

ENVIRONMENTAL ENGINEERING, BACHELOR OF SCIENCE

The Department of Civil and Environmental Engineering offers a complete environmental engineering undergraduate program to students on the Lincoln and Omaha campuses of the University of Nebraska. Curriculum requirements are nearly identical on both campuses. The goal is to prepare students for entry into the environmental engineering profession immediately after graduation or to pursue graduate-level studies.

The general educational objectives of the University of Nebraska–Lincoln environmental engineering undergraduate program are to prepare our graduates so that, with a UNL BS ENVE degree, a few years beyond graduation, alumni will:

- Be employed in environmental engineering or a closely related field and successfully pursue professional licensure; or, graduates will be pursuing an advanced degree in environmental engineering, a closely related field or professional education in engineering, medicine, business, or law.
- Contribute to society and address societal and environmental needs through engagement in professional, community, or service organizations.
- Agree that the environmental engineering program prepared them for success in their careers in terms of knowledge and skillsets as embodied in the program and the Complete Engineer™ Initiative.

The professional discipline of environmental engineering is defined as the application of engineering principles to improve and maintain the environment for the protection of human health, for the protection of nature's beneficial ecosystems, and for environment-related enhancement of the quality of human life. In all professional endeavors, the environmental engineer must consider ecological effects as well as the social, economic, and political needs of people.

The environmental engineer devises solutions for topics ranging from water and air pollution control and treatment, drinking water supply, wastewater management, solid waste management, public health, water resources management, sustainable design, and industrial ecology. Environmental engineers focus on minimizing the impacts of air, water, and land pollution, minimizing waste production, maximizing the use of renewable energy in environmental systems, and protecting the environment.

Instructional emphasis is placed on fundamental engineering principles derived from mathematics, chemistry, physics, biology, earth science, and engineering science. These subjects provide a sound background for the subsequent introductory courses in environmental engineering, water resources engineering, fate and transport, process design, and sustainable design. Students are introduced to design concepts in the freshman year. Design is incorporated throughout the curriculum that culminates in two senior-level courses, CIVE 385 Professional Practice and Management in Civil Engineering and CIVE 489 Senior Design Project.

Instructional laboratories in that provide experiences with more than one media (water, soil, and air) in environmental engineering provide each student with an opportunity to learn, through individual participation.

Professional Admission to Environmental Engineering

Criteria for Professional Admission to the Environmental Engineering Degree Program

Pre-professionally admitted College of Engineering students majoring in environmental engineering must have their academic records reviewed for

professional admission to the environmental engineering degree program during the fall, spring or summer immediately following the term in which:

- At least 12 credits (one semester) have been completed after admission to the College of Engineering;
- At least 43 credits applicable to the degree have been earned; and
- PHYS 2110 General Physics I, MECH 223 Engineering Statics, and MECH 325 Mechanics of Elastic Bodies or MECH 373 Engineering Dynamics have been completed.

Additionally, the student can have no more than two declined professional admission requests to other engineering majors. It is likely a student may need to complete four full semesters of credits applying to the program before these requirements are able to be completed.

Professional admission approval to the environmental engineering degree program also requires that all of the following departmental-specific criteria must be met:

- Earn a C letter grade or better in PHYS 2110, MECH 223, and MECH 373 or MECH 325
- Earn a cumulative grade point average of 2.4 or greater; and
- Earn a C letter grade or better in ALL math, science and engineering courses required for the bachelor of science in environmental engineering degree if the cumulative grade point average is less than 2.700.

Students approved for professional admission to the program are then allowed to take 400-level civil & environmental engineering courses to complete their degree.

Requirements

(City Campus in Lincoln and Scott Campus in Omaha)

This document represents a SAMPLE 4-year plan for degree completion with this major. Actual course selection and sequence may vary and should be discussed individually with your college or department academic advisor. Advisors also can help you plan other experiences to enrich your undergraduate education such as internships, education abroad, undergraduate research, learning communities, and service learning and community-based learning.

Students must have completed the equivalent of the fourth semester before admission to the environmental engineering program. Transfer students must have all transfer hours accepted before being considered for the degree program.

Course	Title	Credits
First Semester		
ENVE 101	INTRODUCTION TO ENVIRONMENTAL ENGINEERING	3
CHEM 1180	GENERAL CHEMISTRY I	3
CHEM 1184	GENERAL CHEMISTRY I LABORATORY	1
MATH 1950	CALCULUS I	5
ACE 2 Communication Skills Elective		3
ENGR 10	FRESHMAN ENGINEERING SEMINAR	0
		Credits
		15
Second Semester		
CIST 1600	INTRODUCTION TO PROGRAMMING USING PRACTICAL SCRIPTING	3
CHEM 1190	GENERAL CHEMISTRY II	3
PHYS 2110	GENERAL PHYSICS I - CALCULUS LEVEL	4
MATH 1960	CALCULUS II	4
ACE 1 Writing Elective		3
		Credits
		17

Third Semester

ENVE 210	FUNDAMENTALS OF ENVIRONMENTAL ENGINEERING	3
MECH 223	ENGINEERING STATICS	3
BIOL 1020	PRINCIPLES OF BIOLOGY	4
MATH 1970	CALCULUS III	4
ACE 5 Humanities Elective		3
ENGR 20	SOPHOMORE ENGINEERING SEMINAR	0

Credits **17**

Fourth Semester

CIVE 321	PRINCIPLES OF ENVIRONMENTAL ENGINEERING	3
MECH 373 or MECH 325	ENGINEERING DYNAMICS or MECHANICS OF ELASTIC BODIES	3
GEOL 1010 or GEOL 1170	ENVIRONMENTAL GEOLOGY or INTRODUCTION TO PHYSICAL GEOLOGY	3
MATH 2350	DIFFERENTIAL EQUATIONS	3
ACE 6 Social Sciences Elective		3

Credits **15**

Fifth Semester

CIVE 310	FLUID MECHANICS	3
ENVE 322	BIOLOGICAL PRINCIPLES OF ENVIRONMENTAL ENGINEERING	2
CIVE 321L	ENVIRONMENTAL ENGINEERING LABORATORY	1
STAT 3800	APPLIED ENGINEERING PROBABILITY AND STATISTICS	3
ACE 7 Arts Elective		3
ACE 8 Ethics Elective		3

Credits **15**

Sixth Semester

ENVE 410	ENVIRONMENTAL FATE AND TRANSPORT	3
CIVE 352		3
CIVE 424 or CHME 4890	SOLID WASTE MANAGEMENT ENGINEERING or AIR POLLUTION, ASSESSMENT AND CONTROL	3
CHEM 2210 & CHEM 2214	FUNDAMENTALS OF ORGANIC CHEMISTRY and FUNDAMENTALS OF ORGANIC CHEMISTRY LABORATORY	5
MECH 200	ENGINEERING THERMODYNAMICS	3

Credits **17**

Seventh Semester

ENVE 430	SUSTAINABLE DESIGN IN ENVIRONMENTAL ENGINEERING	3
CIVE 385	PROFESSIONAL PRACTICE AND MANAGEMENT IN CIVIL ENGINEERING	3
CIVE 420	ENVIRONMENTAL ENGINEERING PROCESS DESIGN	3
ACE 9 Global Awareness and Human Diversity Elective		3
Environmental Engineering Elective		3

Credits **15**

Eighth Semester

CIVE 419 or CIVE 452	FLOW SYSTEMS DESIGN or WATER RESOURCES DEVELOPMENT	3
CIVE 489	SENIOR DESIGN PROJECT	3

Environmental Engineering Elective	3
Technical Electives	5
Credits	14
Total Credits	125

A list of approved ACE courses offered on the Omaha campus can be found here (https://tes.collegesource.com/publicview/TES_publicview03_group_report.aspx?sid=12214&rid=1d4a5187-e01b-4f1f-aaa6-b0040e957167&aid=e4ff42df-9ddc-4416-a5dd-18e971d1c0e4&cgrid=5508).

For more information, call 402-554-2462 or visit www.engineering.unl.edu/civil/ (<http://www.engineering.unl.edu/civil/>)

Major Requirements

Requirements for the Degree of Bachelor of Science in Environmental Engineering

The BS degree in environmental engineering is offered on both the Lincoln and Omaha campuses. Degree Requirements - 125 hours

Code	Title	Credits
ENVIRONMENTAL ENGINEERING CORE		
ENVE 101	INTRODUCTION TO ENVIRONMENTAL ENGINEERING	3
ENVE 210	FUNDAMENTALS OF ENVIRONMENTAL ENGINEERING	3
ENVE 322	BIOLOGICAL PRINCIPLES OF ENVIRONMENTAL ENGINEERING	2
ENVE 410	ENVIRONMENTAL FATE AND TRANSPORT	3
ENVE 430	SUSTAINABLE DESIGN IN ENVIRONMENTAL ENGINEERING	3
ENVE 401	ENVIRONMENTAL ENGINEERING DESIGN I	3
ENVE 402	ENVIRONMENTAL ENGINEERING DESIGN II	3
Credit Hours Subtotal		20
CIVIL AND ENVIRONMENTAL ENGINEERING		
CIVE 310	FLUID MECHANICS	3
CIVE 321	PRINCIPLES OF ENVIRONMENTAL ENGINEERING	3
CIVE 321L	ENVIRONMENTAL ENGINEERING LABORATORY	1
CIVE 352		3
CIVE 420	ENVIRONMENTAL ENGINEERING PROCESS DESIGN	3
CIVE 419 or CIVE 452	FLOW SYSTEMS DESIGN WATER RESOURCES DEVELOPMENT	3
CIVE 424	SOLID WASTE MANAGEMENT ENGINEERING	3
or CHME 4890	AIR POLLUTION, ASSESSMENT AND CONTROL	
Credit Hours Subtotal		19
GENERAL ENGINEERING		
CIST 1600	INTRODUCTION TO PROGRAMMING USING PRACTICAL SCRIPTING	3
MECH 223	ENGINEERING STATICS	3
MECH 325 or MECH 373	MECHANICS OF ELASTIC BODIES ENGINEERING DYNAMICS	3
MECH 200	ENGINEERING THERMODYNAMICS	3
ENGR 10	FRESHMAN ENGINEERING SEMINAR	0

ENGR 20	SOPHOMORE ENGINEERING SEMINAR	0
Credit Hours Subtotal		12
ENVIRONMENTAL ENGINEERING ELECTIVES		
Choose a total of six credits of courses not used to satisfy another degree requirement from the following list of courses:		6
CHME 4890	AIR POLLUTION, ASSESSMENT AND CONTROL	
CIVE 331	Introduction to Geotechnical Engineering	
CIVE 371	Materials of Construction	
CIVE 419	Flow Systems Design	
CIVE 422	POLLUTION PREVENTION: PRINCIPLES AND PRACTICES	
CIVE 424	Solid Waste Management Engineering	
CIVE 426	DESIGN OF WATER TREATMENT FACILITIES	
CIVE 427	DESIGN OF WASTEWATER TREATMENT AND DISPOSAL FACILITIES	
CIVE 430	FUNDAMENTALS OF WATER QUALITY MODELING	
CIVE 452	WATER RESOURCES DEVELOPMENT	
CIVE 454	HYDRAULIC ENGINEERING	
CIVE 455	NONPOINT SOURCE POLLUTION CONTROL ENGINEERING	
CIVE 456	SURFACE WATER HYDROLOGY	
CIVE 458	GROUNDWATER ENGINEERING	
CIVE 475	WATER QUALITY STRATEGY	
CIVE 481	COMPUTATIONAL PROBLEM SOLVING IN CIVIL ENGINEERING	
Credit Hours Subtotal		6
TECHNICAL ELECTIVES		
Choose a total of six credits from:		6
Any 400-level CIVE course not taken to fulfill another requirement		
Any 200-, 300- or 400-level course in any engineering major not used to fulfill another requirement		
Any 200-, 300- or 400-level course in Biology, Chemistry, Public Administration (including PA 1010), Geology, GEOG 2620, Mathematics, Statistics, or Physics not used to fulfill another requirement.		
Any course in the following list: ACCT 2000, ANTH 3910, ANTH 3920, BIOL 1020, BIOL 1450, BIOL 1750, CHEM 1180, CHEM 1190, ECON 2200, ENTR 3710, GEOG 1030, (GEOG 3510 and GEOG 3514), GEOL 1170, GEOL 1180, GEOL 1010, MKT 3310 not used to fulfill another requirement.		
Credit Hours Subtotal:		6
SCIENCE		
CHEM 1180 & CHEM 1184	GENERAL CHEMISTRY I and GENERAL CHEMISTRY I LABORATORY	4
CHEM 1190	GENERAL CHEMISTRY II	3
CHEM 2210 & CHEM 2214	FUNDAMENTALS OF ORGANIC CHEMISTRY and FUNDAMENTALS OF ORGANIC CHEMISTRY LABORATORY (The 1 credit for CHEM 2214 can be used as a Technical Elective.)	5
BIOL 1020	PRINCIPLES OF BIOLOGY	4
GEOL 1010 or GEOL 1170	ENVIRONMENTAL GEOLOGY INTRODUCTION TO PHYSICAL GEOLOGY	3
PHYS 2110	GENERAL PHYSICS I - CALCULUS LEVEL	4

Credit Hours Subtotal		22
MATHEMATICS		
MATH 1950	CALCULUS I	5
MATH 1960	CALCULUS II	4
MATH 1970	CALCULUS III	4
MATH 2350	DIFFERENTIAL EQUATIONS	3
STAT 3800	APPLIED ENGINEERING PROBABILITY AND STATISTICS	3
Credit Hours Subtotal		19
ACE REQUIREMENTS		
ACE 1: Writing		3
Choose from the list of approved ACE 1 courses ¹		
ACE 2: Communication Skills		3
Choose from the list of approved ACE 2 courses ¹		
ACE 3: Math/Stat Reasoning		
This requirement is satisfied by MATH 1950, MATH 1960, MATH 1970, MATH 2350, or STAT 3800		
ACE 4: Science		
This requirement is satisfied by CHEM 1180, CHEM 1190, PHYS 2110, BIOL 1020, GEOL 1010, or GEOL 1170		
ACE 5: Humanities		3
Choose from the list of approved ACE 5 courses ¹		
ACE 6: Social Sciences		3
Choose from the list of approved ACE 6 courses ¹		
ACE 7: Arts		3
Choose from the list of approved ACE 7 courses ¹		
ACE 8: Ethics		
Choose from the list of approved ACE 8 courses ¹		
ACE 9: Global Awareness and Human Diversity		3
Choose from the list of approved ACE 9 courses ¹		
ACE 10: Capstone Experience		
This requirement is satisfied by ENVE 402		
Credit Hours Subtotal:		21
Total Credit Hours		125

¹ A list of approved ACE courses offered on the Omaha campus can be found here (https://tes.collegesource.com/publicview/TES_publicview03_group_report.aspx?sid=12214&rid=1d4a5187-e01b-4f1f-aaa6-b0040e957167&aid=e4ff42df-9ddc-4416-a5dd-18e971d1c0e4&cgrid=5508).

ENVE 101 INTRODUCTION TO ENVIRONMENTAL ENGINEERING (3 credits)

Introduction to engineering design process through hands-on projects supported by instruction of underlying engineering science and fundamentals, model development, and the required tools. Be exposed to environmental engineering to know what it means to be an environmental engineer and an introduction to environmental engineering profession with focus on ethics.

ENVE 210 FUNDAMENTALS OF ENVIRONMENTAL ENGINEERING (3 credits)

Introduction to material and energy balances on environmental systems involving physical, chemical, and biological processes. Primary focus on single phase systems.

Prerequisite(s): CHEM 1180 with a C or better, and MATH 1950 with a C or better

ENVE 322 BIOLOGICAL PRINCIPLES OF ENVIRONMENTAL ENGINEERING (2 credits)

Introduction to the basics of microbes in the environment, including basic microbiological concepts, microbial environment, detection/enumeration/identification of microbes, microbial interactions with environment, microbial remediation of pollutants, waterborne pathogens, and wastewater treatment and disinfection.

Prerequisite(s): CIVE 321

ENVE 401 ENVIRONMENTAL ENGINEERING DESIGN I (3 credits)

Practical application of the engineering design process in a team project focused on an authentic and comprehensive environmental engineering design project.

Prerequisite(s): CIVE 321, ENVE 322, CIVE 352

ENVE 402 ENVIRONMENTAL ENGINEERING DESIGN II (3 credits)

Practical application of the engineering design process in a team project focused on an authentic and comprehensive environmental engineering design project.

Prerequisite(s): ENVE 401

ENVE 410 ENVIRONMENTAL FATE AND TRANSPORT (3 credits)

Covers fate and transport principles, such as interphase chemical equilibrium, the formulation and application of the advection-diffusion equation, and their specific environmental engineering applications.

Prerequisite(s): CIVE 310 or CHME 332; ENVE 210 or CHME 202; and CIVE 321

ENVE 430 SUSTAINABLE DESIGN IN ENVIRONMENTAL ENGINEERING (3 credits)

Introduction to sustainability concepts and sustainable engineering design processes for environmental engineers such as life cycle assessment, multi-criteria decision analysis, and analysis of renewable energy systems.

Prerequisite(s): CIVE 321; Co-requisite STAT 3800

ENVE 898 SPECIAL PROBLEMS IN ENVIRONMENTAL ENGINEERING (1-6 credits)

Special research-oriented problems in current topics in environmental engineering.

Prerequisite(s): Permission.

ENVE 899 MASTER'S THESIS (1-10 credits)

Master's thesis work

ENVE 990 SEMINAR IN ENVIRONMENTAL ENGINEERING (1 credit)

Presentation and discussion of current research topics and projects in environmental engineering and closely allied areas.

Prerequisite(s): Permission. Not open to non-degree graduate students.

ENVE 998 SPECIAL TOPICS IN ENVIRONMENTAL ENGINEERING (1-6 credits)

Independent library and/or experimental research, analysis, evaluation and presentation of current and advanced topics in environmental engineering and closely related areas.

Prerequisite(s): Permission.