UNIVERSITY OF MINNESOTA
Driven to Discover℠

Twin Cities Campus

Environmental Engineering B.Env.E

CSENG Civil, Envrn & Geo-Eng (CEGE)

College of Science and Engineering

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2016
- Required credits to graduate with this degree: 125
- Required credits within the major: 107 to 114
- Degree: Bachelor of Environmental Engineering

The environmental engineering program seeks innovative and sustainable solutions to air, and water-related problems in natural and built systems. Focus areas of the program include water chemistry; water and wastewater treatment; water quality; hydrology; groundwater remediation; environmental microbiology; pollutant fate and transport; stream restoration, sustainable design, and air pollution. Environmental engineering is a broad and interdisciplinary field, and the program emphases are chemistry, microbiology, water resources, and fluid mechanics.

Program Delivery

This program is available:

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

Admission Requirements

Students must complete 9 courses before admission to the program.

Freshman and transfer students 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 1371 - CSE Calculus I [MATH] (4.0 cr)
or MATH 1271 - Calculus I [MATH] (4.0 cr)
or MATH 1571H - Honors Calculus I [MATH] (4.0 cr)
MATH 1372 - CSE Calculus II (4.0 cr)
or MATH 1272 - Calculus II (4.0 cr)
or MATH 1572H - Honors Calculus II (4.0 cr)
MATH 2374 - CSE Multivariable Calculus and Vector Analysis (4.0 cr)
or MATH 2263 - Multivariable Calculus (4.0 cr)
or MATH 2573H - Honors Calculus III (4.0 cr)
MATH 2574H - Honors Calculus IV (4.0 cr)

Physical Science and Mechanics

Mechanics

AEM 2011 - Statics (3.0 cr)

Chemistry

CHEM 1061 - Chemical Principles I [PHYS] (3.0 cr)
CHEM 1065 - Chemical Principles I Laboratory [PHYS] (1.0 cr)
or CHEM 1071H - Honors Chemistry I [PHYS] (3.0 cr)
CHEM 1075H - Honors Chemistry I Laboratory [PHYS] (1.0 cr)

Chemical Principles II

CHEM 1062 - Chemical Principles II [PHYS] (3.0 cr)
CHEM 1066 - Chemical Principles II Laboratory [PHYS] (1.0 cr)
or CHEM 1072H - Honors Chemistry II [PHYS] (3.0 cr)
CHEM 1076H - Honors Chemistry II Laboratory [PHYS] (1.0 cr)

Physics

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)

BEnvE Requirements

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CHEM 2301 - Organic Chemistry I (3.0 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

Major Courses

AEM 3031 - Deformable Body Mechanics (3.0 cr)
CEGE 3101 - Computer Applications I (3.0 cr)
CEGE 3102 - Uncertainty and Decision Analysis (3.0 cr)
CEGE 3301 - Soil Mechanics I (3.0 cr)
CEGE 3402 - Civil Engineering Materials (3.0 cr)
CEGE 3501 - Introduction to Environmental Engineering [ENV] (3.0 cr)
CEGE 3502 - Fluid Mechanics (4.0 cr)
CEGE 3541 - Environmental Engineering Laboratory (3.0 cr)
CEGE 4102W - Capstone Design for Civil Engineering [WI] (4.0 cr)
CEGE 4501 - Hydrologic Design (4.0 cr)
CEGE 4502 - Water and Wastewater Treatment (3.0 cr)
CHEM 4501 - Introduction to Thermodynamics, Kinetics, and Statistical Mechanics (3.0 cr)
MATH 2373 - CSE Linear Algebra and Differential Equations (4.0 cr)

ESCI

Take any one ESCI course three credits or higher. ESCI 1007 and ESCI 4801 cannot be used to fulfill this requirement.
ESCI 3402, ESCI 3425, ESCI 4702 can be used to fullfill this requirement or the Water/Atmospheric Sciences/Sustainability/Policy selective elective requirement but not both.
ESCI 1xxx
or ESCI 2xxx
or ESCI 3xxx
or ESCI 4xxx
or ESCI 5xxx

Selected Electives

Selected Electives

Students should take 4 courses. Two courses from each category. Students may not use courses from the Selected Electives to also meet the Tech Electives requirements.

Chemistry/Ecology/Mircrobiology

Students must take 2 courses from this category
CEGE 4562 - Environmental Remediation Technologies (3.0 cr)
or CEGE 5541 - Environmental Water Chemistry (3.0 cr)
or EEB 3408W - Ecology [WI] (4.0 cr)
or ESCI 3303W - Geochemical Principles [WI] (4.0 cr)
or LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)
or MICB 3301 - Biology of Microorganisms (5.0 cr)
or CEGE 4561 - Solids and Hazardous Wastes (3.0 cr)
or BBE 4533 - Sustainable Waste Management Engineering (3.0 cr)
or CEGE 5551 - Environmental Microbiology (3.0 cr)
or ESCI 4801 - Geomicrobiology (3.0 cr)
or BBE 4608 - Environmental and Industrial Microbiology (3.0 cr)
or PMB 4121 - Microbial Ecology and Applied Microbiology (3.0 cr)

Water/Atmospheric Sciences/Sustainability/Policy

Students must take 2 courses from this category.
ESCI 3402, ESCI 3425, ESCI 4702 can be used to fullfill this selective elective requirement or the ESCI requirement but not both.
BBE 4523 - Ecological Engineering Design (3.0 cr)
or BBE 4535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)
or CEGE 4351 - Groundwater Mechanics (3.0 cr)
or CEGE 4512 - Open Channel Hydraulics (3.0 cr)
or CEGE 5511 - Urban Hydrology and Water Quality (4.0 cr)
or CEGE 5543 - Introductory Environmental Fluid Mechanics (4.0 cr)
or CEGE 5561 *{Inactive}*(3.0 cr)
or CEGE 5571 *{Inactive}*[GP] (3.0 - 4.0 cr)
or ESCI 3402 - Science and Politics of Global Warming [ENV] (3.0 cr)

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or ESCI 3425 *{Inactive}*(3.0 cr)
or ESCI 4702 - General Hydrogeology (4.0 cr)
or PA 5022 - Applications of Economics for Policy Analysis (1.5 - 3.0 cr)
or PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
or WRS 5101 - Water Policy (3.0 cr)
or PA 5723 - Water Policy (3.0 cr)

Tech Electives

Take 12 or more credit(s) from the following:

•AEM 4xxx
or AEM 5xxx
or AST 4xxx
or AST 5xxx
or BBE 4xxx
or BBE 5xxx
or BMEN 4xxx
or BMEN 5xxx
or CEGE 3xxx
or CEGE 4xxx
or CEGE 5xxx
or CHEM 4xxx
or CHEM 5xxx
or CHEN 4xxx
or CHEN 5xxx
or CMPE 4xxx
or CMPE 5xxx
or CSCI 4xxx
or CSCI 5xxx
or EE 4xxx
or EE 5xxx
or ESCI 4xxx
or ESCI 5xxx
or IE 4xxx
or IE 5xxx
or MATH 4xxx
or MATH 5xxx
or MATS 4xxx
or MATS 5xxx
or ME 4xxx
or ME 5xxx
or PHYS 4xxx
or PHYS 5xxx
or STAT 4xxx
or STAT 5xxx

Upper Division Writing Intensive within the major

Students are required to take one upper division writing intensive course within the major. If that requirement has not been satisfied within the core major requirements, students must choose one course from the following list. Some of these courses may also fulfill other major requirements.

Take 0 - 1 course(s) from the following:

•CEGE 3402 - Civil Engineering Materials (3.0 cr)
•CEGE 4102W - Capstone Design for Civil Engineering [WI] (4.0 cr)
•EEB 3408W - Ecology [WI] (4.0 cr)
•ESCI 3303W - Geochemical Principles [WI] (4.0 cr)

Biological Sciences relevant to the major

Students should take one 3 credit class or higher; it must include lab or field experience

AGRO 1101 - Biology of Plant Food Systems [BIOL] (4.0 cr)
or ANTH 1001 - Human Evolution [BIOL] (4.0 cr)
or BBE 4608 - Environmental and Industrial Microbiology (3.0 cr)
or BIOL 1001 - Introductory Biology: Evolutionary and Ecological Perspectives [BIOL] (4.0 cr)
or BIOL 1003 - Evolution and Biology of Sex [BIOL] (4.0 cr)
or BIOL 1009 - General Biology [BIOL] (4.0 cr)
or BIOL 1009H - Honors: General Biology [BIOL] (4.0 cr)
or BIOL 1012 - Human Biology: Concepts and Current Ethical Issues [BIOL, CIV] (4.0 cr)
or BIOL 1055 - Environmental Biology: Science and Solutions with Laboratory [BIOL, ENV] (4.0 cr)

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or BIOL 2002 *{Inactive}*[BIOL] (6.0 cr)
or BIOL 2002H *{Inactive}*[BIOL] (6.0 cr)
or PMB 4121 - Microbial Ecology and Applied Microbiology (3.0 cr)
or BMEN 2501 - Cellular and Molecular Biology for Biomedical Engineers [BIOL] (4.0 cr)
or CEGE 5551 - Environmental Microbiology (3.0 cr)
or CI 1512 - Nature in the City [BIOL, ENV] (4.0 cr)
or EEB 3407 - Ecology (3.0 cr)
or EEB 3408W - Ecology [WI] (4.0 cr)
or ENT 1005 - Insect Biology with Lab [BIOL] (4.0 cr)
or ESCI 1007 - From Microbes to Mammoths: History of Life on Earth [BIOL] (4.0 cr)
or ESCI 4801 - Geomicrobiology (3.0 cr)
or GEOG 1403 - Biogeography of the Global Garden [BIOL, ENV] (4.0 cr)
or HECU 3593 *{Inactive}*(4.0 cr)
or HORT 1001 - Plant Propagation [BIOL] (4.0 cr)
or MICB 3301 - Biology of Microorganisms (5.0 cr)
or NSCI 2101 - Human Neuroanatomy [BIOL] (4.0 cr)
or PLPA 1005 - Plants Get Sick Too [BIOL] (4.0 cr)
or VBS 1001 - Introduction to Biotechnology [BIOL, TS] (4.0 cr)

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