

ENVIRONMENTAL ENGINEERING MAJOR (B.S.)

<https://ceps.unh.edu/civil-environmental-engineering/program/bs/environmental-engineering-major>

Description

The Environmental Engineering program is accredited by the:

Engineering Accreditation Commission of ABET
111 Market Place
Suite 1050
Baltimore, MD 21202-4012,
(410) 347-7700
<http://www.abet.org>

Environmental engineers graduating with a B.S. EnvE degree will plan, design, and construct public and private facilities to minimize the impact of human activity on the environment and to protect human health. For example, environmental engineers design and build drinking water treatment systems, municipal and industrial wastewater treatment plants, solid waste management facilities, contaminated ground water remediation systems, and hazardous waste remediation facilities. These facilities must meet regulatory requirements, be cost effective to build and maintain, be safe to operate, and have minimal environmental impact. EnvE students can also focus on sustainable engineering with a required course (CEE 705 Introduction to Sustainable Engineering) in junior year and two or three senior year electives, including design electives.

In CEE 420 Environmental Engineering Lectures I, students are introduced to the full spectrum of environmental engineering projects that they will subsequently explore in design teams during their degree program. In (CEE 520 Environmental Pollution and Protection: A Global Context), students tour field sites and through junior and senior year classes and student organizations (ASCE, EWRI, EWB), they interact with engineers who talk about engineering consulting and design practices applied to local projects. As part of these projects, students:

1. analyze treatment alternatives;
2. recommend a system that meets regulatory operational needs, and is sustainable; and
3. prepare an implementation schedule and project budget.

Design projects are performed in CEE 731 Advanced Water Treatment Processes and a minimum of two design electives. CEE 797 Introduction to Project Planning and Design/ and CEE 798 Project Planning and Design/ serve as a capstone design experience where students work on a multi-disciplinary environmental engineering project and apply skills learned in other courses while working with real-world problems/ clients. EnvE students do not have to take a course in the Discovery Biological Science category since they satisfy this category with CEE 724 Environmental Engineering Microbiology.

At the end of the sophomore year, students are required to have a minimum overall grade-point average of 2.00 and a minimum grade-point average of 2.00 in the following to be permitted to enroll in junior-level courses:

Code	Title	Credits
CEE 420	Environmental Engineering Lectures I	3
MATH 425	Calculus I	4
CHEM 405	Chemical Principles for Engineers	4
PHYS 407	General Physics I	4
MATH 426	Calculus II	4
CEE 500	Statics for Civil Engineers	3
CEE 520	Environmental Pollution and Protection: A Global Context	4

To qualify for graduation, an EnvE major must: have satisfied the previously specified course requirements, have satisfied the University's Academic Requirements, have a minimum cumulative grade-point average of 2.00, and have a minimum grade-point average of 2.00 in engineering courses.

Requirements

These are the required major courses. For a full listing of the requirements within the four years of study please refer to the degree plan tab.

Code	Title	Credits
CEE 402	2D Computer Aided Design	3
CEE 420	Environmental Engineering Lectures I	3
CEE 500	Statics for Civil Engineers	3
CEE 502	Project Engineering	3
CEE 520	Environmental Pollution and Protection: A Global Context	4
CEE 620	Fundamental Aspects of Environmental Engineering	4
CEE 650	Fluid Mechanics	4
CEE 705	Introduction to Sustainable Engineering	3
CEE 720	Solid and Hazardous Waste Engineering	3
CEE 721	Environmental Sampling and Analysis	4
CEE 723	Environmental Water Chemistry	4
CEE 724	Environmental Engineering Microbiology	4
CEE 731	Advanced Water Treatment Processes	4
CEE 797	Introduction to Project Planning and Design	2
CEE 798	Project Planning and Design	2
CHEM 405	Chemical Principles for Engineers	4
ENGL 502	Professional and Technical Writing	4
ESCI 654	Fate and Transport in the Environment	4
MATH 425	Calculus I	4
MATH 426	Calculus II	4
MATH 527	Differential Equations with Linear Algebra	4
MATH 644	Statistics for Engineers and Scientists	4
PHYS 407	General Physics I	4

CEE Electives (lists are subject to change, check with advisor)

1. For Design and Non-Design, four courses are required, two of which must be Design, and total credits at least 12.
2. One course is required from each of the other sections.
3. Hydraulics, hydrology and public health electives cannot be used to cover more than one category.

Design Electives:

Code	Title	Credits
CEE 719	Green Building Design	3
CEE 730	Public Health Engineering for Rural and Developing Communities	3
CEE 732	Solid and Hazardous Waste Design	4
CEE 733	Public Infrastructure Asset Management	4
CEE 734	Bioenvironmental Engineering Design	4
CEE 755	Design of Pressurized Water Transmission Systems	4

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CEE 758	Stormwater Management Designs	3
CEE 759	Stream Restoration	4

Non-Design Electives:

Code	Title	Credits
CEE 706	Environmental Life Cycle Assessment	3
CEE 722	Introduction to Marine Pollution and Control	4
CEE #750	Ecohydrology	3
CEE 751	Open Channel Flow	3
CEE 754	Engineering Hydrology	3
CEE #757	Coastal Engineering and Processes	3
CEE 768	Geo-Environmental Engineering	3
SAFS 632	Urban Agriculture	4
CHE 709	Fundamentals of Air Pollution and Its Control	4

CEE Lab Electives: One course required

Code	Title	Credits
CEE 665	Soil Mechanics	4
CEE 721	Environmental Sampling and Analysis	4

Geospatial Electives: One course required

Code	Title	Credits
CEE 403	GIS for Civil and Environmental Engineering	3
FORT 581	Applied Geospatial Techniques	4
NR 658	Introduction to Geographic Information Systems	4
NR 757	Remote Sensing of the Environment	4

Hydraulics Electives: One course required

Code	Title	Credits
CEE 755	Design of Pressurized Water Transmission Systems	4
CEE 758	Stormwater Management Designs	3
CEE 759	Stream Restoration	4
CEE 751	Open Channel Flow	3
CEE 754	Engineering Hydrology	3
CEE #757	Coastal Engineering and Processes	3

Hydrology Electives: One course required

Code	Title	Credits
CEE #750	Ecohydrology	3
CEE 754	Engineering Hydrology	3
ESCI 705	Principles of Hydrology	4
ESCI 710	Groundwater Hydrology	4

Public Health Electives: One course required

Code	Title	Credits
HMP 403	Introduction to Public Health	4
HMP 444A	Global Public Health Issues	4
HMP 501	Epidemiology and Community Medicine	4
HMP 715	Environmental Health	4
CEE 730	Public Health Engineering for Rural and Developing Communities	3

Degree Plan

The following schedule is a sample of a planned program for environmental engineering students completing the major.

Course	Title	Credits
First Year		
Fall		
CEE 420	Environmental Engineering Lectures I	3
ENGL 401	First-Year Writing	4

MATH 425	Calculus I ¹	4
CHEM 405	Chemical Principles for Engineers	4
Discovery Electives ²		4
Credits		19

Spring

ENGL 502	Professional and Technical Writing	4
MATH 426	Calculus II ¹	4
PHYS 407	General Physics I	4
Discovery Electives ²		4
Credits		16

Second Year

Fall

CEE 402	2D Computer Aided Design	3
CEE 500	Statics for Civil Engineers	3
CEE 520	Environmental Pollution and Protection: A Global Context	4
MATH 527	Differential Equations with Linear Algebra	4
Discovery Elective		4
Credits		18

Spring

MATH 644	Statistics for Engineers and Scientists	4
CEE 502	Project Engineering	3
Discovery Elective		4
Public Health Elective		4
Discovery or Geospatial Course		4
Credits		19

Third Year

Fall

CEE 650	Fluid Mechanics	4
CEE 705	Introduction to Sustainable Engineering	3
CEE 720	Solid and Hazardous Waste Engineering	3
ESCI 654	Fate and Transport in the Environment	4
Credits		14

Spring

CEE 620	Fundamental Aspects of Environmental Engineering	4
CEE 724	Environmental Engineering Microbiology	4
Hydrology Elective ⁴		3-4
Discovery		4
Credits		15-16

Fourth Year

Fall

CEE 721	Environmental Sampling and Analysis	4
CEE 723	Environmental Water Chemistry	4
CEE 797	Introduction to Project Planning and Design	2
CEE Design Electives (2)		6-8
Credits		16-18

Spring

CEE 731	Advanced Water Treatment Processes	4
CEE 798	Project Planning and Design	2
CEE Electives (2)		6-8

Hydraulics Elective	3-4
Credits	15-18
Total Credits	132-138

- ¹ Students who are required to take MATH 418 Analysis and Applications of Functions because they did not pass the placement examination as determined by the Mathematics Department prior to the fall semester, will enroll in MATH 425 Calculus I during the spring semester. Subsequent MATH courses (MATH 426 Calculus II, MATH 527 Differential Equations with Linear Algebra, MATH 644 Statistics for Engineers and Scientists) will be taken one semester later than shown here.
- ² See Discovery Program requirements. The Discovery requirements for Writing, Quantitative Reasoning, and Physical Science are fulfilled by ENGL 401 First-Year Writing, MATH 425 Calculus I, and PHYS 407 General Physics I, respectively. CEE 520 Environmental Pollution and Protection: A Global Context fulfills the Environmental, Technology, and Society requirement. CEE 797 Introduction to Project Planning and Design and CEE 798 Project Planning and Design fulfill the Senior Capstone requirement. Environmental Engineering Microbiology fulfills the Biological Science requirement. Courses in the EnvE curriculum designated Discovery Electives can be selected from the University's approved Discovery Program courses in Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures, and Social Science. One of these electives must have an Inquiry attribute.
- ³ Approved lists of technical, hydrology, hydraulics, and design and non-design electives are available from the EnvE administrator, Paula Mouser. Students must take a minimum of four 700-level CEE electives totaling at least 12 credits. A minimum of two CEE elective courses must be from the design category.

The EnvE program requires a minimum of 132 total credits for graduation.

Student Learning Outcomes

- To have obtained a working knowledge in the environmental engineering areas of water and wastewater treatment, environmental health and safety, solid and hazardous waste engineering, sustainability, and water resources.
- To be able to locate, assess, and compile data, and to conduct experiments to gather data, and analyze and interpret data using engineering judgement to draw conclusions.
- To have an ability to acquire and apply new knowledge, techniques, skills, and software necessary for engineering practice.
- To be able to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, use project management skills to establish goals, plan tasks, and meet objectives.
- To be able to effectively communicate and support ideas in documents and presentations to a range of audiences.
- To be able to apply principles of mathematics, science, and engineering to identify, formulate, and solve complex engineering problems.
- To have been prepared for the Fundamentals of Engineering examination and understand the importance of professional licensure.
- To have 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, social, economic, public policy, and environmental issues.

- To recognize the roles and responsibilities of public institutions, private organization, and businesses in project development, management, and regulatory compliance.
- To be able 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.