CIVIL ENGINEERING, BACHELOR OF SCIENCE

Description

Website: https://cee.unl.edu/

The Department of Civil and Environmental Engineering offers a complete 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 civil engineering profession immediately after graduation or to pursue graduate-level studies.

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

- Be employed in civil and environmental engineering or a closely related field; or, graduates will be pursuing an advanced degree in civil and environmental engineering or a closely related field.
- Contribute to society and address societal and environmental needs through engagement in professional, community, or service organizations.
- Agree that the civil 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.

As a professional discipline, civil engineering is closely related to the total human environment. In all professional endeavors, the civil engineer must consider ecological effects as well as the social, economic, and political needs of people. The civil engineer designs systems to control and manage our water resources to provide electric power, agricultural irrigation, flood control, recreation, water supplies, and wastewater treatment systems for our urban and industrial needs.

The civil engineer plans, designs, and constructs our transportation systems—including highways, railroads, waterways, and airports—to connect rural, urban, and industrial areas. The civil engineer also designs and constructs housing and facilities for recreational, industrial, and commercial complexes, which comprise the urban environment. It is the responsibility of civil engineering to minimize air, water, and land pollution and protect the environment.

Instructional emphasis is placed on fundamental engineering principles derived from mathematics, chemistry, physics, and engineering science. These subjects provide a sound background for the subsequent introductory courses in environmental, geotechnical, structural, transportation, and water resources engineering. Students are introduced to design concepts in the freshman year. Design is incorporated throughout the curriculum that culminates in two senior-level courses, CIVE 401 (https://nextcatalog.unl.edu/search/?P=CIVE%20401) Civil Engineering Design I and CIVE 402 (https://nextcatalog.unl.edu/search/?P=CIVE%20402) Civil Engineering Design II.

Instructional laboratories in environmental engineering, hydraulics, geotechnical engineering, structures, and surveying provide each student with an opportunity to learn, through individual participation, the operation of the testing equipment used to establish engineering design criteria and to monitor and model engineering facilities such as water and wastewater treatment plants, river control systems, and structural systems.

The Department of Civil and Environmental Engineering also offers a major and a minor in Environmental Engineering.

Learning Outcomes

Graduates of the civil engineering program will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. 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.
3. An ability to communicate effectively with a range of audiences.
4. 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.
5. 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.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The above student outcomes have been approved by the ABET Engineering Area Delegation for use beginning with the 2019-20 academic year, and have been adopted by the faculty of the Department of Civil and Environmental Engineering.

Criteria for Professional Admission to the Civil Engineering Degree Program

Students are expected to meet minimum college entrance requirements. After being admitted to the college as pre-civil engineering students, students wishing to pursue a degree in civil engineering must further be admitted to the degree program. Students who have completed 43 credit hours applicable to their civil engineering degree are considered for formal admission to the civil engineering degree program. Transfer students must have at least 12 credit hours of coursework from the University of Nebraska–Lincoln on record before an application will be considered. Students must receive a grade of C or better in the following classes to be professionally admitted to the civil engineering program:

CHEM 1180 General Chemistry I and CHEM 1184 General Chemistry I Laboratory ;

MATH 1950 Calculus I , MATH 1960 Calculus II , and MATH 2350 Differential Equations ;

CIST 1600 Introduction to Programming Using Practical Scripting;

PHYS 2110 General Physics I ; and

MECH 223 Engineering Statics , and MECH 325 Mechanics of Elastic Bodies .

PLEASE NOTE:

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.

Course	Title	Credits
First Semester		
CIVE 101	INTRODUCTION TO CIVIL ENGINEERING (This fulfills the ENGR 10 requirement)	3

CHEM 1180	GENERAL CHEMISTRY I (Students must receive a "C" or better in this course.)	3
CHEM 1184	GENERAL CHEMISTRY I LABORATORY	1
MATH 1950	CALCULUS I (Students must receive a "C" or better in this course.)	5
	MATH 1950 becomes critical to your success in the major if not completed by the end of the first term of enrollment. Not compng MATH 1950 in the first term can delay completion of your degree.	
ACE 2 Communication Skills Elective [See note below]		3
	Credits	**15**
Second Semester		
CIVE 102	GEOMATICS FOR CIVIL ENGINEERING	3
CIST 1600	INTRODUCTION TO PROGRAMMING USING PRACTICAL SCRIPTING (Students must receive a "C" or better in this course.)	3
PHYS 2110	GENERAL PHYSICS I - CALCULUS LEVEL (Students must receive a "C" or better in this course.)	4
	PHYS 2110 becomes critical to your success in the major if not completed by the end of the second term of enrollment. Not completing PHYS 2110 in the second term can delay completion of your degree.	
MATH 1960	CALCULUS II (Students must receive a "C" or better in this course.)	4
	MATH 1960 becomes critical to your success in the major if not completed by the end of the second term of enrollment. Not completing MATH 1960 in the second term can delay completion of your degree.	
ACE 1 Writing Elective [See note below]		3
	Credits	**17**
Third Semeseter		
CIVE 201	CIVIL ENGINEERING ANALYSIS I	2
MECH 223	ENGINEERING STATICS (Students must receive a "C" or better in this course.)	3
	MECH 223 becomes critical to your success in the major if not completed by the end of the third term of enrollment. Not completing MECH 223 in the third term can delay completion of your degree.	
PHYS 2120	GENERAL PHYSICS-CALCULUS LEVEL (or CHEM 1190 and CHEM 1194)	4
MATH 1970	CALCULUS III	4
ACE 5 Humanities Elective [See note below]		3
ENGR 20	SOPHOMORE ENGINEERING SEMINAR	0
	Credits	**16**
Fourth Semester		
CIVE 202	CIVIL ENGINEERING ANALYSIS II	2
CIVE 371	Materials of Construction	3
MECH 325	MECHANICS OF ELASTIC BODIES (Students must receive a "C" or better in this course.)	3
	MECH 325 becomes critical to your success in the major if not completed by the end of the fourth term of enrollment. Not completing MECH 325 in the fourth term can delay completion of your degree.	
MECH 373	ENGINEERING DYNAMICS	3
MATH 2350	DIFFERENTIAL EQUATIONS (Students must receive a "C" or better in this course.)	3
ACE 6 Social Science Elective [See note below]		3
	Credits	**17**
Fifth Semester		
CIVE 301	CIVIL ENGINEERING SYNTHESIS I	1
CIVE 310	FLUID MECHANICS	3
CIVE 310L	HYDRAULICS LAB	1
CIVE 341	STRUCTURAL ANALYSIS FUNDAMENTALS	3
CIVE 342	STRUCTURAL DESIGN FUNDAMENTALS	1
CIVE 361	PRINCIPLES OF TRANSPORTATION ENGINEERING	3
STAT 3800	APPLIED ENGINEERING PROBABILITY AND STATISTICS	3
	CIVE 310, CIVE 310L, CIVE 341, CIVE 342, and CIVE 361 become critical to your success in the major if not completed by the end of the fifth term of enrollment. Not completing CIVE 310, CIVE 310L, CIVE 341, and CIVE 361 in the fifth term can delay completion of your degree.	
	Credits	**15**
Sixth Semester		
CIVE 302	CIVIL ENGINEERING SYNTHESIS II	1
CIVE 321	PRINCIPLES OF ENVIRONMENTAL ENGINEERING	3
CIVE 321L	ENVIRONMENTAL ENGINEERING LABORATORY	1
CIVE 331	INTRODUCTION TO GEOTECHNICAL ENGINEERING	4
CIVE 351	INTRODUCTION TO WATER RESOURCES ENGINEERING	3
ACE 7 Arts Elective [See note below]		3
	CIVE 321, CIVE 321L, CIVE 331, and CIVE 351 become critical to your success in the major if not completed by the end of the sixth term of enrollment. Not completing CIVE 321, CIVE 321L, CIVE 331, and CIVE 351 in the sixth term can delay completion of your degree.	
	Credits	**15**
Seventh Semester		
CIVE 401	CIVIL ENGINEERING DESIGN I	3
CIVE Depth Elective (Environmental and Water)		3
	Choose 1 from CIVE 420, CIVE 425, CIVE 427, CIVE 419, CIVE 452	
Science Elective		4
	BIOL 1020 or BIOL 1450 or GEOL 1170 or (PHYS 1350 and PHYS 1354) or (GEOG 3510 and GEOG 3514) or (CHEM 2210 and CHEM 2214)	
Technical Elective		3
	Work with your advisor to correctly select this elective.	
ACE 8 Ethics Elective [See note below]		3
	Credits	**16**
Eighth Semester		
CIVE 402	CIVIL ENGINEERING DESIGN II	3
CIVE Depth Elective (Geotech/Materials, Structures, and Transportation)		3
	Choose 1 from CIVE 436, CIVE 440, CIVE 441, CIVE 462, CIVE 463	
CIVE Depth Elective (Choose one that was not used to fulfill another requirement		3
	CIVE 419, CIVE 420, CIVE 425, CIVE 427, CIVE 436, CIVE 440, CIVE 441, CIVE 462, CIVE 463	
Technical Elective		3

Work with your advisor to correctly select this elective		
ACE 9 Global Awareness and Human Diversity Elective [See note below]		3
	Credits	**15**
	Total Credits	**126**

NOTE: List of approved ACE courses offered on the Omaha campus (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 Civil Engineering

The BS degree in civil engineering is offered on both the Lincoln and Omaha campuses. Degree Requirements - 126 hours

Code	Title	Credits
CIVIL ENGINEERING CORE		
CIVE 101	INTRODUCTION TO CIVIL ENGINEERING (This fulfills the ENGR 10 requirement.)	3
CIVE 102	GEOMATICS FOR CIVIL ENGINEERING	3
CIVE 201	CIVIL ENGINEERING ANALYSIS I	2
CIVE 202	CIVIL ENGINEERING ANALYSIS II	2
CIVE 301	CIVIL ENGINEERING SYNTHESIS I	1
CIVE 302	CIVIL ENGINEERING SYNTHESIS II	1
CIVE 401	CIVIL ENGINEERING DESIGN I	3
CIVE 402	CIVIL ENGINEERING DESIGN II	3
Credit Hours Subtotal:		18
CIVIL ENGINEERING BREADTH		
CIVE 310	FLUID MECHANICS	3
CIVE 310L	HYDRAULICS LAB	1
CIVE 321	PRINCIPLES OF ENVIRONMENTAL ENGINEERING	3
CIVE 321L	ENVIRONMENTAL ENGINEERING LABORATORY	1
CIVE 331	INTRODUCTION TO GEOTECHNICAL ENGINEERING	4
CIVE 341	STRUCTURAL ANALYSIS FUNDAMENTALS	3
CIVE 342	STRUCTURAL DESIGN FUNDAMENTALS	1
CIVE 351	INTRODUCTION TO WATER RESOURCES ENGINEERING	3
CIVE 361	PRINCIPLES OF TRANSPORTATION ENGINEERING	3
CIVE 371	MATERIALS OF CONSTRUCTION	3
Credit Hours Subtotal:		25
CIVIL ENGINEERING DEPTH ELECTIVES		
Depth Electives in Environmental and Water Resources Engineering		3
Choose one from:		
CIVE 420	ENVIRONMENTAL ENGINEERING PROCESS DESIGN	
CIVE 425	DESIGN OF WATER TREATMENT FACILITIES	
CIVE 419	FLOW SYSTEMS DESIGN	
CIVE 452	WATER RESOURCES DEVELOPMENT	
Depth Electives in Geotechnical, Structural and Transportation Engineering		3
Choose one from:		
CIVE 436	FOUNDATION ENGINEERING	
CIVE 440	REINFORCED CONCRETE DESIGN I	
CIVE 441	STEEL DESIGN I	
CIVE 462	HIGHWAY DESIGN	
CIVE 463	TRAFFIC ENGINEERING (General Civil Engineering Depth Electives)	
General Civil Engineering Depth Electives		3
Choose three credits from the following that were not used to fulfill another requirement:		
CIVE 420, CIVE 425, CIVE 419, CIVE 436, CIVE 440, CIVE 441, CIVE 462, CIVE 463		
Credit Hours Subtotal:		9
GENERAL ENGINEERING		
CIST 1600	INTRODUCTION TO PROGRAMMING USING PRACTICAL SCRIPTING	3
MECH 223	ENGINEERING STATICS	3
MECH 325	MECHANICS OF ELASTIC BODIES	3
MECH 373	ENGINEERING DYNAMICS	3
ENGR 20	SOPHOMORE ENGINEERING SEMINAR	0
Credit Hours Subtotal:		12
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, BIOS 4940, 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
PHYS 2110	GENERAL PHYSICS I - CALCULUS LEVEL	4
Select one fo the following:		4
PHYS 2120	GENERAL PHYSICS-CALCULUS LEVEL	
CHEM 1190 & CHEM 1194	GENERAL CHEMISTRY II and GENERAL CHEMISTRY II LABORATORY	
Science Elective-Select one of the following:		
BIOL 1020	PRINCIPLES OF BIOLOGY	
CHEM 2210 & CHEM 2214	FUNDAMENTALS OF ORGANIC CHEMISTRY and FUNDAMENTALS OF ORGANIC CHEMISTRY LABORATORY	
GEOL 1170	INTRODUCTION TO PHYSICAL GEOLOGY	
PHYS 1350 & PHYS 1354	PRINCIPLES OF ASTRONOMY and INTRODUCTORY ASTRONOMY LAB	

GEOG 3510 & GEOG 3514	METEOROLOGY and INTRODUCTION TO METEOROLOGY LABORATORY	
BIOL 1450	BIOLOGY I	
Credit Hours Subtotal:		16
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, PHYS 2120, BIOL 1020, PHYS 1350, 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		3
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 CIVE 402		
Credit Hours Subtotal:		21
Total Credit Hours		**126**

[1] List of approved ACE courses offered on the Omaha campus (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)