

## **CIVIL ENGINEERING**

Would you like to make this world a better place to live and improve the quality of life for all of us? You could do just that by choosing a career in civil engineering. Civil engineers are involved in a wide variety of projects affecting virtually everyone. These projects may include the designing of transportation networks (land, air or water), water supply and sewage systems, as well as buildings, dams and roads. The civil engineer plays a critical role in determining how our environment looks and functions.

### **The Program**

Civil engineers are professionals who have broad technical knowledge, possess strong problem solving skills and enjoy working with people. Their work is directly related to the public wellbeing and safety, and has a significant impact on decision making processes.

The graduates from North Dakota State University's Department of Civil Engineering apply their skills in all fields of the profession across the United States and overseas. NDSU civil engineering graduates are sought by companies from all over the country at competitive salaries. They have most certainly put their education to good use, bettering themselves and the world in which they live. The department also offers graduate programs leading to a master's degree or doctoral degree in civil engineering.

### **Mission**

The mission of the civil engineering program is to:

1. Provide quality education to prepare nationally competitive undergraduate students for a successful career in civil engineering;
2. Provide advanced skills and knowledge in state-of-the-art research and design in sub-areas of civil engineering for graduate students; and
3. Provide service to the University, engineering profession and the public.

### **Educational Objectives**

The following program educational objectives are consistent with the university, college and department missions. Graduates of our Bachelor of Science in civil engineering program are expected within a few years of graduation to have:

1. Established a mastery of fundamental knowledge, problem solving skills, engineering experimental abilities and design capabilities for a civil engineering career and/or graduate school;
2. Established the knowledge and skills necessary for identifying and assessing design alternatives and the related social, economic, environmental and public safety impacts;
3. Demonstrated their ability to deal effectively with ethical and professional issues, taking into account the broader societal implications of civil engineering; and
4. Obtained or made progress for obtaining professional licensure, assumed or made progress toward assuming leadership roles and engaged in life-long learning.

### **A Flexible Curriculum**

First year civil engineering students at NDSU begin their education with fundamental courses in English, chemistry, math and an introduction to the engineering sciences. Second year courses become more specific with an emphasis in surveying, math, physics and engineering science courses. The third year student previews the specialization areas of civil engineering. These are (1) geotechnical, (2) structural, (3) transportation, (4) water resources and (5) environmental engineering. The senior year continues to require certain courses but also provides for 12 hours of technical electives and a senior design project. The technical electives allow the student to take additional courses in those areas of civil engineering in which he or she intends to practice professionally. Currently, there are 42 civil engineering courses from which the student may choose.

### **Faculty**

The department has well-qualified and dedicated faculty. They are recognized nationally and internationally. All faculty members in the department have a doctoral degree. Half of them are licensed professional engineers. Almost all classes are taught by full-time professors.

### **A Modern, Well-Equipped Facility**

The civil engineering building is part of the eight building engineering complex. Seven well-equipped laboratories are designed for experimentation in each of the areas of civil engineering and advanced materials. In the last few years, there has been a continual upgrading of the laboratory equipment with special emphasis on the environmental, geotechnical, materials, fluid mechanics and advanced materials laboratories. Laboratory class sections are restricted to 20 or fewer students whenever possible.

### **Student Organizations**

Students participate in several professional student organizations in the department, which helps them develop leadership skills and the ability to work in teams. The NDSU American Society of Civil Engineers (ASCE) Steel Bridge Team has won six national championships, more than any school in the country. Other organizations have also won national and regional awards.

### **Preparation**

High school students who wish to prepare for some phase of engineering at the college level should attempt to complete the following high school credits: one unit of physics, four units of mathematics and one unit of chemistry. Students who have studied two years of pre-engineering at another institution can normally complete the civil engineering degree program in two additional years.

## Scholarships And Financial Aid

The Department of Civil Engineering awards the George E. Haggart Scholarship to a deserving sophomore, the James and Jean Jorgenson Scholarship to a student with strong academic performance and leadership, and the John A. Oakey Memorial Scholarship to two outstanding juniors. Many other scholarships are awarded to students. The scholarship awards range from \$300 to \$2,000. The Institute of Transportation Engineers (ITE) and ASCE student chapters recognize students who are active in their respective organizations. Other forms of financial aid are available through the Office of Student Financial Services.

## Career Opportunities

NDSU civil engineering graduates are very successful in finding excellent jobs. Most have selected a job before graduation and others within a few weeks of graduation. The work varies in regard to type of activity and location. Civil engineers can work in the office, in the field or a combination of the two. They can work primarily with numbers involving intricate designs or with people in management or sales.

Job placement of recent NDSU civil engineering graduates indicates a variety of work experience. About 40 percent of the graduates have gone to work for consulting engineering firms and another 40 percent with city, state and federal government. The remainder is employed by industry, contractors and the military or has gone to graduate school at NDSU or other universities. Most graduates are involved in more than one type of civil engineering activity. Some students accept jobs in which they are not involved in a specific civil engineering activity, but use their engineering background in other activities. Job placement of our graduates in the last few years has been 75 to 100 percent. The starting salaries accepted by recent civil engineering graduates were between \$46,000 and \$68,000.

## Sample Curriculum

General Education	Credits
First Year Experience	
UNIV 189 - Skills for Academic Success.....	1
Communication	
COMM 110 - Fundamentals of Public Speaking.....	3
ENGL 110, 120 - College Composition I, II.....	3, 3
ENGL 321 - Writing in the Technical Professions.....	3
Quantitative Reasoning	
MATH 165 - Calculus I.....	4
Science & Technology	
CHEM 121, 121L - General Chemistry I and Lab.....	3, 1
CHEM 122, 122L - General Chemistry II.....	3
GEOL 105 - Physical Geology.....	3
Humanities & Fine Arts	
ENGR 311 - History of Technology in America.....	3
Humanities & Fine Arts Elective.....	3
Social & Behavioral Sciences	
ENGR 312 - Impact of Technology on Society.....	3
Social & Behavioral Sciences Elective.....	3
Wellness.....	2
Cultural Diversity.....	-
Global Perspective	
GEOL 105 - Physical Geology.....	3
<b>Total.....</b>	<b>40</b>

Major Requirements	Credits
CE 204 - Surveying.....	4
CE 212 - Graphic Communication.....	3
CE 303, 303L - Civil Engineering Materials & Lab.....	2, 1
CE 309 - Fluid Mechanics.....	3
CE 310 - Fluid Mechanics Lab.....	1
CE 316 - Soil Mechanics.....	3
CE 343 - Structural Analysis.....	4
CE 370 - Introduction to Environmental Engineering.....	3
CE 371 - Environmental Engineering Lab.....	1
CE 404 - Reinforced Concrete.....	3
CE 408 - Water Resource and Supply.....	3
CE 418 - Transportation Engineering.....	4
CE 444 - Structural Steel Design.....	3
CE 483 - Contracts and Specifications.....	3
CE 489 - Senior Design.....	3
<b>Total.....</b>	<b>44</b>

Additional Requirements	Credits
CE 111 - Introduction to Civil Engineering.....	2
CHEM 122L - General Chemistry II Lab.....	1
ENGR 402 - Engineering Ethics and Social Responsibility.....	1
IME 440 - Engineering Economy.....	2
IME 460 - Evaluation of Engineering Data.....	3
MATH 128 - Introduction to Linear Algebra.....	1
MATH 166 - Calculus II.....	4
MATH 259 - Multivariate Calculus.....	3
MATH 266 - Introduction to Differential Equations.....	3
ME 221 - Engineering Mechanics I.....	3
ME 222 - Engineering Mechanics II.....	3
ME 223 - Mechanics of Materials.....	3
ME 350 - Thermal and Heat Transfer.....	3
PHYS 252 - University Physics II.....	4
Technical Electives.....	12
<b>Total.....</b>	<b>48</b>
<b>Curriculum Total.....</b>	<b>133</b>

**This sample curriculum is not intended to serve as a curriculum guide for current students, but rather an example of course offerings for prospective students. For the curriculum requirements in effect at the time of entrance into a program, consult with an academic advisor or with the Office of Registration and Records.**

### For Further Information

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