

CONSTRUCTION ENGINEERING

The construction industry is one of the largest industries in the United States. It accounts for nearly 8 percent of the nation's gross national product and employs millions of people. The industry is divided into four sectors: residential building construction, industrial construction, commercial building construction, and heavy civil construction. The Department of Construction Management and Engineering provides quality educational programs that prepare nationally competitive undergraduate and graduate students for successful careers in the construction engineering and management professions.

The Program

Construction Engineering involves the planning, design, and management of construction facilities, such as highways, bridges, airports, railroads, buildings, dams, and reservoirs. The construction of such projects requires knowledge of engineering, management, economics, and business. Construction Engineering is differentiated from Construction Management from the standpoint of the use of math, science, and engineering to design projects and processes and analyze problems. Construction Engineering is involved in a variety of construction disciplines, including commercial, residential, transportation, and infrastructure systems. Construction Engineers are also involved in the engineering design of temporary structures, cost estimating, planning and scheduling, material procurement, selection of equipment, and cost control. Due to their diverse skills, there is a very high demand for Construction Engineers.

The Department of Construction Management and Engineering offers a Bachelor of Science in Construction Engineering degree which offers a blend of engineering and construction courses. The program is designed for those who want to work in the construction industry and enjoy the status of a professional engineer. A thorough knowledge of the physical sciences, math, and engineering is developed during the first two years followed by construction management and engineering courses. The technical side of the program is balanced with requirements in writing, humanities, social science, and communications. The program leading to the Bachelor of Science in Construction Engineering degree is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

Program Educational Objectives (PEO)

Program educational objectives (PEO's) are broad statements that describe what graduates are expected to attain within a few years after graduation. Program educational objectives are based on the needs of the program's constituencies. Graduates from the Bachelor of Science in Construction Engineering program are expected to be productive construction engineers who, within the first few years after graduation:

1. Begin to serve in a middle-level project leadership role in their construction engineering career.
2. Acquire and use new knowledge and skills in the construction engineering field.
3. Be respected construction engineers who are valued by their peers, customers, and the general public for their technical expertise and ethical conduct.

Student Outcomes (SO)

The Program Educational Objectives are further connected to seven Student Outcomes (SO), developed by the Engineering Accreditation Commission of ABET, www.abet.org, which describe what students are expected to know and be able to do by the time of graduation. These outcomes relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program.

The Student Outcomes are listed below:

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.

Faculty and Staff

The Department of Construction Management and Engineering has a group of faculty and staff members dedicated to teaching, advising and career consultation. All full-time faculty members have doctoral degrees. Many of them have professional licenses such as the Professional Engineer (PE) and/or the Certified Professional Constructor (CPC), and have construction related working experiences both in the United States and overseas. Additionally, the department has many Adjunct professors who are currently working in the construction industry in supervisory roles.

Facilities

The Department of Construction Management and Engineering has well equipped classrooms, computer labs and teaching and research labs for its students. Classrooms used by the department are equipped with a computer, a Blackboard course management system, Internet access, a projector, a document camera, and an apple TV/AirMedia system. In addition, the department maintains a computer lab, a virtual reality lab, a concrete lab and a soils lab and shares laboratory space with the Department of Civil Engineering for the structural, geotechnical and surveying labs. The department has the most updated modern teaching and research equipment such as GPS units, robotic total stations, drones, etc.

Career Opportunities

Construction engineering graduates are in high demand after graduation by contractors in all types of construction, from design-construction firms to large owners who have continuing construction projects. Positions available include field engineer, office engineer, project engineer, project controls engineer, superintendent and project manager. Starting salary has been between \$50,000 and \$80,000 in the recent years. Summer internships or employment in the construction industry is also available to construction engineering students.

Industry Advisory Council

The Industry Advisory Council (IAC) consists of 35 members who specialize in different sectors throughout the construction industry. The IAC helps the program develop the professional body of knowledge appropriate to construction management and engineering. They serve as a liaison between the construction industry and the Department. They advance and support the highest quality faculty, and educational facilities for the student enrolled in the programs. Through active participation, the IAC offers advice, counsel, and provides industry's vision for the program.

Student Organizations

There are four student organizations in the Department of Construction Management and Engineering: Associated General Contractors of America (AGC), National Association of Home Builders (NAHB), Sigma Lambda Chi (SLC), and Student Advisory Board (SAB). AGC Student Chapter competes each year at the Associated Schools of Construction Competition and the Midwest Construction Quiz Bowl. NAHB Student Chapter competes each year at the Residential Construction Management Competition. SLC is an international construction honor society. SAB provides advising and best practices to first year freshmen, and provides student feedback to the program.

Scholarship Opportunities

The AGC of North Dakota, the Home Builders Care Foundation (a charitable arm of the Home Builders Association of Fargo-Moorhead), and the NAHB offer annual scholarships to outstanding freshmen and upper class students. In addition, many other scholarships, such as Interstates Construction Management and Engineering Scholarship and J.L. McCormick Memorial Trust Scholarship, are available to students. Students can contact the Office of Admission for more information or check the department website at www.ndsu.edu/construction/current_students/scholarships/.

Construction Engineering Plan of Study

Please note this is a sample plan of study and not an official curriculum. Actual student schedules for each semester will vary depending on start year, education goals, applicable transfer credit, and course availability. Students are encouraged to work with their academic advisor on a regular basis to review degree progress and customize an individual plan of study.

Freshman			
Fall	Credits	Spring	Credits
CM&E 111 Intro to Construction Management and Engineering	1	CM&E 212 Construction Graphic Communications	3
CM&E 200 Construction Documents and Codes	3	MATH 166 Calculus II	4
MATH 165 Calculus I	4	ENGL 120 College Composition II	3
ENGL 110 College Composition I	4	CHEM 122 General Chemistry II	3
CHEM 121 General Chemistry I	3	ME 221 Engineering Mechanics I	3
CHEM 121L General Chemistry I Laboratory	1	Economics*	3
	16		19
Sophomore			
Fall	Credits	Spring	Credits
CM&E 204 Construction Surveying	3	CM&E 240 Financial Cost Concepts for Construction Managers	3
Gen Ed Social & Behavioral Sciences	3	PHYS 252 University Physics II	4
MATH 128 Introduction to Linear Algebra	1	COMM 110 Fundamentals of Public Speaking	3
MATH 259 Multivariate Calculus	3	MATH 266 Introduction to Differential Equations	3
ME 222 Engineering Mechanics II	3	ME 223 Mechanics of Materials	3
GEOL 105 Physical Geology or 106 The Earth Through Time	3	Gen Ed Wellness	2
	16		18
Junior			
Fall	Credits	Spring	Credits
CM&E 305 Pre-Construction Management	3	CM&E 301 Construction Technology and Equipment	3
CM&E 380 Construction Estimating: Quantities and Costs	3	CM&E 315 Specifications and Contracts	3
CE 309 Fluid Mechanics	3	CE 303 Civil Engineering Materials	2
CE 316 Soil Mechanics	3	CE 303L Civil Engineering Materials Laboratory	1
STAT 330 Introductory Statistics	3	CE 343 Structural Engineering and Analysis	4
	15	CM&E 405 Construction Support Operations	3
			16
Senior			
Fall	Credits	Spring	Credits
CM&E 403 Scheduling and Project Control	3	CM&E 489 Construction Design Capstone	3
4XX Technical Elective**	3	4XX Technical Elective**	3
4XX Technical Elective**	3	4XX Technical Elective**	3
ENGL 320 Business and Professional Writing or 321 Writing in the Technical Professions	3	Gen Ed Humanities & Fine Arts	3
Gen Ed Humanities & Fine Arts/Gen Ed Cultural Diversity	3	BUSN 431 Business Law I-Contracts, Property and Torts	3
ENGR 402 Engineering Ethics and Social Responsibility	1		
	16		15
Total Credits: 131			

* To satisfy the Gen Ed Category B requirements, a student can choose between two options: ECON 105 plus an additional course within Category B OR ECON 201 and ECON 202. Both options satisfy the Gen Ed Category G.

** Refer to list of **Construction Engineering Technical Electives (CE 400 Level Courses)** Minimum 12 Credits)

View NDSU equivalencies of transfer courses at: www.ndsu.edu/transfer/equivalencies

For Further Information

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