of Steel Design	3
C E 362M	Advanced Reinforced Concrete Design	3
C E 362N	Advanced Steel Design	3
C E 363	Advanced Structural Analysis	3

Transportation Engineering

Code	Title	Hours
C E 367G	Design and Evaluation of Ground-Based Transportation Systems	3
C E 367P	Pavement Design and Performance	3
C E 367T	Traffic Engineering	3
C E 367R	Optimization Techniques for Transportation Engineers	3

Water Resources Engineering

Code	Title	Hours
C E 358	Introductory Ocean Engineering	3
C E 374K	Hydrology	3
C E 374N	Topics in Natural Water Systems Engineering	3
C E 374U	Topics in Urban Water Systems Engineering	3