Duluth Campus

Civil Engineering B.S.C.E.

UMD-Civil Engineering, Dept of

Swenson College of Science and Engineering

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2018
- Required credits to graduate with this degree: 131 to 132
- Required credits within the major: 119 to 120
- This program requires summer terms.
- Degree: Bachelor of Science in Civil Engineering

The B.S.C.E. program in civil engineering integrates topics from chemistry, physics, advanced mathematics, statistics, geology, and core engineering science to prepare graduates to work professionally in public and private organizations that design, develop, and construct structures; design, build, and maintain transportation systems and infrastructure; and design, operate, and control water resource systems. Graduates are rooted in safe and efficient design skills and show respect for and strive to improve the environment wherever they work.

The program includes four areas in civil engineering: transportation engineering, environmental and water resource engineering, structural engineering, and geotechnical engineering. Upper division students are exposed to each of these areas and obtain an in-depth knowledge in at least one area by taking additional elective courses.

Civil engineering graduates are qualified for employment in a wide variety of organizations, both public and private, including design, material testing and manufacture, construction, transportation, natural resources development, and energy. Graduates are prepared to begin their first step toward professional registration by taking the FE exam before completing their collegiate degree. They are also well qualified to continue with graduate education in civil engineering or engineering management.

Students in the B.S.C.E. program have the opportunity to put their design and entrepreneurial skills to use in ASCE design competitions, projects sponsored by regional companies, and research projects in the Undergraduate Research Opportunities Program.

The Bachelor of Science in Civil Engineering is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org

Honors Requirement: To graduate with department honors, a student must have a 3.40 GPA, be an active member of Tau Beta Pi or a professional engineering society (e.g. ASCE, ACI, SWE, & SME), and be nominated by a department faculty member.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Admission Requirements

Students must complete 11 courses before admission to the program.

Freshman and transfer students students are usually admitted to pre-major status before admission to this major

A GPA above 2.0 is preferred for the following:

- 2.50 already admitted to the degree-granting college
- 2.50 transferring from another University of Minnesota college
- 2.50 transferring from outside the University

Freshmen, sophomores, and transfer students may declare a CE major and be admitted to lower division status. Admission to the upper division B.S.C.E. program is competitive and based on performance in lower division courses and space availability. To be considered, students must complete the CE Application to upper division. The following requirements must be met:
1. Completion of the following 11 classes with a C- or better in each class (total 36 credits).
2. A cumulative GPA of 2.5 or better in the 11 required classes.

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

Required prerequisites
Course Admission Requirements (36 -37 cr)
Chemistry I with lab
CHEM 1153 - General Chemistry I [LE CAT, NAT SCI] (4.0 cr)
CHEM 1154 - General Chemistry Lab I [LE CAT, NAT SCI] (1.0 cr)

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Civil Engineering
CE 1025 - Introduction to Civil Engineering (1.0 cr)
CE 2017 - Engineering Mechanics: Statics and Mechanics of Materials (5.0 cr)
Computer Science
CS 1411 - Introduction to Programming in Matlab (4.0 cr)
or CS 1121 - Introduction to Programming in Visual BASIC.NET [LE CAT, LOGIC & QR] (3.0 cr)
Mathematics
MATH 1296 - Calculus I [LE CAT, LOGIC & QR] (5.0 cr)
MATH 1297 - Calculus II [LOGIC & QR] (5.0 cr)
MATH 3280 - Differential Equations with Linear Algebra (4.0 cr)
Physics I course
PHYS 2013 - General Physics I [LE CAT, NAT SCI] (4.0 cr)
or PHYS 2017 - Honors: General Physics I [NAT SCI] (4.0 cr)
Physics I lab
PHYS 2014 - General Physics Lab I [NAT SCI] (1.0 cr)
Writing
WRIT 1120 - College Writing [LE CAT, WRITING] (3.0 cr)

General Requirements

The Board of Regents, on recommendation of the faculty, grants degrees from the University of Minnesota. Requirements for an undergraduate degree from University of Minnesota Duluth include the following:

1. Students must meet all course and credit requirements of the departments and colleges or schools in which they are enrolled including an advanced writing course. Students seeking two degrees must fulfill the requirements of both degrees. However, two degrees cannot be awarded for the same major.
2. Students must complete all requirements of the Liberal Education Program.
3. Students must complete a minimum of 120 semester credits.
4. At least 30 of the last 60 degree credits earned immediately before graduation must be awarded by UMD.
5. Students must complete at least half of their courses at the 3xxx-level and higher at UMD. Study-abroad credits earned through courses taught by UM faculty and at institutions with which UMD has international exchange programs may be used to fulfill this requirement.
6. If a minor is required, students must take at least three upper division credits in their minor field from UMD.
7. The minimum cumulative UM GPA required for graduation will be 2.00 and will include only University of Minnesota coursework. A minimum UM GPA of 2.00 is required in each UMD undergraduate major and minor. No academic unit may impose higher grade point standards to graduate.
8. Diploma, transcripts, and certification will be withheld until all financial obligations to the University have been met.

Program Requirements

1. A minor or second major is not required for B.S.C.E.

2. Summer terms are not required but are optional for all students.

3. C- or better is required in all Civil Engineering courses.

B.S.C.E. Major Requirements (44 cr)
CE 2020 - Computational Tools for Civil Engineers (4.0 cr)
CE 3015 - CAD & Engineering Drawing (4.0 cr)
CE 3016 - Surveying (2.0 cr)
CE 3025 - Environmental Engineering [SUSTAIN] (4.0 cr)
CE 3026 - Project Management (3.0 cr)
CE 3027 - Infrastructure Materials (4.0 cr)
CE 3115 - Structural Analysis (3.0 cr)
CE 3221 - Fluid Mechanics (3.0 cr)
CE 3225 - Hydraulics and Hydrology (4.0 cr)
CE 3316 - Transportation Engineering (3.0 cr)
CE 3426 - Soil Mechanics (4.0 cr)
CE 4126 - Design of Concrete Structures (3.0 cr)
CE 4255 - Senior Design (4.0 cr)

Additional B.S.C.E. Requirements (21 cr)

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Communications
COMM 1112 - Public Speaking [LE CAT, COMM & LAN] (3.0 cr)
Economics
ECON 1022 - Principles of Economics: Macro [LE CAT, SOC SCI] (3.0 cr)
or ECON 1023 - Principles of Economics: Micro [LE CAT, SOC SCI] (3.0 cr)
Mathematics and Statistics
MATH 3298 - Calculus III (4.0 cr)
STAT 3411 - Engineering Statistics (3.0 cr)
Physics II with lab
PHYS 2015 - General Physics II (4.0 cr)
or PHYS 2018 - Honors General Physics II (4.0 cr)
PHYS 2016 - General Physics Lab II (1.0 cr)
Advanced Writing
WRIT 31xx - Adv Writ (3 cr)

Technical Electives (6 cr)
An additional 6 credits of technical electives must be taken and can be chosen from any course in the Swenson College of Science and Engineering at 2xxx or above (including CE courses not already counted toward the degree). CHEM 1152, CHEM 1155 and CHEM 1156, CHEM 1175 and CHEM 1176, as well as GIS 3564, GIS 4565, or SAFE 6051 can also be used to fulfill technical elective requirement. STAT 2411 may not be used to fulfill this requirement.

Civil Engineering Electives (12 cr)
Choose 12 credits from the courses listed below. At least two courses (6 credits) must be taken from the same area. CE 4991 (Independent Study), CE 4995 (Special Topics), and CE 4996 (Independent Study) are allowed with Department approved petition.

Structures Area
Take 0 or more course(s) from the following:
•CE 4100 - Applications of Management in Resilient Precast Concrete (1.0 cr)
•CE 4115 - Design of Steel Structures (3.0 cr)
•CE 4128 - Prestressed Concrete Structures (3.0 cr)
•CE 4135 - Advanced Reinforced Concrete Design (3.0 cr)
•CE 4136 - Structural Systems (3.0 cr)
•CE 4515 - Sustainable Design [SUSTAIN] (3.0 cr)
•CE 5027 - Advanced Concrete Materials and Repair (3.0 cr)
•CE 5115 - Structural Dynamics (3.0 cr)
•CE 5127 - Bridge Analysis and Design (3.0 cr)
•CE 5128 - Prestressed Concrete Structures (3.0 cr)
•CE 5135 - Advanced Reinforced Concrete Design (3.0 cr)
•CE 5515 - Sustainable Design and Construction (SUSTAIN) (3.0 cr)

-OR-

Environmental and Water Resources Area
Take 0 or more course(s) from the following:
•CE 4213 - Open Channel Hydraulics (3.0 cr)
•CE 4215 - Hydraulic Design (3.0 cr)
•CE 4228 - Watershed Engineering (3.0 cr)
•CE 4237 - Water Quality Engineering (3.0 cr)
•CE 4246 - Environmental Remediation Technologies (3.0 cr)
•CE 4256 - Design of Water and Wastewater Treatment Plants (3.0 cr)
•CE 4257 - Municipal Solid Waste Management and Hazardous Waste Systems (3.0 cr)
•CE 5201 - Water Policy (3.0 cr)
•CE 5203 *{Inactive}*(3.0 cr)
•CE 5216 - Applications in Environmental Modeling (3.0 cr)
•CE 5226 - Water Resources Engineering (3.0 cr)
•CE 5237 - Water Quality Engineering (3.0 cr)
•CE 5241 - Water Chemistry (3.0 cr)
•CE 5246 - Environmental Remediation Technologies (3.0 cr)
•CE 5251 *{Inactive}*(4.0 cr)
•CE 5525 - Decision, Risk and Reliability (3.0 cr)

-OR-

Transportation Engineering Area
Take 0 or more course(s) from the following:
•CE 4315 - Design of Traffic Systems (3.0 cr)
•CE 4316 - Pavement Analysis and Design (3.0 cr)

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•CE 4318 - Pavement Maintenance, Rehabilitation, and Management (3.0 cr)
•CE 4326 - Highway Planning and Design (3.0 cr)
•CE 5315 - Design of Traffic Systems (3.0 cr)
•CE 5316 - Pavement Analysis and Design (3.0 cr)
•CE 5317 - Traffic Flow Theory and Modeling (3.0 cr)
•CE 5318 - Pavement Maintenance, Rehabilitation, and Management (3.0 cr)
•CE 5326 - Highway Planning and Design (3.0 cr)

-OR-

Geotechnical Engineering Area
Take 0 or more course(s) from the following:
•CE 4415 - Geotechnical Design (3.0 cr)
•CE 4422 - Numerical Modeling in Geotechnical Engineering (3.0 cr)
•CE 4426 - Rock Mechanics (3.0 cr)
•CE 5420 - Advanced Soil Mechanics (3.0 cr)
•CE 5421 *{Inactive}*(3.0 cr)
•CE 5422 - Numerical Modeling in Geotechnical Engineering (3.0 cr)
•CE 5426 - Rock Mechanics (3.0 cr)

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