CIVIL ENGINEERING MAJOR (B.S)

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

Description

Matriculating students should have strong aptitudes in mathematics and science along with imagination, spatial and graphic abilities, communication skills, and creativity.

Students follow a four-year program of study. The first two years of the program provide the necessary technical knowledge in mathematics, chemistry, and physics, while introducing and developing problem-solving techniques in eight courses tailored to civil engineering students. The junior year provides courses in each of the civil engineering sub-disciplines, providing students with skills in each and allowing students to determine which they wish to pursue further. The senior year is flexible, allowing students to choose where to focus attention by selecting from more than forty elective courses in civil and environmental engineering.

Additional opportunities exist for study abroad, cognates, minors, and dual majors, a three-year accelerated track, and early admission into two masters of science degree programs.

The Civil Engineering program (B Sci in Civil Engineering) is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the General Criteria and the Program Criteria for Civil and Similarly Named Engineering Programs.

Requirements

Degree Requirements

Minimum Credit Requirement: 128 credits

Minimum Residency Requirement: 32 credits must be taken at UNH

Minimum GPA: 2.0 required for conferral*

Core Curriculum Required: Discovery & Writing Program Requirements

Foreign Language Requirement: No

All Major, Option and Elective Requirements as indicated.
**Major GPA requirements as indicated.*

Major Requirements

More than half of the major's total credits and nearly all of the senior-level courses are elected by the student. Of these, there are Discovery Program electives required by the University and other electives required by the department in order to satisfy departmental objectives and accreditation requirements.

The Discovery Program is described in University Academic Requirements. Courses required by the BSCIVE program fulfill Discovery requirements in Inquiry and Environment, Technology, and Society; Writing Skills; Quantitative Reasoning; Physical Sciences and Discovery Lab; and Capstone.

To graduate with a bachelor of science in civil engineering, a student must achieve the following: 128 or more credits, credit for the civil engineering program's major and elective courses, satisfaction of the University's Discovery Program requirements, satisfaction of the University's writing-intensive course requirements, a cumulative grade-point average of 2.0 or better for all courses, and a cumulative grade-point average of 2.0 or better in all CEE courses.

Code	Title	Credits
Required Courses		
CEE 400	Introduction to Civil Engineering	4
CEE 402	2D Computer Aided Design	3
CEE 403	GIS for Civil and Environmental Engineering	3
or CEE 404	Surveying and Mapping	
or NR 658	Introduction to Geographic Information Systems	
or ANTH 674	Archaeological Survey and Mapping in Belize	
CEE 500	Statics for Civil Engineers	3
CEE 501	Strength of Materials	3
CEE 502	Project Engineering	3
CEE 505	Introduction to Sustainable Engineering	3
CEE 520	Environmental Pollution and Protection: A Global Context	4
CEE 620	One Water Engineering	4
CEE 635	Engineering Materials	4
CEE 650	Fluid Mechanics	4
CEE 665	Soil Mechanics	4
CEE 680	Classical Structural Analysis	3
CEE 797	Introduction to Project Planning and Design	2
CEE 798	Project Planning and Design	2
CHEM 405	Chemical Principles for Engineers	4
or CHEM 403 & CHEM 404	General Chemistry I and General Chemistry II	
MATH 425	Calculus I	4
MATH 426	Calculus II	4
MATH 527	Differential Equations with Linear Algebra	4
MATH 539	Introduction to Statistical Analysis	4
or MATH 644	Statistics for Engineers and Scientists	
PHYS 407	General Physics I	4
PHYS 408	General Physics II	4
Electives		
Choose seven courses from the '700-level CEE Electives Course List' below with the following restrictions:		
1. Courses must be taken in four of six different areas (sustainability, environmental, materials, water resources, geotechnical, structural).		
2. At least three design courses; including one Project-based Design Elective PDE course.		
3. One of the seven 700-level courses is a senior technical elective.		
Design/Area Elective (Project-based Design Elective PDE)		3-4
Design/Area Elective		3-4
Design/Area Elective		3-4
Area Elective		3-4
CEE Elective		3-4
CEE Elective		3-4
Senior Technical Elective (choose a course from the '700-level CEE Electives Course List' below, CEPS 700-level course, GEOG 757, INCO 795, NR 757, TECH 750, or TECH 780).		3-4
700-Level CEE Electives		
Select courses from the following lists:		
Project-based Design Elective (PDE) Courses		
CEE 749	Pavement Design and Analysis	
CEE 755	Design of Pressurized Water Transmission Systems	
CEE 758	Stormwater Management Designs	
CEE 759	Stream Restoration	
CEE 778	Foundation Design I	
CEE 791	Reinforced Concrete Design	
CEE 793	Structural Design in Steel	
Additional Design Courses		
CEE 719	Green Building Design	
CEE 730	Public Health Engineering for Rural and Developing Communities	
CEE 731	Advanced Water Treatment Processes	
CEE 732	Solid Waste Facility and Remediation System Design	
CEE 779	Foundation Design II	

CEE 789	Timber Design
CEE 790	Structural Design in Masonry
CEE 792	Pre-stressed Concrete
CEE 794	Bridge Design
Structural Engineering (STR) Area Courses	
CEE 780	Matrix Structural Analysis and Modeling
CEE 781	Dynamics of Structures
CEE 789	Timber Design
CEE 790	Structural Design in Masonry
CEE 791	Reinforced Concrete Design
CEE 792	Pre-stressed Concrete
CEE 793	Structural Design in Steel
CEE 794	Bridge Design
Geotechnical Engineering (GEO) Area Courses	
CEE 765	Engineering Behavior of Soils
CEE 766	Introduction to Geotechnical Earthquake Engineering
CEE 768	Geo-Environmental Engineering
CEE 778	Foundation Design I
CEE 779	Foundation Design II
Material (MAT) Area Courses	
CEE 733	Public Infrastructure Asset Management
CEE 735	Properties and Production of Concrete
CEE 736	Asphalt Mixtures and Construction
CEE 749	Pavement Design and Analysis
Water Resources (WAT) Area Courses	
CEE 751	Open Channel Flow
CEE 753	Snow Hydrology
CEE 754	Engineering Hydrology
CEE 755	Design of Pressurized Water Transmission Systems
CEE 758	Stormwater Management Designs
CEE 759	Stream Restoration
Environmental Engineering (ENV) Area Courses	
CEE 720	Waste Management and Site Remediation
CEE 721	Environmental Sampling and Analysis
CEE 722	Introduction to Marine Pollution and Control
CEE 723	Environmental Engineering Chemistry
CEE 724	Environmental Engineering Microbiology
CEE 730	Public Health Engineering for Rural and Developing Communities
CEE 731	Advanced Water Treatment Processes
CEE 732	Solid Waste Facility and Remediation System Design
CEE 768	Geo-Environmental Engineering
Sustainability (SUS) Area Courses	
CEE 706	Environmental Life Cycle Assessment
CEE 719	Green Building Design
CEE 733	Public Infrastructure Asset Management
Additional CEE Elective Courses	
CEE 700	Building Information Modeling
CEE 703	Site Design and Project Development
CEE 704	Transportation Engineering: Highway Geometric Design

To transfer into the BSCIVE major, a student must satisfy the following:

1. Be a CEPS major or have at least 12 credits of graded work at UNH along with Calculus I, and either chemistry or calculus-based physics.
2. Have an overall UNH grade-point average of 2.33 or greater.
3. Have an overall grade-point average of 2.33 or greater in all CEE courses taken to date;
4. Have a grade-point average of 2.33 or greater in courses taken to date at UNH of MATH 425, PHYS 407, CHEM 403 or CHEM 405, CEE 500 or ME 525 ; and CEE 501 or ME 526 .
5. Have a grade-point average of 2.33 or greater in courses taken to date of CEE 500, CEE 501, ME 525, ME 526

At the time of transferring into the BSCIVE program, only CEE 600-level and CEE 700-level classes with a grade of C- or better may be transferred in.

BSCIVE majors wishing to participate in domestic or international exchange programs must achieve a cumulative grade-point average of 2.75 or better in all CEE courses taken to date at the time of application to the exchange program.

To begin taking the required CEE 600-level courses in the junior year, students must meet the following requirements:

1. MATH 425, PHYS 407, CHEM 403 or CHEM 405, CEE 500 or ME 525 ; and CEE 501 or ME 526 must have been completed with passing grades.
2. The student must have a grade-point average of 2.00 or greater in all CEE courses.
3. The student must have a grade-point average of 2.00 or greater in MATH 425, PHYS 407, CHEM 403 or CHEM 405, CEE 500 or ME 525 , and CEE 501 or ME 526 .
4. The student must have a grade-point average of 2.00 or greater in CEE 500 or ME 525 and CEE 501 or ME 526 .

Degree Plan

Sample Degree Plan

This sample degree plan serves as a general guide; students collaborate with their academic advisor to develop a personalized degree plan to meet their academic goals and program requirements.

First Year		
Fall		**Credits**
CEE 400	Introduction to Civil Engineering	4
CEE 520	Environmental Pollution and Protection: A Global Context	4
CEE 402	2D Computer Aided Design	3
MATH 418	Analysis and Applications of Functions (if necessary, 0-4 credits)	
Discovery Program requirement [1]		4
	Credits	**15**
Spring		
MATH 425	Calculus I	4
PHYS 407	General Physics I	4
Elective Spatial Metrics [3]		4
ENGL 401	First-Year Writing	4
	Credits	**16**
Second Year		
Fall		
CEE 500	Statics for Civil Engineers	3
CEE 502	Project Engineering	3
MATH 426	Calculus II	4
PHYS 408	General Physics II	4
Discovery Program requirement [1]		4
	Credits	**18**
Spring		
CEE 501	Strength of Materials	3
CEE 505	Introduction to Sustainable Engineering	3
CHEM 405	Chemical Principles for Engineers	4
MATH 527	Differential Equations with Linear Algebra	4

Discovery Program requirement [1]		4
	Credits	**18**
Third Year		
Fall		
CEE 635	Engineering Materials	4
CEE 650	Fluid Mechanics	4
CEE 680	Classical Structural Analysis	3
Discovery Program requirement [1]		4
	Credits	**15**
Spring		
CEE 620	One Water Engineering	4
CEE 665	Soil Mechanics	4
Elective Statistics [3]		4
Discovery Program requirement [1]		4
	Credits	**16**
Fourth Year		
Fall		
CEE 797	Introduction to Project Planning and Design	2
Elective Project-Based Design Elective [3]		4
Elective Area Elective 2 [3]		3
Elective Civil Engineering [3]		3
Discovery Program requirement [1]		4
	Credits	**16**
Spring		
CEE 798	Project Planning and Design	2
Elective Area Elective 3 [3]		3
Elective Area Elective 4 [3]		3
Elective Civil Engineering [3]		3
Elective Senior Technical Elective [3]		3
	Credits	**14**
	Total Credits	**128**

1 A course satisfying one each of the Discovery Program categories of Biological Science, Humanities, Fine and Performing Arts, Historical Perspectives, Social Science and World Cultures, preferably taken in this order. The Discovery Social Science elective must be selected from CEP 415, ECON 401, ECON 402, NR 411, GEOG 582, or POLT 402.

2 Satisfies capstone requirement for Discovery.

3 Approved list available in the CEE office.

Student Learning Outcomes

Program Learning Outcomes
By the time of graduation students have attained:

- 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.