Twin Cities Campus

Earth Sciences B.A.

Department of Earth Sciences

College of Liberal Arts

- Program Type: Baccalaureate
- Requirements for this program are current for Spring 2017
- Required credits to graduate with this degree: 120
- Required credits within the major: 71
- This program requires summer terms.
- Degree: Bachelor of Arts

Earth Sciences is the study of the composition, structure, and history of the Earth, as well as the processes that operate on and within it. Emphasis on the crust, oceans, and atmosphere. The BA prepares students for graduate study or professional employment.

Earth scientists are employed in a wide range of fields, including exploration for and development of natural resources, environmental science, urban planning, education, oceanography, and other areas related to natural science. Potential employers include the oil, gas, and minerals industries, environmental consultants, federal and private research institutions, universities, schools, and government agencies. An advanced degree is usually required for a career in research or teaching.

Program Delivery

This program is available:

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

Admission Requirements

A GPA above 2.0 is preferred for the following:

- 2.50 transferring from outside the University

Students interested in Earth Sciences as a major may want to consider taking one of these courses with a lab: ESCI 1001, 1005, 1006, or 1007.

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

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

Students are required to take 4 semester(s) of any second language.

CLA BA degrees require 4 semesters or the equivalent of a second language.

CLA degrees require students to complete 48 credits of upper division coursework taken at the 3xxx, 4xxx, or 5xxx level. For a BA at least 18 of the 48 upper division credits must be outside of the major. For some specific majors, there are exceptions to this requirement.

This program requires 18 upper division credits outside the major. See your advisor for a list of courses that can or cannot be used to meet this requirement.

Students may earn a BA or a minor in earth sciences, but not both.

All incoming CLA freshmen must complete the First Year Experience course sequence.

Mathematics

Take 1 of the following calculus sequences for a total of 8 credits.
MATH 1271 - Calculus I [MATH] (4.0 cr)
MATH 1272 - Calculus II (4.0 cr)
or MATH 1371 - CSE Calculus I [MATH] (4.0 cr)

MATH 1372 - CSE Calculus II (4.0 cr)
or MATH 1571H - Honors Calculus I [MATH] (4.0 cr)
MATH 1572H - Honors Calculus II (4.0 cr)

Physics
Take 2 of the following courses for a total of 8 credits.
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)

Chemistry
Take 4 of the following courses for a total of 8 credits.
Chemical Principles I
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)

Major Courses
Take the following 7 courses for a total of 25 credits.
ESCI 2201 - Solid Earth Dynamics (4.0 cr)
ESCI 2202 - Earth History (4.0 cr)
ESCI 2203 - Earth Surface Dynamics (4.0 cr)
ESCI 2301 - Mineralogy (3.0 cr)
ESCI 3202 - Fluid Earth Dynamics (4.0 cr)
ESCI 3303W - Geochemical Principles [WI] (4.0 cr)
ESCI 3891 - Field Methods (2.0 cr)

Field Courses
Take 2 of the following courses for a total of 8 credits.
ESCI 3911 - Introductory Field Geology (4.0 cr)
ESCI 4911 - Advanced Field Geology (4.0 cr)
or ESCI 4971W - Field Hydrogeology [WI] (4.0 cr)

Electives
ESCI 2302, 4501, and 4602 are strongly recommended for satisfying the elective credits.
Take 14 or more credit(s) from the following:
- ESCI 2302 - Petrology (3.0 cr)
- ESCI 3001 *{Inactive}*(3.0 cr)
- ESCI 3002 - Climate Change and Human History [ENV] (3.0 cr)
- ESCI 3004 - Water and Society [ENV] (3.0 cr)
- ESCI 3005 - Earth Resources (3.0 cr)
- ESCI 3006 - Rocks and Stars: Introduction to Planetary Science (3.0 cr)
- ESCI 3093 - Directed Studies in Earth & Environmental Sciences: Junior (1.0 - 4.0 cr)
- ESCI 3402 - Science and Politics of Global Warming [ENV] (3.0 cr)
- ESCI 3425 *{Inactive}*(3.0 cr)
- ESCI 3890 - Field Workshop (1.0 cr)
- ESCI 4xxx
- ESCI 4010 - Undergraduate Seminar: Current Topics in Earth & Environmental Sciences (1.0 - 4.0 cr)
- ESCI 4093 - Directed Studies in Earth & Environmental Sciences: Senior (1.0 - 4.0 cr)
- ESCI 4094 - Senior Thesis (2.0 cr)
- ESCI 4102W - Vertebrate Paleontology: Evolutionary History and Fossil Records of Vertebrates [WI] (3.0 cr)
- ESCI 4103W - Fossil Record of Mammals [WI] (3.0 cr)
- ESCI 4203 - Environmental Geophysics (3.0 cr)
- ESCI 4204 - Geomagnetism and Paleomagnetism (3.0 cr)
- ESCI 4211 *{Inactive}*(3.0 cr)
- ESCI 4212 - Geodynamics (3.0 cr)
- ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)
- ESCI 4402 - Biogeochemical Cycles in the Ocean (3.0 cr)
- ESCI 4501 - Structural Geology (3.0 cr)

- ESCI 4502 - Tectonic Styles (3.0 cr)
- ESCI 4503 *{Inactive}*(3.0 cr)
- ESCI 4602 - Sedimentology and Stratigraphy (3.0 cr)
- ESCI 4701 - Geomorphology (4.0 cr)
- ESCI 4702 - General Hydrogeology (4.0 cr)
- ESCI 4703 - Glacial Geology (4.0 cr)
- ESCI 4801 - Geomicrobiology (3.0 cr)
- ESCI 5201 - Time-Series Analysis of Geological Phenomena (3.0 cr)
- ESCI 5203 - Mineral and Rock Physics (3.0 cr)
- ESCI 5204 - Geostatistics and Inverse Theory (3.0 cr)
- ESCI 5205 *{Inactive}*(3.0 cr)
- ESCI 5302 - Isotope Geology (3.0 cr)
- ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)
- ESCI 5351 *{Inactive}*(3.0 cr)
- ESCI 5502 *{Inactive}*(3.0 cr)
- ESCI 5503 - Advanced Petrology (3.0 cr)
- ESCI 5504W *{Inactive}*[WI] (3.0 cr)
- ESCI 5601W *{Inactive}*[WI] (4.0 cr)
- ESCI 5705 - Limnogeology and Paleoenvironment (3.0 cr)
- ESCI 5713 *{Inactive}*(3.0 cr)
- ESCI 5980 - Seminar: Current Topics in Earth Sciences (1.0 - 4.0 cr)
- ESPM 3425 - Atmospheric Pollution: From Smog to Climate Change (3.0 cr)
- GCC 3004 *{Inactive}*[ENV] (3.0 cr)
- GCC 3006 *{Inactive}*[ENV] (3.0 cr)
- GCC 5008 - Policy and Science of Global Environmental Change [ENV] (3.0 cr)
- MATS 5353 *{Inactive}*(3.0 cr)

Major Project

The Major Project for the Earth Sciences BA is fulfilled with successful completion of either ESci 4911 or ESci 4971W. Students must complete one of these courses for the Field Courses requirement.

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:

- ESCI 3303W - Geochemical Principles [WI] (4.0 cr)
- ESCI 4971W - Field Hydrogeology [WI] (4.0 cr)