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		Hours
Environmental Engineering		
EVE 103	First-Year Seminar	1
EVE 302	Foundations of Environmental Engineering	3
EVE 310	Sustainable Systems Engineering	3
EVE 312	Environmental Engineering and Science	3
Approved environmental engineering elective		15
Approved environmental engineering design elective (may carry an independent inquiry flag)		3
Architectural Engineering		
ARE 323K	Project Management and Economics	3
Biology		
BIO 311C	Introductory Biology I	3

Chemistry		
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 (quantitative reasoning flag)	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	Applied Thermodynamics	3
or M E 326	Thermodynamics	
or CH 353	Physical Chemistry I	
Approved mathematics or science elective		3
Approved engineering elective		6
Remaining Core Curriculum Courses		
RHE 306	Rhetoric and Writing	3
E 316L	British Literature [1]	3
or E 316M	American Literature	
or E 316N	World Literature	
or E 316P	Masterworks of Literature	
American and Texas Government [2]		6
American History [2]		6
Social and behavioral science [3]		3
Visual and performing arts [3]		3
UGS 302	First-Year Signature Course [4]	3
or UGS 303	First-Year Signature Course	
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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*

Architectural Engineering 377K, *Studies in Architectural Engineering*

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*