

BACHELOR OF SCIENCE IN GEOLOGY

DEPARTMENT OF GEOLOGY AND ENVIRONMENTAL SCIENCE

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67 credits minimum

Updated 12/24

Excellent preparation for GRADUATE SCHOOL and careers in ENVIRONMENTAL GEOLOGY, GEOTECHNICAL, GIS, PETROLEUM, AND MANY OTHER FIELDS.

CORE COURSES (check each as completed)

(30 credits)

Choose one of the following introductory geology classes:

____ GEOL 0800 Geology (3) **OR** GEOL 0820 Natural Disasters (3)

Take each of the following:

____ GEOL 0055 Geology Laboratory (2) [Fall, Spring, Jones] **This is a prerequisite for all core courses!**

____ GEOL 0060 History of the Earth (4) [Spring, Jones] **Excellent follow-up to 0800/0820 and 0055.**

____ GEOL 1001 Mineralogy (4) [Fall, Capo] **This is a prerequisite for GEOL 1003 and co-req. for 1020!**

____ GEOL 1003 Igneous and Metamorphic Petrology (4) [Spring, Stewart]

____ GEOL 1015 Colloquium [Fall, Spring, Staff, taken pass/fail] (1) **Better taken after some core classes.**

____ GEOL 1020 Sedimentology and Stratigraphy (4) [Fall, Jones]

____ GEOL 1100 Structural Geology (4) [Spring, McQuarrie]

____ GEOL 1960 Field Camp (4-8) [Summer. In the fall, seek out programs run by other universities (see this [list of field camps](#)) and [transfer in the credits](#). The Yellowstone Field Camp does not fulfill this requirement.] *Note: GEOL 0060 and GEOL 1020 together fulfill one writing (W) requirement.*

CO-REQUIREMENTS (Take as early as possible, calc before physics; check each as completed):

(28 credits)

____ MATH 0220 Analytical Geometry and Calculus 1 (4)

____ MATH 0230 Analytical Geometry and Calculus 2 (4) **Note: This one is hard. Be prepared!**

____ STAT 1000 Applied Stat. Methods (4) **OR** GEOL 1045 Statistics for Earth Science (3) **OR** MATH 0240 Analytical Geometry and Calculus 3 (4) **OR** MATH 0280 Linear Algebra (3) **OR** MATH 0290 Diff-Eqs

____ CHEM 0110 General Chemistry 1 (4)

____ CHEM 0120 General Chemistry 2 (4)

____ PHYS 0110 Physics 1 (Mechanics, Heat, Waves; 3) **OR** PHYS 0174 Physics for Sci. & Engin. 1 (4)

____ PHYS 0111 Physics 2 (Electricity, Magnetism, Optics; 3) **OR** PHYS 0175 Phys for Sci. & Engin. 1 (4)

ELECTIVES (At least 9 credits of upper level or graduate GEOL courses):

(9 credits)

____ GEOL 1030 Oceans, Atmosphere, and Climate (3) [Fall, Spring]

____ GEOL 1050 Surface Water Hydrology (4) [Fall, TBA]

____ GEOL 1051 Groundwater Geology (4) [Spring, TBA]

____ GEOL 1052 Paleoclimatology (3) [Alternate years, Abbott]

____ GEOL 1060 Geomorphology (4) [Fall, Spring]

____ GEOL 1062 Geomorphology: Dynamic Evol. of Earth's Surface (4) [Shelef, Spring of even-numbered years]

____ GEOL 1203 Invertebrate Paleontology (4) [Spring of odd years, Jones]

____ GEOL 1204 Vertebrate Paleontology (3) [Spring of even years, Carroll]

____ GEOL 1315 W - Scientific Communication for Geoscience Professionals (3) [TBA]

____ GEOL 1331 Health and Safety (HAZWOPER) (3) [Fall, Kubeldis]

____ GEOL 1410 Exploration Geophysics (3) [Spring of odd-numbered years, Harbert]

____ GEOL 1413 Geophysical Well Logging (3) [Spring of even-numbered years, Harbert]

____ GEOL 1445 GIS, GPS, and Computer Methods (3) [Fall, Spring, Summer]

____ GEOL 1446 Advanced Geographic Information Systems (3) [Spring]

____ GEOL 1460 Remote Sensing of the Earth (3) [Fall, Ramsey]

____ GEOL 1510 Aquatic and Sedimentary Geochemistry (3) [Spring of odd-numbered years, Werne]

____ GEOL 1516 Environmental Geochemistry with Lab (4) [Fall, Spring]

____ GEOL 1701 Geology of the Planets (3) [Williams]

____ GEOL 1900 Internship (3-4) [Get pre-approved by Jones]

____ GEOL 1903 Undergraduate Research (1-4) [Arrange with a GES faculty member]

____ GEOL 1910 Undergraduate Thesis (1-4) [Arrange with a GES faculty member]

____ GEOL 1xxx Other upper-level geology classes (GEOL 1000 or higher) may be approved by your advisor.

____ GEOL 2xxx Graduate classes are numbered 2000 and up. **Get instructor permission for graduate classes,** including such classes as GEOL 2054 Soils, GEOL 2110 Plate Tectonics, and GEOL 2750: Volcanology.

____ CEE 1800 Engineering Geology (3) [Fall, Geary] Excellent preparation for the Professional Geologists Exam!

Note: GEOL 1313 and GEOL 1342 do not count as electives, but they do count as W classes.

Typical Course Schedules for the Geology Major:

Words of wisdom: **Take your co-requisites as early as possible.** While calculus and physics are not directly used in many of our classes, a basic conceptual understanding of physics is a foundation for scientific thinking about the physical world. In contrast, basic chemistry is important for a number of the GEOL classes. Warning: *GEOL 1100 Structural Geology* has a time-consuming lab. Don't schedule a lot of labs the same semester as GEOL 1100.

1. Luxury Schedule: You picked the geology major early.

Fall, Sophomore Year	Spring, Sophomore Year
Geol 0800 <i>or</i> Geol 0820 (an introductory class)	Geol 0060: History of the Earth (w/ lab)
Geol 0055: Geology Laboratory	Geology elective or Geol 0055 if necessary
Fall, Junior Year	Spring, Junior Year
Geol 1001: Mineralogy (w/ lab)	Geol 1003: Igneous and Metamorphic Petrology (w/ lab)
Geol 1020: Sedimentology and Stratigraphy (w/ lab)	Geol 1100: Structural Geology (w/ Big Lab)
Register for a summer field camp !	
Fall, Senior Year	Spring, Senior Year
Geology elective	Geology elective
Geology elective	Apply for April (spring) graduation

2. Condensed Schedule: You picked geology at the last minute and want to graduate pronto.

Fall, Junior Year	Spring, Junior Year
Geol 0800 <i>or</i> Geol 0820 (an introductory class)	Geol 0060: History of the Earth (w/ lab)
Geol 0055: Geology Laboratory	Geology elective or Geol 0055 if necessary
Geol 1001: Mineralogy (w/ lab) or Geology elective	Geol 1003 Ig Met Pet <u>if</u> you took GEOL 1001 in the fall.
Fall, Senior Year	Spring, Senior Year
Geol 1020: Sedimentology and Stratigraphy (w/ lab)	Geology elective or Geol 1003 Ign & Met Pet (w/lab)
Geology elective or Mineralogy (w/ lab)	Geol 1100: Structural Geology (w/ Big Lab)
Geology elective. Register for a summer field camp !	Apply for August graduation. For April graduation, need to have taken Geol 1100 and field camp in junior year.

Recommended courses beyond the Department of Geology and Environmental Sciences:

The following courses are of particular interest to those wishing to become professional geologists. These do not count as electives. Engineering advisors have indicated geology majors should have the appropriate background for these courses. If they are wrong, **please let us know!** We need feedback to advise effectively.

Petroleum Engineering courses: Understanding the engineering of petroleum extraction should help you to be better at petroleum exploration and faster at climbing the career ladder.

PETE 1160: Intro to Petroleum Reservoir Engin. (3)	PETE 1204: Enhanced Oil Recovery Processes (3)
PETE 1201: Recovery of Oil by Waterflooding (3)	PETE 1205: Petroleum Production Engineering (3)

Click [here](#) for the PETE course descriptions. **Pay attention to pre-req's.** Ask the instructor if you have questions.

Civil Engineering courses: These courses are of particular interest to those wishing to become hydrogeologists and environmental geologists. Engineers often run environmental companies, so being able to talk their language will help you do your job and achieve greater success.

CEE 1200: Construction Management (3)	CEE 1220: Energy Technol. & the Environment (3)
CEE 1209: Life Cycle Assmnt Meth & Tools (3)	CEE 1503: Introduction to Environmental Engring (3)
CEE 1210: Engineering and Sustainable Devel. (3)	CEE 1514: Environmental Impact Assessment (3)
CEE 1212: Environmental Management (3)	CEE 1800: Engineering Geology (3)

Click [here](#) for the CEE course descriptions. **Pay attention to pre-req's.** Ask the instructor if you have questions.

* We offer scholarships to offset some of the cost of a field camp.

Departmental Honors Requirements: Complete the requirements for *one* of the following three options:

Course Option: Complete the minimum degree requirements, earn an overall QPA of 3.25 or more, and:

1. Satisfactorily complete a total of at least nine additional credits from other formal GEOL courses (excluding the 0800 series) or from any of the following: BIOSC 0370; CHEM 0250, 0260, 0310, 0320, 1410, 1540; ASTRON 0113, 1122; PHYS 0477, 0577, 1150, 1331;
2. Include within the requirements listed above a minimum of three credits in either geochemistry (GEOL 1051, 1515, 2500, or 2520) or geophysics (GEOL 1410 or 1460).

Research Option: Complete the minimum degree requirements, earn an overall QPA of 3.25 or more, and complete a minimum of three credits of Undergraduate Research (GEOL 1903) under the supervision of a faculty member from the Department of Geology and Environmental Science. This research must culminate in a written thesis that documents original research conducted by the student. Acceptance of the thesis will be contingent upon approval of the faculty supervisor and two additional faculty members. The results of the student's research are to be presented orally in a departmental seminar.

Let your advisor know if you are seeking Departmental Honors!

Suggested Elective Concentrations (grouped by interest)

First, let me state that the **core classes** are fundamentally important for all of the fields that follow. Professional and academic geologists constantly rely upon the basic stuff covered in these classes, and working professionals consistently tell me that the most important professional training we can give is to ensure that our majors are well grounded in the fundamentals of geology.

Environmental Geology

These classes are useful to environmental geologists:

GEOL 1051: Groundwater Geology
GEOL 1050: Surface Water Hydrology
GEOL 1060: Geomorphology
GEOL 1331: Health and Safety (HAZWOPER)
GEOL 1445: GIS, GPS, and Comp. Meth.
GEOL 1460: Remote Sensing
GEOL 1515: Environmental Geochemistry
GEOL 2054: Soils (instructor permission needed)

Groundwater seems to be particularly important for the Professional Geologists' Fundamentals of Geology exam.

Engineering Geology

These classes are essential to engineering geologists:

GEOL 1100: Structural Geology: Excel at this!
GEOL 1060 or GEOL 1062 Geomorphology: And excel at this!

In addition, groundwater geology, soils, and others from the Environmental Geology list are strongly recommended, particular when it comes to passing the Professional Geologists license exam ("Fundamentals of Geology"; see the [Professional Geologists License](#) link on the geology advising web page.

Petroleum Exploration:

These classes are helpful to petroleum/exploration geologists:

GEOL 1410: Exploration Geophysics
GEOL 1413: Well Logging
GEOL 2110: Plate Tectonics (instructor permission needed)
GEOL 2120: Basin Analysis (instructor permission needed)

Paleontology

In addition to our 1200-level offerings, take some biology! The following should help you understand the factors that control changes in organisms over time, but do get advice from actual paleontologists!

BIOSC 0150+0050: Biology 1 plus lab.
BIOSC 0160: Biology 2 plus lab
BIOSC 0350: Genetics
BIOSC 0370: Ecology plus lab
BIOSC 1200: Vertebrate morphology plus lab

Planetary Science:

These classes are helpful for budding planetary geologists:

GEOL 1060 Geomorphology
GEOL 1460: Remote Sensing of the Earth
GEOL 1701: Geology of the Planets
GEOL 2460: Applied Remote Sensing and GPS Techniques
GEOL 2750: Volcanology (instructor permission needed)

In addition to these, look for offerings at the graduate level and in the Department of Physics and Astronomy.
