Geology-Chemistry

Geochemistry 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.

Four basic supporting science courses

CHEM 0330 Equilibrium, Rate, and Structure 1

Three courses to build quantitative skills:

APMA 0330 Methods of Applied Mathematics I (or higher) 3
BIOL 0495 Statistical Analysis of Biological Data
ENGN 0040 Dynamics and Vibrations (or higher)
MATH 0090 Single Variable Calculus, Part I (or higher)

Ten Concentration courses

EEPS 0220 Understanding Earth and Environmental Processes 1
EEPS 0230 Geochemistry: Earth and Planetary Materials and Processes 1
EEPS 0240 Earth: Evolution of a Habitable Planet 1

Three additional chemistry courses such as:

CHEM 0350 Organic Chemistry I
CHEM 0360 Organic Chemistry II
CHEM 0500 Inorganic Chemistry
CHEM 1060 Advanced Inorganic Chemistry
CHEM 1140 Physical Chemistry: Quantum Chemistry
CHEM 1150 Physical Chemistry: Thermodynamics and Statistical Mechanics
BIOL 0280 Biochemistry

Two upper level courses from EEPS

EEPS 1130 Ocean Biogeochemical Cycles
EEPS 1240 Stratigraphy and Sedimentation
EEPS 1380 Environmental Stable Isotopes
EEPS 1420 Petrology

Three additional upper-level science or math courses with approval from the concentration advisor

EEPS 1970 Individual Study of Geologic Problems

Total Credits 14

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

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:

CHEM 0330 Equilibrium, Rate, and Structure 1

Four courses to build quantitative skills:

APMA 0330 Methods of Applied Mathematics I (or higher)
BIOL 0495 Statistical Analysis of Biological Data
CSCI 0170 Computer Science: An Integrated Introduction (or higher)
ENGN 0040 Dynamics and Vibrations (or higher)

Fourteen Concentration Courses

EEPS 0220 Understanding Earth and Environmental Processes 1
EEPS 0230 Geochemistry: Earth and Planetary Materials and Processes 1
EEPS 0240 Earth: Evolution of a Habitable Planet 1
EEPS 1370 Environmental Geochemistry 1
EEPS 1410 Mineralogy 1

Three additional chemistry courses such as:

CHEM 0350 Organic Chemistry I
CHEM 0360 Organic Chemistry II
CHEM 0500 Inorganic Chemistry
CHEM 1060 Advanced Inorganic Chemistry
CHEM 1140 Physical Chemistry: Quantum Chemistry
CHEM 1150 Physical Chemistry: Thermodynamics and Statistical Mechanics
BIOL 0280 Biochemistry

Two upper level courses from EEPS

EEPS 1130 Ocean Biogeochemical Cycles
EEPS 1240 Stratigraphy and Sedimentation
EEPS 1380 Environmental Stable Isotopes
EEPS 1420 Petrology

Three additional upper-level science or math courses with approval from the concentration advisor

EEPS 1970 Individual Study of Geologic Problems

Total Credits 19