

Geochemistry and Environmental Chemistry

The Geochemistry and Environmental Chemistry concentration offers 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 the formation and evolution of the Earth and other planets, magma formation and properties, volcanic activity, and metamorphism.

Both A.B. and Sc.B. degrees are offered, requiring 12 and 19 courses, respectively. These degrees build skills in critical thinking, data analysis and modeling, finding solutions to complex problems, and written and oral communication. DEEPS provides a highly collaborative learning environment that emphasizes process-oriented, hands-on approaches in the classroom, in labs and on field trips. There are many opportunities for students to do paid research during the summer or academic year.

Students interested in this concentration may also wish to consider related concentrations: Earth, Climate and Biology, Geophysics and Climate Physics, and Earth and Planetary Science.

Standard program for the A.B. degree

This program is recommended for students interested in applying chemical and physical principles toward an understanding of Earth and planetary history and processes, and environmental and resource issues, while pursuing diverse academic goals. The program prepares students for careers in environmental science, Earth and planetary science, and global change. Some course requirements may be flexible based on consultation with the concentration advisor.

Note - For students still enrolled with the prior Concentration in Geology-Chemistry A.B., please refer to the Archived Bulletin link on left hand navigation for your requirements for the year you declared.

Three basic supporting science courses

CHEM 0330	Equilibrium, Rate, and Structure	1
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Two courses to build quantitative skills:		2
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BIOL 0495	Statistical Analysis of Biological Data	
or APMA 1650	Statistical Inference I	
MATH 0090	Single Variable Calculus, Part I (or higher)	
ENGN 0040	Engineering Statics and Dynamics (or higher)	
CSCI 0111	Computing Foundations: Data (or higher)	
APMA 0350	Applied Ordinary Differential Equations (or higher)	
PHYS 0050	Foundations of Mechanics (or higher)	

Nine Concentration courses

Two of these four fundamentals courses:		2
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EEPS 0220	Understanding Earth and Environmental Processes	
EEPS 0230	Geochemistry: Earth and Planetary Materials and Processes	
EEPS 0240	Earth: Evolution of a Habitable Planet	
EEPS 0250	Computational Approaches to Modelling and Quantitative Analysis in Natural Sciences: An Introduction	

Three additional chemistry courses such as:		3
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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 courses from the following:		2
EEPS 1410	Mineralogy	
EEPS 1420	Petrology	
EEPS 1130	Ocean Biogeochemical Cycles	
EEPS 1370	Environmental Geochemistry	
Two additional upper-level EEPS courses or substitutes with approval from the concentration advisor.		2
Total Credits		12

Standard program for the Sc.B. degree

This program is recommended for students interested in more in-depth study in geochemistry, climate science, planetary science and related fields, potentially including graduate school and wide-ranging careers in these areas. Some course requirements may be flexible based on consultation with the concentration advisor.

Note - For students still enrolled with the prior Concentration in Geology-Chemistry Sc.B., please refer to the Archived Bulletin link on left hand navigation for your requirements for the year you declared.

Basic Supporting Science Courses:

CHEM 0330	Equilibrium, Rate, and Structure	1
Four courses to build quantitative skills:		4
MATH 0090	Single Variable Calculus, Part I (or higher)	
BIOL 0495	Statistical Analysis of Biological Data	
or APMA 1650	Statistical Inference I	
CSCI 0111	Computing Foundations: Data	
ENGN 0040	Engineering Statics and Dynamics (or higher)	
APMA 0350	Applied Ordinary Differential Equations (or higher)	
PHYS 0050	Foundations of Mechanics (or higher)	
EEPS 0250	Computational Approaches to Modelling and Quantitative Analysis in Natural Sciences: An Introduction	

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:		3
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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 such as		2
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	3
EEPS 1970 Individual Study of Geologic Problems	1
Total Credits	19