Geology-Chemistry

Geology-Chemistry involves two different emphases. Low-temperature geochemistry involves study of chemical and biochemical processes on and near Earth's surface, including land, oceans and freshwater bodies, and how the geochemical record reflects climate conditions. High-temperature geochemistry includes study of formation and evolution of the Earth and other planets, magma formation and properties, volcanic activity, and metamorphism. The AB degree requires a total of 14 courses, including 5 geoscience courses and 4 chemistry courses, and a few supporting math and physics courses. The ScB degree requires a total of 20 courses, including 7 geoscience courses and 4 chemistry courses, either with an organic or an inorganic focus, plus some supporting math and physics courses and one research course. Geoscience courses emphasize a process-oriented approach, with hands-on experiences in labs and on field trips. There is a strong emphasis on active and collaborative learning, and on practice in communication. There are many opportunities for students to do research work for pay during the academic year or in the summer, in areas such as experimental studies of magma formation, and analyzing lunar rock samples for water content.

Standard program for the A.B. degree

Recommended for students seeking a liberal education and interested in applying physical and chemical principles toward an understanding of Earth history, Earth processes, and environmental and resource issues.

Basic supporting science courses
Select two courses in mathematics at the level of: 2
- MATH 0090  Introductory Calculus, Part I (or more advanced)
- MATH 0100  Introductory Calculus, Part II (or more advanced)

CHEM 0330  Equilibrium, Rate, and Structure 1

PHYS 0050  Foundations of Mechanics (or a more advanced course) 1
or ENGN 0030  Introduction to Engineering

Concentration courses
- GEOL 0220  Physical Processes in Geology 1
- GEOL 0230  Geochemistry: Earth and Planetary Materials and Processes 1
- GEOL 0240  Earth: Evolution of a Habitable Planet 1

Three additional chemistry courses 3
Select one of the following Series: 2
- GEOL 1410  Mineralogy
  & GEOL 1420  Petrology
- GEOL 1130  Ocean Biogeochemical Cycles
  & GEOL 1370  Environmental Geochemistry

Two additional courses from upper level geological sciences, math, or supporting sciences with approval from the departmental concentration advisor. 2

Total Credits 14

Standard program for the Sc.B. degree

This program is recommended for students interested in graduate study and careers in geochemistry and related fields.

Basic Supporting Science Courses:
Select two courses in mathematics at the level of: 2
- MATH 0090  Introductory Calculus, Part I (or more advanced)
- MATH 0100  Introductory Calculus, Part II (or more advanced)

CHEM 0330  Equilibrium, Rate, and Structure 1

Select one of the following series: 2

PHYS 0050  Foundations of Mechanics
& PHYS 0060  Foundations of Electromagnetism and Modern Physics

ENGN 0030  Introduction to Engineering
& ENGN 040  Dynamics and Vibrations
or a more advanced course

Concentration Courses:
Either the geochemistry/inorganic option or the geochemistry/organic option: 10

Geochemistry/Inorganic Option:
- GEOL 0220  Physical Processes in Geology
- GEOL 0230  Geochemistry: Earth and Planetary Materials and Processes
- GEOL 0240  Earth: Evolution of a Habitable Planet
- GEOL 1130  Ocean Biogeochemical Cycles
  or GEOL 1370  Environmental Geochemistry
- GEOL 1410  Mineralogy
- GEOL 1420  Petrology

Plus one from:
- GEOL 1240  Stratigraphy and Sedimentation
- GEOL 1330  Global Environmental Remote Sensing
- GEOL 1450  Structural Geology

Three from:
- CHEM 0350  Organic Chemistry
- CHEM 0550  Inorganic Chemistry
- CHEM 1060  Advanced Inorganic Chemistry
- CHEM 1140  Physical Chemistry: Quantum Chemistry
- CHEM 1150  Physical Chemistry: Thermodynamics and Statistical Mechanics

Geochemistry/Organic Option:
- GEOL 0220  Physical Processes in Geology
- GEOL 0230  Geochemistry: Earth and Planetary Materials and Processes
- GEOL 0240  Earth: Evolution of a Habitable Planet
- GEOL 1130  Ocean Biogeochemical Cycles
- GEOL 1370  Environmental Geochemistry
- GEOL 1410  Mineralogy

Plus one from:
- GEOL 1240  Stratigraphy and Sedimentation
- GEOL 1330  Global Environmental Remote Sensing
- GEOL 1380  Environmental Stable Isotopes

Three Chemistry courses:
- CHEM 0350  Organic Chemistry
- CHEM 0360  Organic Chemistry

Plus one additional chemistry course 3

Three additional courses from upper level geological sciences, mathematics, or supporting sciences with approval of the departmental concentration advisor:
- GEOL 1970  Individual Study of Geologic Problems 1

Total Credits 19

1. Advanced placement may be substituted for the first semester of physics.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Helvetica was used instead of Arial.

The editor may contact Leepfrog for a draft with the correct fonts in place.