

GEOSCIENCE

College of Natural Science and Mathematics
Department of Geosciences
907-474-7565
www.uaf.edu/geology/

B.S. Degree

Minimum Requirements for Degree: 120 credits

Graduates in geoscience have broad backgrounds in the earth sciences and firm foundations in mathematics, physics and chemistry. Four concentrations are available to allow students to pursue their own emphasis: geology, paleontology, geospatial science and geophysics. The concentrations allow students to focus earlier in their studies but are flexible enough to allow students to pursue their own interests in the junior and senior years. All of the concentrations are designed to prepare students for industry jobs in oil, mining and environmental consulting; jobs with agencies such as U.S. Geological Survey, NASA, Alaska Division of Geological and Geophysical Surveys; or graduate studies.

The geology concentration offers students a sound background in a spectrum geological disciplines with an emphasis on current field mapping techniques essential to exploration and research. The paleontology concentration is designed to provide students with the skills necessary to locate, excavate, interpret and curate specimens for museums, agencies or universities. The geospatial sciences concentration focuses on the principles, techniques and applications of remote sensing, GIS and GPS to prepare students for careers that require geospatial data analysis and visualization. The geophysics concentration challenges students to use physics in understanding geoscience concepts, emphasizing applications in seismology, volcanology and glaciology in the context of the Alaskan landscape. This concentration is designed to prepare students for graduate work in geophysics and environmental engineering fields or other disciplines that use geophysical tools such as ground-penetrating radar or exploration seismology.

Major — B.S. Degree

1. Complete the general university requirements. (See page 169. As part of the core curriculum requirements, complete MATH F251X and CHEM F105X.)
2. Complete the following:*
GEOS F101X—The Dynamic Earth4
GEOS F112X—The History of Earth and Life4
GEOS F309—Plate Tectonics.....3
3. Complete one of the following concentrations:*

Geology

- a. Complete the following:
CHEM F106X—General Chemistry II4
PHYS F103X—College Physics I.....4
PHYS F104X—College Physics II.....4
- b. Complete the following (major) requirements:*
GEOS F213—Mineralogy.....4
GEOS F214—Petrology and Petrography4
GEOS F225—Field and Computer Methods in Geology.....2
GEOS F304—Geomorphology3
GEOS F314—Structural Geology.....4
GEOS F315W—Paleobiology and Paleontology4
GEOS F322—Stratigraphy and Sedimentation.....4
GEOS F351W—Field Geology**8
GEOS F430—Statistics and Data Analysis in Geology.....3
STAT F200X—Elementary Probability and Statistics (3)
or STAT F300—Statistics (3)3

- c. Complete 12 additional credits of upper-division GEOS courses or other upper-division courses approved by the undergraduate advisor* including one O (oral-intensive) course from any department.

Paleontology

- a. Complete the following:
CHEM F106X—General Chemistry II4
PHYS F103X—College Physics I.....4
- b. Complete the following (major) requirements:*
GEOS F213—Mineralogy.....4
GEOS F214—Petrology and Petrography4
GEOS F225—Field and Computer Methods in Geology.....2
GEOS F314—Structural Geology.....4
GEOS F322—Stratigraphy and Sedimentation4
GEOS F351W—Field Geology**8
GEOS F430—Statistics and Data Analysis in Geology.....3
STAT F200X—Elementary Probability and Statistics (3)
or STAT F300—Statistics (3)3
GEOS F315W—Paleobiology and Paleontology4
GEOS F317O—Paleontological Research and Laboratory
Methods2
- c. Complete at least two of the following electives:*
GEOS F453—Palynology and Paleopalynology4
GEOG F485—Mass Extinctions, Neocatastrophism and
the History of Life.....3
GEOS F486—Vertebrate Paleontology.....3
GEOS F488—Undergraduate Research.....2
- d. Complete the requirements for a minor in biological sciences.....20

Geospatial Sciences

- a. Complete the following:
CHEM F106X—General Chemistry II4
PHYS F103X—College Physics I.....4
PHYS F104X—College Physics II.....4
- b. Complete the following (major) requirements:*
GEOS F213—Mineralogy.....4
GEOS F214—Petrology and Petrography4
GEOS/GEOG F222—Fundamentals of Geospatial Sciences.....3
GEOS F225—Field and Computer Methods in Geology.....3
GEOS F304—Geomorphology3
GEOS F314—Structural Geology.....4
GEOS F322—Stratigraphy and Sedimentation4
GEOS F351W—Field Geology**8
GEOS F430—Statistics and Data Analysis in Geology.....3
STAT F200X—Elementary Probability and Statistics (3)
or STAT F300—Statistics (3)3
- c. Complete at least two of the following remote sensing electives:*
GEOS F408—Photogeology2
GEOS F422—Geoscience Applications of Remote Sensing3
GEOS F488—Undergraduate Research.....2
NRM F641—Remote Sensing of Natural Resources4
- d. Complete at least two of the following GIS electives:*
GEOG F309—Digital Cartography and Geo-Visualization4
GEOG F435—GIS Analysis3
GEOS F458—Geoscience Applications of GPS and GIS3
NRM F338—Introduction to GIS3
- e. Complete 9 additional credits of upper-division GEOS courses or other upper-division courses approved by the undergraduate advisor* including one O (oral-intensive) course and one additional W (writing-intensive) course from any department.

Geophysics

- a. Complete the following:*
 - GEOS F262—Rocks and Minerals3
 - GEOS F318—Solid Earth Geophysics.....3
 - GEOS F406—Volcanology3
 - GEOS F431—Foundations of Geophysics.....4
 - GEOS F475W,O—Presentation Techniques in the Geosciences2
 - GEOS F477O—Ice in the Climate System3
 - GEOS F488—Undergraduate Research.....2
 - MATH F252X—Calculus II4
 - MATH F253X—Calculus III.....4
 - MATH F302—Differential Equations3
 - MATH F314—Linear Algebra3
 - PHYS F211 and PHYS F212—General Physics8
 - PHYS F213X—Elementary Modern Physics.....4
 - PHYS F220—Introduction to Computational Physics4
 - b. Complete at least three of the following science and engineering electives:*
- ES F331—Mechanics of Materials3
 - ES F341—Fluid Mechanics.....4
 - GEOS F314—Structural Geology.....4
 - GEOS F322—Stratigraphy and Sedimentation.....4
 - GEOS F422—Geoscience Applications of Remote Sensing.....3
 - ME F441—Heat and Mass Transfer3
 - PHYS F301—Introduction to Mathematical Physics.....4
 - PHYS F313—Thermodynamics and Statistical Physics.....4
 - PHYS F341—Classical Physics I: Particle Mechanics4
- c. Complete 3 additional upper-division GEOS credits or other upper-division courses as approved by the undergraduate advisor*
 - d. Complete one W (writing-intensive) course approved by the undergraduate advisor.*
4. Minimum credits required120

* Students must earn a C- grade or better in each of these courses.

** GEOS F351 is offered at UAF during the summer of odd-numbered years.

Students may substitute a 6-credit field geology class at another institution. The geology and geophysics undergraduate advisor will assist students in placement in an approved field geology class.

Minors

Geology

1. Complete the following:
 - GEOS F101X—The Dynamic Earth4
 - GEOS F112X—The History of Earth and Life4
2. Complete 12 additional credits of GEOS courses as approved by the undergraduate geoscience advisor12
3. Minimum credits required20

Paleontology

1. Complete the following:
 - GEOS F101X—The Dynamic Earth4
 - GEOS F112X—The History of Earth and Life4
2. Complete three of the following:
 - GEOS F315W—Paleobiology and Paleontology4
 - GEOS F317O—Paleontological Research and Laboratory Methods2
 - GEOS F322—Stratigraphy and Sedimentation.....4
 - GEOS F453—Palynology and Paleopalynology4
 - GEOS F485—Mass Extinctions, Neocatastrophism and the History of Life.....3
 - GEOS F486—Vertebrate Paleontology.....3
3. Minimum credits required 16-20

Geospatial Sciences

1. Complete the following:
 - GEOS F101X—The Dynamic Earth4
 - GEOS F112X—The History of Earth and Life4
 - GEOS/GEOG F222—Fundamentals of Geospatial Sciences.....3
 - GEOS F225—Field and Computer Methods in Geology.....2
 - GEOS F422—Geoscience Applications of Remote Sensing.....3
 - GEOS F458—Geoscience Applications of GPS and GIS3
2. Minimum credits required:19

Geophysics

1. Complete the following:
 - GEOS F101X—The Dynamic Earth4
 - GEOS F112X—The History of Earth and Life4
 - GEOS F318—Solid Earth Geophysics.....3
 - GEOS F406—Volcanology3
 - GEOS F431—Foundations of Geophysics.....4
 - GEOS F477O—Ice in the Climate System3
2. Minimum credits required:21