



Twin Cities Campus

Geoengineering B.GeoE.

CSENG Civil, Envrn & Geo-Eng (CEGE)

College of Science and Engineering

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2011
- Required credits to graduate with this degree: 128
- Required credits within the major: 61
- This program requires summer terms.
- Degree: Bachelor of Geoengineering

The mission of the geoengineering program comprises three overlapping and mutually supportive components:

- * Prepare students to become productive engineers and contributing members of their professional community.
- * Prepare students for continual learning and professional development.
- * Prepare students for formal advanced education.

The program has four core objectives:

1. To produce graduates with a strong fundamental scientific and technical knowledge base and critical thinking skills required for engineering problem formulation and problem solving.
2. To produce graduates with the ability to work as a professional team member. This includes the ability to communicate effectively through both oral and written language.
3. To produce graduates with an understanding of their obligations as professional geological engineers to protect human health, welfare, and the environment.
4. To ensure that graduates have had opportunities to complement their academic studies with scholarly (research) investigations, co-ops, and internships.

Program Delivery

This program is available:

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

Admission Requirements

Students must complete 10 courses before admission to the program.

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

For information about University of Minnesota admission requirements, visit the [Office of Admissions website](#).

Required prerequisites

Mathematics

Honors math (MATH 1571H, 1572H, 2573H, 2574H) may be taken in place of the listed courses

[MATH 1271](#) - Calculus I [MATH] (4.0 cr)

or [MATH 1371](#) - CSE Calculus I [MATH] (4.0 cr)

[MATH 1272](#) - Calculus II (4.0 cr)

or [MATH 1372](#) - CSE Calculus II (4.0 cr)

[MATH 2243](#) - Linear Algebra and Differential Equations (4.0 cr)

or [MATH 2373](#) - CSE Linear Algebra and Differential Equations (4.0 cr)

[MATH 2263](#) - Multivariable Calculus (4.0 cr)

or [MATH 2374](#) - CSE Multivariable Calculus and Vector Analysis (4.0 cr)

Mechanics

[AEM 2011](#) - Statics (3.0 cr)

[AEM 3031](#) - Deformable Body Mechanics (3.0 cr)

Physical Sciences

[CHEM 1021](#) *{Inactive}* [PHYS] (4.0 cr)

or [CHEM 1031H](#) *{Inactive}* [PHYS] (4.0 cr)

[CHEM 1022](#) *{Inactive}* [PHYS] (4.0 cr)

or [CHEM 1032H](#) *{Inactive}* [PHYS] (4.0 cr)

[PHYS 1301W](#) - Introductory Physics for Science and Engineering I [PHYS, WI] (4.0 cr)



or [PHYS 1401V](#) - Honors Physics I [PHYS, WI] (4.0 cr)
[PHYS 1302W](#) - Introductory Physics for Science and Engineering II [PHYS, WI] (4.0 cr)
or [PHYS 1402V](#) - Honors Physics II [PHYS, WI] (4.0 cr)

General Requirements

All students are required to complete general University and college requirements including writing and liberal education courses. For more information about University-wide requirements, see the [liberal education requirements](#). Required courses for the major or minor in which a student receives a D grade (with or without plus or minus) do not count toward the major or minor (including transfer courses).

Program Requirements

Geology

[ESCI 2301](#) - Mineralogy (3.0 cr)
[ESCI 2302](#) - Petrology (3.0 cr)
[ESCI 3890](#) - Field Workshop (1.0 cr)
[ESCI 4501](#) - Structural Geology (3.0 cr)
[ESCI 1001](#) - Earth and Its Environments [PHYS, ENV] (4.0 cr)
or [ESCI 2201](#) - Solid Earth Dynamics (4.0 cr)
[ESCI 3911](#) - Introductory Field Geology (4.0 cr)
or [ESCI 4971W](#) - Field Hydrogeology [WI] (4.0 cr)

Engineering

[CEGE 3101](#) - Computer Applications I (3.0 cr)
[CEGE 3502](#) - Fluid Mechanics (4.0 cr)
[CEGE 4104W](#) - Capstone Design for Geoengineering [WI] (4.0 cr)
[CEGE 3102](#) - Uncertainty and Decision Analysis (3.0 cr)
[CEGE 3501](#) - Introduction to Environmental Engineering [ENV] (3.0 cr)
[GEOE 4121](#) ~~{Inactive}~~ (3.0 cr)
[CEGE 3301](#) - Soil Mechanics I (3.0 cr)
or [GEOE 3301](#) ~~{Inactive}~~ (3.0 cr)
[AEM 2012](#) - Dynamics (3.0 cr)
or [CHEM 2301](#) - Organic Chemistry I (3.0 cr)
or [EE 2001](#) ~~{Inactive}~~ (3.0 cr)
or [MATS 2001](#) - Introduction to the Science of Engineering Materials (3.0 cr)
or [CSCI 1113](#) - Introduction to C/C++ Programming for Scientists and Engineers (4.0 cr)
or [ME 3331](#) - Thermodynamics (3.0 cr)

Civil Engineering Elective

[CEGE 3402](#) - Civil Engineering Materials (3.0 cr)
or [CEGE 4501](#) - Hydrologic Design (4.0 cr)
or [CEGE 4502](#) - Water and Wastewater Treatment (3.0 cr)

Geoengineering Elective

[GEOE 4301](#) ~~{Inactive}~~ (3.0 cr)
or [GEOE 4311](#) ~~{Inactive}~~ (4.0 cr)
or [GEOE 4351](#) ~~{Inactive}~~ (3.0 cr)

Geology Elective

[GEO 4xxx](#)

Program Sub-plans

Students are required to complete one of the following sub-plans.

Honors UHP

This is an honors sub-plan.

Students admitted to the University Honors Program (UHP) must fulfill UHP requirements in addition to degree program requirements. Honors courses used to fulfill degree program requirements will also fulfill UHP requirements.

Current departmental honors course offerings are listed at:

http://www.honors.umn.edu/academics/curriculum/dept_courses_current.html



Honors students complete an honors thesis project in the final year, most often in conjunction with an honors thesis course, or with an honors directed studies or honors directed research course. Students select honors courses and plan for a thesis project in consultation with their UHP adviser and their departmental faculty adviser.

Geomechanics Engineering

Geomechanics Technical Electives

Students must take 12-14 credits from the approved list of technical electives.

Take 12 - 14 credit(s) from the following:

- AEM 4581 - Mechanics of Solids (3.0 cr)
- CEGE 4301 - Soil Mechanics II (3.0 cr)
- CEGE 4311 - Rock Mechanics (4.0 cr)
- CE 4341 *{Inactive}*(3.0 cr)
- CEGE 4351 - Groundwater Mechanics (3.0 cr)
- CEGE 4352 - Groundwater Modeling (3.0 cr)
- CEGE 4501 - Hydrologic Design (4.0 cr)
- CE 5311 *{Inactive}*(3.0 cr)
- CE 5321 *{Inactive}*(3.0 cr)
- CE 5331 *{Inactive}*(3.0 cr)
- ESCI 4203 - Environmental Geophysics (3.0 cr)
- MATH 4457 *{Inactive}*(4.0 cr)
- MATH 4458 *{Inactive}*(4.0 cr)
- MATH 4567 - Applied Fourier Analysis (4.0 cr)
- MATH 5583 - Complex Analysis (4.0 cr)

Adviser-Approved Technical Elective

Students must take an additional 3 credits in an area approved by the student's adviser.

Geoenvironmental Engineering

Geoenvironmental Technical Electives

Students must take 12-14 credits from the approved list of technical electives.

Take 12 - 14 credit(s) from the following:

- CEGE 4351 - Groundwater Mechanics (3.0 cr)
- CEGE 4352 - Groundwater Modeling (3.0 cr)
- CEGE 4501 - Hydrologic Design (4.0 cr)
- CEGE 4502 - Water and Wastewater Treatment (3.0 cr)
- CEGE 4561 - Solids and Hazardous Wastes (3.0 cr)
- CEGE 4562 - Environmental Remediation Technologies (3.0 cr)
- CEGE 5180 - Special Topics (1.0 - 4.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 5551 - Environmental Microbiology (3.0 cr)
- CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)
- BBE 4533 - Sustainable Waste Management Engineering (3.0 cr)
- BBE 4733 - Renewable Energy Technologies [TS] (3.0 cr)
- EEB 4611 - Biogeochemical Processes (3.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)

Adviser-Approved Technical Elective

Students must take an additional 3 credits in an area approved by the student's adviser.

Geofluids Engineering

Geofluids Technical Electives

Students must take 12-14 credits from the approved list of technical electives.

Take 12 - 14 credit(s) from the following:

- CEGE 4301 - Soil Mechanics II (3.0 cr)
- CE 4341 *{Inactive}*(3.0 cr)
- CEGE 4351 - Groundwater Mechanics (3.0 cr)
- CEGE 4352 - Groundwater Modeling (3.0 cr)
- CEGE 4501 - Hydrologic Design (4.0 cr)
- ESCI 4701 - Geomorphology (4.0 cr)
- MATH 4457 *{Inactive}*(4.0 cr)
- MATH 4458 *{Inactive}*(4.0 cr)
- MATH 4567 - Applied Fourier Analysis (4.0 cr)
- MATH 5583 - Complex Analysis (4.0 cr)
- CEGE 4511 - Hydraulic Structures (3.0 cr)
- CEGE 4512 - Open Channel Hydraulics (3.0 cr)

Adviser-Approved Technical Elective



Students must take an additional 3 credits in an area approved by the student's adviser.