CONSTRUCTION ENGINEERING, BACHELOR OF SCIENCE

Description

Construction engineering (CONE) is a program of the Charles W. Durham School of Architectural Engineering and Construction. The construction engineering major integrates engineering, construction and management courses. This program is designed for persons fulfilling the construction industry's need for licensed professional engineers. It resembles the construction management program but provides a greater emphasis on engineering, scientific, and technical courses to meet requirements for licensure as a professional engineer. The courses focus on the application of engineering principles to solve real-world construction problems. They include instruction in civil engineering, structural principles, material testing and evaluation, project management, computer-assisted design, 3D animation, sustainability, and graphic communication.

The Durham School Construction Engineering program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc.

Program Educational Objectives (PEOs)

1. Professional Achievement: The Construction Engineering program prepares graduates to become Licensed Professional Engineers and Certified Professional Constructors.
2. Career Achievement: The Construction Engineering program prepares graduates to contribute to society by working in an occupation related to the architecture-engineering-construction industry.

Under the stimulus of increasing demand for global services, many Nebraska companies have expanded their reach well beyond U.S. borders. This demand gives the construction engineering graduate an unprecedented number of opportunities for employment—locally, nationally and internationally—and for pursuing an advanced degree at the University of Nebraska–Lincoln or elsewhere.

Construction engineers participate in the preparation of engineering and architectural documents, including specifications, which they translate into finished projects such as buildings for housing, commerce and industry, highways, railroads, waterways, airports, power plants, energy distribution systems, military bases and space center complexes. These projects involve thousands of details shared by a team of owners, architects, engineers, general constructors, specialty constructors, manufacturers, material suppliers, equipment distributors, regulatory bodies and agencies, labor resources and others. The constructor assumes responsibility for delivery of the completed project at a specified time and cost and also accepts associated legal, financial and management obligations. Because of the broad scope of the construction engineer's project responsibility, they must assure the project's constructability as well as its capability to be operated and maintained.

Construction engineering students are required to enroll in a set of courses specifically designed for a general construction education. Each student selects, with the guidance of an advisor, a set of approved electives. The program outlined below leads to the bachelor of science degree in construction engineering.

Professional Admission Requirements

In order to be professionally admitted into the construction engineering program, students must complete at least 43 credit hours of courses listed in the first two years of the required curriculum with a minimum GPA of 2.5 for those major courses (not necessarily the cumulative GPA).

Learning Outcomes

Graduates of the construction 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 Charles W. Durham School of Architectural Engineering and Construction.

Requirements

Students are required to enroll in a predetermined set of courses specifically designed for general construction education. Each student selects, with the approval of their advisor, a set of approved electives.

Course	Title	Credits
First Semester		
CHEM 1180	GENERAL CHEMISTRY I	3
CHEM 1184	GENERAL CHEMISTRY I LABORATORY	1
ENGR 100 or CMST 1110	INTERPERSONAL SKILLS FOR ENGINEERING LEADERS or PUBLIC SPEAKING FUNDS	3
CONE 103	INTRODUCTION TO CONSTRUCTION ENGINEERING	1
CIST 1600	INTRODUCTION TO PROGRAMMING USING PRACTICAL SCRIPTING	3
MATH 1950	CALCULUS I	5
ENGR 10	FRESHMAN ENGINEERING SEMINAR	0
	Credits	**16**
Second Semester		
CNST 112	CONSTRUCTION COMMUNICATIONS	3
MATH 1960	CALCULUS II	4
PHYS 2110	GENERAL PHYSICS I - CALCULUS LEVEL	4
PHYS 1154	GENERAL PHYSICS LABORATORY I [1]	1
ACE Elective [2]		3
	Credits	**15**
Third Semeseter		
CONE 221	GEOMETRIC CONTROL SYSTEMS	3
ENGR 220/JGEN 200	TECHNICAL COMMUNICATION I	3
or		
ENGL 3980	TECHNICAL WRITING ACROSS THE DISCIPLINES	
MATH 1970	CALCULUS III	4
MECH 223	ENGINEERING STATICS	3

PHYS 2120	GENERAL PHYSICS-CALCULUS LEVEL	4
ENGR 20	SOPHOMORE ENGINEERING SEMINAR	0
	Credits	**17**
Fourth Semester		
CONE 206	ENGINEERING ECONOMICS	3
CNST 225	INTRODUCTION TO BUILDING INFORMATION MODELING	3
MATH 2350	DIFFERENTIAL EQUATIONS	3
MECH 325	MECHANICS OF ELASTIC BODIES	3
MECH 373	ENGINEERING DYNAMICS	3
	Credits	**15**
Fifth Semester		
ECEN 211	ELEMENTS OF ELECTRICAL ENGINEERING	3
CIVE 341	STRUCTURAL ANALYSIS FUNDAMENTALS	3
CIVE 342	STRUCTURAL DESIGN FUNDAMENTALS	1
CNST 241	HORIZONTAL CONSTRUCTION	3
CONE/CNST 378	CONSTRUCTION ESTIMATING I	3
CIVE 310	FLUID MECHANICS	3
	Credits	**16**
Sixth Semester		
CIVE 331	INTRODUCTION TO GEOTECHNICAL ENGINEERING	4
CIVE 371	MATERIALS OF CONSTRUCTION	3
ECON 2200	PRINCIPLES OF ECONOMICS (MICRO) [3]	3
STAT 3800	APPLIED ENGINEERING PROBABILITY AND STATISTICS	3
ACE Elective [2]		3
	Credits	**16**
Seventh Semester		
CNST 420	PROFESSIONAL PRACTICE AND ETHICS	3
CIVE 440	REINFORCED CONCRETE DESIGN I	3
CNST 444	CONSTRUCTION SITE SAFETY MANAGEMENT	3
CONE/CNST 476	PROJECT BUDGETS AND CONTROLS	3
CONE/CNST 485	CONSTRUCTION PLANNING, SCHEDULING, AND CONTROLS	3
	Credits	**15**
Eighth Semester		
CIVE 441	STEEL DESIGN I	3
CONE 489	CONSTRUCTION ENGINEERING CAPSTONE	3
Technical Elective [4]		3
Design Elective [4]		3
ACE Elective [2]		3
	Credits	**15**
	Total Credits	**125**

1 PHYS 1154: PHYS 1164 is an acceptable substitute if taken with PHYS 2120.

2 ACE elective: Choose one course from each ACE Student Learning Outcome (SLO) 5, 7 or 9 elective courses.

3 ECON 2200 satisfies SLO area 6.

4 See tables below for Design and Technical Elective options.

Additional Major Requirements

Grade Rules

C- and D Grades

All coursework must be of C grade level or higher to be credited toward graduation requirements or to be valid as a prerequisite for another course.

Electives

Students are required to enroll in a predetermined set of courses specifically designed for general construction education. Each student selects, with the approval of their advisor, a set of approved electives.

Technical electives are selected from the following list. One (3 credit hour) of the required two electives needs to be considered a design technical elective.

Code	Title	Credits
Design Electives		
CONE 417	FORMWORK SYSTEMS	3
CONE 481	HIGHWAY & BRIDGE CONSTRUCTION	3
CONE 483	SUPPORT OF EXCAVATION	3
CIVE 443	ADVANCED STRUCTURAL ANALYSIS	3
CIVE 444	STRUCTURAL DESIGN AND PLANNING	3
CIVE 446	STEEL DESIGN II	3
CIVE 447	REINFORCED CONCRETE II	3
CIVE 462	HIGHWAY DESIGN	3
CIVE 468	AIRPORT PLANNING AND DESIGN	3
CIVE 472	PAVEMENT DESIGN AND EVALUATION	3

Code	Title	Credits
Technical Electives		
All previously listed Design Electives		
CNST 305	BUILDING ENVIRONMENTAL TECHNICAL SYSTEMS I	3
CNST 306	ELECTRICAL SYSTEMS	3
CNST 379	CONSTRUCTION ESTIMATING II	3
CNST 405	MECHANICAL ESTIMATING	3
CNST 406	ELECTRICAL ESTIMATING	3
CNST 411	PROJECT ADMINISTRATION	3
CNST 415	MECHANICAL/ELECTRICAL PROJECT MANAGEMENT	3
CNST 425	ALTERNATIVE PROJECT DELIVERY METHODS	3
CNST 434	THE DESIGN-BUILD PROJECT DELIVERY SYSTEM	3
CNST 436	INTENT AND APPLICATION OF INTERNATIONAL BUILDING CODE	3
CNST 440	BUILDING INFORMATION MODELING (BIM) II	3
CNST 442	HEALTHCARE DESIGN AND CONSTRUCTION	3
CONE 450	SUSTAINABLE CONSTRUCTION	3
CONE 466	HEAVY AND/OR CIVIL ESTIMATING	3
CNST 480	PRODUCTIVITY AND HUMAN FACTORS IN CONSTRUCTION	3
CNST 486	CONSTRUCTION MANAGEMENT SYSTEMS	3
CNST 488	RESIDENTIAL CONSTRUCTION AND REAL ESTATE DEVELOPMENT	3
CNST 495	INTERNSHIP	3

ACE Requirements

The CONE program follows the University of Nebraska-Lincoln ACE general education requirements. Because of the specific needs of the program, several of these courses are specified in the curriculum. Please contact DurhamSchool@unl.edu (:durhamschool@unl.edu), if you are interested in more information about this program.