

Duluth Campus

Environmental Science B.S.

D Earth & Environmental Sci

Swenson College of Science and Engineering

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2019
- Required credits to graduate with this degree: 120
- Required credits within the major: 93 to 95
- Degree: Bachelor of Science

The BS in environmental science is designed for students who want a multidisciplinary science education focusing on aspects of the environment. This environmental science program requires a broad base of knowledge in the basic sciences and mathematics, physics, chemistry, biology, Earth sciences, and statistics. In addition, prudent study of environmental science requires understanding of economic, political, and ethical considerations. Environmental science features an intense grounding in resource issues (including courses in renewable and non-renewable resources) and builds on the strength of UMD in freshwater issues. In addition, the capstone course deals with sources, distribution, and ultimate fate of air, water, and solid waste pollution. Elective courses from areas such as habitats, climate processes, environmental chemistry, quantitative methods, and global resources are also required. The program is predicated on the belief that a student graduating with a BS in environmental science should have a firm background in physical and life sciences and a basic understanding of 1) existing environmental policies and regulations and the legislative process of their formation; 2) the major environmental issues including water, global climate, energy, pollution, and population; 3) techniques of environmental monitoring and prediction; and 4) economics and business organization.

Program Delivery

This program is available:

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

Admission Requirements

For entering freshmen, the only admission requirement is acceptance into the College of Science and Engineering. Transfer students must meet campus and college requirements and are accepted into the program at the level corresponding to credits completed, based on existing transfer manuals and on faculty judgment when courses are not in existing manuals.

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

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.

- Diploma, transcripts, and certification will be withheld until all financial obligations to the University have been met.

Program Requirements

Required Environmental Science Core (29 - 31 cr)

Core Courses (11 - 12 cr)

[GEOL 1110](#) - Geology and Earth Systems [LE CAT4, NAT SCI, SUSTAIN] (4.0 cr)

or [GEOG 1414](#) - Physical Geography [LE CAT4, NAT SCI, SUSTAIN] (4.0 cr)

or [GEOL 1610](#) - Oceanography [LE CAT5, NAT SCI, SUSTAIN] (3.0 cr)

[ESCI 2010](#) - Surface Processes (4.0 cr)

[GEOL 2110](#) - Earth History (4.0 cr)

Advanced Core Courses (12 cr)

[ESCI 3201](#) - Mineral Resources (3.0 cr)

[ESCI 3202](#) - Energy Resources (3.0 cr)

[ESCI 3203](#) - Surface water and groundwater interaction (3.0 cr)

[ESCI 4102](#) - Environmental Assessment (3.0 cr)

Pollution (3 cr)

[CHE 4613](#) - Air Pollution Control (3.0 cr)

or [CE 4237](#) - Water Quality Engineering (3.0 cr)

or [CE 4246](#) - Environmental Remediation Technologies (3.0 cr)

Water Sciences (3 - 4 cr)

[ESCI 4201](#) - Introduction to Watershed Hydrology (3.0 cr)

or [GEOL 5250](#) - Hydrogeology (4.0 cr)

Required Courses From Other Programs (52 cr)

Biology

[BIOL 1011](#) - General Biology I [LE CAT4, NAT SCI] (5.0 cr)

[BIOL 1012](#) - General Biology II [SUSTAIN] (5.0 cr)

[BIOL 2801](#) - General Ecology (3.0 cr)

[BIOL 2802](#) - Ecology Laboratory (2.0 cr)

Chemistry I and lab

[CHEM 1153](#) - General Chemistry I [LE CAT5, NAT SCI] (4.0 cr)

[CHEM 1154](#) - General Chemistry Lab I [LE CAT4, NAT SCI] (1.0 cr)

Chemistry II and lab

[CHEM 1155](#) - General Chemistry II (4.0 cr)

[CHEM 1156](#) - General Chemistry Lab II (1.0 cr)

Additional Chemistry

Environmental Chemistry

[CHEM 2212](#) - Environmental Chemistry [NAT SCI, SUSTAIN] (4.0 cr)

or Quantitative Analysis

[CHEM 2222](#) - Quantitative Analysis (3.0 cr)

[CHEM 2223](#) - Quantitative Analysis Laboratory (1.0 cr)

Mathematics

Calculus I

[MATH 1290](#) - Calculus for the Natural Sciences [LE CAT2, LOGIC & QR] (5.0 cr)

or [MATH 1296](#) - Calculus I [LE CAT2, LOGIC & QR] (5.0 cr)

Calculus II

[MATH 1297](#) - Calculus II [LOGIC & QR] (5.0 cr)

Physics I course

[PHYS 2013](#) - General Physics I [LE CAT5, 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)

Physics II course

[PHYS 2015](#) - General Physics II (4.0 cr)

or [PHYS 2018](#) - Honors General Physics II (4.0 cr)

Physics II lab

[PHYS 2016](#) - General Physics Lab II (1.0 cr)

Advanced Writing

[WRIT 3150](#) - Advanced Writing: Science (3.0 cr)

Advanced Electives (12 cr)

Environmental Science students are required to take elective courses in science and engineering. Recommended courses that can fulfill this requirement specific to particular environmental science concentrations are listed on the Department of Earth and Environmental Science website <https://scse.d.umn.edu/about/departments-and-programs/earth-environmental-sciences>

Earth Science Electives

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- ESCI 3xxx
- ESCI 4xxx
- ESCI 5xxx
- GEOL 3xxx
- GEOL 4xxx
- GEOL 5xxx

Additional Electives

At least one course totally at least one credit must have a designator that is not ESCI or GEOL.

Take 9 or more credit(s) from the following:

- [AST 4110](#) - Observational Astronomy (3.0 cr)
- BIOL 3xxx
- BIOL 4xxx
- BIOL 5xxx
- CE 3xxx
- CE 4xxx
- CE 5xxx
- [CHE 2111](#) - Material and Energy Balances (3.0 cr)
- CHE 3xxx
- CHE 4xxx
- CHE 5xxx
- [CHEM 2541](#) - Organic Chemistry I (3.0 cr)
- [CHEM 2542](#) - Organic Chemistry II (3.0 cr)
- [CHEM 2543](#) - Organic Chemistry I Laboratory (1.0 cr)
- [CHEM 2544](#) - Organic Chemistry II Laboratory (1.0 cr)
- CHEM 3xxx
- CHEM 4xxx
- CHEM 5xxx
- CS 3xxx
- CS 4xxx
- CS 5xxx
- EE 3xxx
- EE 4xxx
- EE 5xxx
- ES 3xxx
- ES 4xxx
- ES 5xxx
- ESCI 3xxx
- ESCI 4xxx
- ESCI 5xxx
- GEOG 3xxx
- GEOG 4xxx
- GEOG 5xxx
- GEOL 3xxx
- GEOL 4xxx
- GEOL 5xxx
- GIS 3xxx
- GIS 4xxx
- GIS 5xxx
- IE 3xxx
- IE 4xxx
- IE 5xxx
- LIM 3xxx
- LIM 5xxx
- MATH 3xxx
- MATH 4xxx

- MATH 5xxx
- ME 3xxx
- ME 4xxx
- ME 5xxx
- PHYS 3xxx
- PHYS 4xxx
- PHYS 5xxx
- STAT 3xxx
- STAT 4xxx
- STAT 5xxx
- [WRS 5101](#) - Water Policy (3.0 cr)