Bachelor of Science in Environmental Engineering

Environmental Engineers protect the natural environment and the health of people as influenced by the environment. The field began as a part of civil engineering by providing the water supply for municipalities but has grown to encompass a broad view of the interaction of humans with the environment. The environmental engineer applies principles from all of the natural sciences (physics, chemistry, geology, and biology) to understand the natural environment and to build systems that protect that environment. Areas of environmental engineering include air quality, water quality, water resources, and contaminant process engineering.

The environmental engineering student obtains a broad background in mathematics and all the sciences, along with their application to the several areas of environmental engineering. This flexible curriculum allows the student to elect 18 semester hours of approved technical coursework to emphasize the areas of environmental engineering of most interest to the student. In addition, courses in the humanities and social sciences are included.

To excel as an environmental engineer, a student should have an aptitude for mathematics and science, an abiding interest in protecting the natural environment and public health, and the motivation to study and prepare for environmental engineering practice. Environmental engineering graduates of the University may seek a wide variety of employment opportunities with private consulting firms, industry, and government agencies at the local, state, and national levels. 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 environmental 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 environmental engineering program should address environmental 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 environmental engineering profession

Portable Computing Devices

Students entering Environmental 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 the Cockrell School of Engineering website.

Curriculum

Each student must complete the University’s Core Curriculum. In some cases, a course required for the Bachelor of Science in Environmental Engineering may also be counted toward the core curriculum; these courses are identified below. To ensure that courses used to fulfill the social and behavioral sciences and visual and performing arts requirements of the core curriculum also meet ABET criteria, students should follow the guidance given in ABET Criteria.

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 flag requirements with a course that meets other requirements of the degree. Courses that may be used to fulfill flag requirements are identified in the Course Schedule.

Math, science and engineering electives are chosen from a list of approved courses maintained in the undergraduate office.

Requirements

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>EVE 103</td>
<td>First-Year Seminar</td>
<td>1</td>
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<tr>
<td>EVE 302</td>
<td>Foundations of Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EVE 310</td>
<td>Sustainable Systems Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EVE 312</td>
<td>Environmental Engineering and Science</td>
<td>3</td>
</tr>
<tr>
<td>Approved environmental engineering elective</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Approved environmental engineering design elective</td>
<td></td>
<td>3</td>
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Architectural Engineering

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<th>Course</th>
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<tbody>
<tr>
<td>ARE 323K</td>
<td>Project Management and Economics</td>
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Biology

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<tr>
<th>Course</th>
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<tbody>
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<td>BIO 311C</td>
<td>Introductory Biology I</td>
<td>3</td>
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Chemistry

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<tr>
<th>Course</th>
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### CH 301
Principles of Chemistry I (part I science and technology) 3

### CH 302
Principles of Chemistry II (part I science and technology) 3

### CH 204
Introduction to Chemical Practice 2

### CH 328M
Organic Chemistry I 3

### Civil Engineering

#### 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 356
Elements of Hydraulic Engineering 3

### Engineering Mechanics

#### E M 306
Statics 3

### Geology

#### GEO 303
Introduction to Geology 3

### Mathematics

#### M 408C
Differential and Integral Calculus (mathematics; quantitative reasoning flag) 4

#### M 408D
Sequences, Series, and Multivariable Calculus 4

#### M 427J
Differential Equations with Linear Algebra (quantitative reasoning flag) 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 (part II science and technology) 3

#### PHY 303L
Engineering Physics II 3

### Other Required Courses

#### E S 333T
Engineering Communication (writing flag; ethics flag) 3

#### M E 310T or M E 326 or CH 353
Applied Thermodynamics, Thermodynamics, Physical Chemistry I 3

### Approved mathematics or science elective 3

### Approved engineering elective 6

### Remaining Core Curriculum Courses

#### RHE 306
Rhetoric and Writing 3

#### E 316L or E 316M or E 316N or E 316P
British Literature, American Literature, World Literature, Masterworks of Literature 3

#### American and Texas Government 2

#### American History 2

#### Social and behavioral science 3

#### Visual and performing arts 3

#### UGS 302 or UGS 303
First-Year Signature Course 3

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1. Some sections of the English humanities courses (E 316L, 316M, 316N, 316P) carry a global cultures or cultural diversity flag.

2. Some sections carry a cultural diversity flag.

3. Some sections carry a global cultures and/or cultural diversity flag.

4. In UGS 302 all sections carry a writing flag; in UGS 303 some sections carry a writing flag.

**Total Hours: 125**

### Technical Electives

Technical electives in environmental engineering are listed in four areas of specialization below. Six semester credit hours must be selected from one of the technical areas along with an approved environmental engineering design elective. Approved environmental engineering design electives are chosen from a list of approved courses maintained in the undergraduate office. The remaining environmental engineering electives can be taken from any area or combination of areas. Courses not listed can be approved by the undergraduate advisor.

#### Area 1, Climate and Energy

- Architectural Engineering 346N, Building Environmental Systems
- Architectural Engineering 346P, HVAC Design
- Architectural Engineering 370, Design of Energy Efficient and Healthy Buildings
- Architectural Engineering 371, Energy Simulation in Building Design
- Architectural Engineering 372, Modeling of Air and Pollutant Flows in Buildings
- Civil Engineering 369L, Air Pollution Engineering
- Civil Engineering 369R, Indoor Air Quality

#### Area 2, Sustainable Water Systems

- Civil Engineering 342, Water and Wastewater Treatment Engineering
- Civil Engineering 346, Solid Waste Engineering and Management
- Environmental Engineering 350, Environmental Chemistry for a Sustainable World

#### Area 3, Water Resources and the Environment

- Civil Engineering 374K, Hydrology
- Civil Engineering 357, Geotechnical Engineering
- Civil Engineering 358, Introductory Ocean Engineering
- Civil Engineering 374N, Topics in Natural Water Systems Engineering
- Civil Engineering 374U, Topics in Urban Water Systems Engineering

#### Area 4, Contaminant Fate and Transport

- Chemical Engineering 319, Transport Phenomena
- Civil Engineering 342, Water and Wastewater Treatment Engineering
- Chemical Engineering 322, Thermodynamics