EARTH SCIENCE, BACHELOR OF SCIENCE

Requirements

Total Course Requirements for the Bachelor's Degree

See the "Requirements for the Bachelor's Degree (https://catalog.csudh.edu/general-information/baccalaureate-degrees-undergraduate-studies/)" in the University Catalog for complete details on general degree requirements. A minimum of 40 units, including those required for the major, must be upper division.

Elective Requirements

Completion of elective courses (beyond the requirements listed below) to reach a total of a minimum of 120 units.

General Education Requirements (49 units)

See the "General Education (https://catalog.csudh.edu/general-education/)" requirements in the University Catalog or the Class Schedule for the most current information on General Education requirements and course offerings.

Graduation Writing Assessment Requirement

See the "Graduation Writing Assessment Requirement (https://catalog.csudh.edu/general-information/baccalaureate-degrees-undergraduate-studies/gwar-certifying-courses/)" in the University Catalog.

Minor Requirements

Students completing this major are not required to complete a minor in another field.

Major Requirements (58-63 units)

Code	Title	Hours
Lower Division Required Courses		
EAR 100	Physical Geology	3
or GEO 200	Physical Geography	
EAR 101	Physical Geology Laboratory	1
EAR 200	Earth History & Evolution	3
EAR 201	Earth History Lab	1
Select one of the following:		7-10
MAT 131 & MAT 171	Elementary Statistics and Probability and Survey of Calculus for Management and Life Sciences	
MAT 191 & MAT 193	Calculus I and Calculus II	
Select one of the following options:		8-10
Option 1:		
CHE 110 & CHE 112	General Chemistry I and General Chemistry II	
Option 2:		
PHY 120 & PHY 122	Elements Of Physics I and Elements Of Physics II	
Option 3:		
BIO 120 & BIO 121	Principles of Biology I and Principles of Biology Lab I	
BIO 122 & BIO 123	Principles of Biology II and Principles of Biology II Lab	
Upper Division Required Courses		
EAR 370	The World Ocean	3
EAR 376	Field Mapping	3
EAR 410	Environmental Geology	3
EAR 450	Plate Tectonics and the Rock Cycle	4
EAR 460	Global Change	3
EAR 490	Sr Sem In Earth Sciences	1
GEO 370	Numerical Methods in Geography	3
GEO 412	Rivers and Streams	3
GEO 415	Geographic Information Systems	3
Select nine units from the following:		9
GEO 310	Geomorphology	
GEO 315	The Weather	
GEO 357	Urban Environmental Geography	
GEO 380	Biogeography	
GEO 408	Remote Sensing and Image Processing	
GEO 416	Earth's Climates	
GEO 420	Natural Resources	
GEO 433	Environmental Analysis	
EAR 476	Groundwater	
EAR 495	Advanced Top In Ear Sci	
EAR 496	Internship In Earth Sci	
Total Hours		**58-63**

Program Learning Outcomes

- **Geographic Literacy:**
  - Students will apply their knowledge of the world's geography by interpreting topographic and thematic maps. They will demonstrate their ability to think geographically by analyzing geographic problems at a variety of scales.
- **Environmental Processes:**
  - Students will demonstrate their understanding of the utilization and distribution of key natural resources. This will include fundamental transport processes such as the hydrologic cycle, the rock cycle, and circulations through the world ocean and global atmosphere and their relationship to contemporary environmental issues.
- **Geotechniques:**
  - Students will demonstrate their understanding of geotechniques such as GIS, remote sensing, spatial statistics, and field maps. Students will apply spatial statistics and other forms of numerical analysis to interrogate existing and original geographical data sets.
- **Field Experience:**
  - Students will apply field research techniques toward the completion of field mapping and other data collection exercises.
- **Written and Oral Communication:**
  - Students will demonstrate their ability to describe research and to summarize research results in essays, written reports and oral presentations.
- **Group Activities:**
  - Students will be able to work together in small groups to collect and analyze classroom/field data and they will demonstrate

their ability to collaborate with other students to deliver research presentations.

- **Professional Preparation:**
  - Students will hone research skills and work on research projects which reflect their command of the subject matter and its relevance to contemporary environmental issues, as well their command of geotechniques and their application. The research projects prepare students for graduate school and/or the workforce, and can be used as examples of the kinds of knowledge and expertise that they could bring to prospective employers.

4-Year Degree Roadmap

Course	Title	Hours
First Year		
Fall		
GE Area A1 Oral Communication		3
GE Area A3 Logic/Critical Thinking		3
GE Area C Arts and Humanities		3
GE Area D Social Science		3
GE Area E Lifelong Learning and Self-Development		3
	Hours	**15**
Spring		
THE 120	Fundamentals of Speech	3
MAT 131 or MAT 191	Elementary Statistics and Probability or Calculus I	3-5
EAR 100 or GEO 200	Physical Geology or Physical Geography	3
EAR 101	Physical Geology Laboratory	1
GE Area C or D		3
Elective to meet 120 units (If registered in MAT 191, elective course not necessary this term)		2-3
	Hours	**15-18**
Second Year		
Fall		
GE Area B2 Life Science		3
MAT 171 or MAT 193	Survey of Calculus for Management and Life Sciences or Calculus II	4-5
GE Area C or D		3
HIS 101		3
Elective to meet 120 units		2-3
	Hours	**15-17**
Spring		
EAR 200	Earth History & Evolution	3
EAR 201	Earth History Lab	1
GE Area C or D		3
GE Area F Ethnic Studies		3
POL 101	American Institutions	3
Elective to meet 120 units		2-3
	Hours	**15-16**
Third Year		
Fall		
GEO 415	Geographic Information Systems	3
CHE 110 or PHY 120 or BIO 120	General Chemistry I or Elements Of Physics I or Principles of Biology I	3-5
Major Elective Course		3
Major Elective Course		3
GWAR satisfying course		3
	Hours	**15-17**
Spring		
EAR 376	Field Mapping	3
GEO 412	Rivers and Streams	3
CHE 112 or PHY 122 or BIO 122	General Chemistry II or Elements Of Physics II or Principles of Biology II	5
GE Area C3 or D3		3
Elective to meet 120 units		1
	Hours	**15**
Fourth Year		
Fall		
EAR 450	Plate Tectonics and the Rock Cycle	4
EAR 460	Global Change	3
Major Elective Course		3
GE Area B5 Integrative Studies in the Natural Sciences		3
GE Area C3 or D3		3
	Hours	**16**
Spring		
EAR 370	The World Ocean	3
EAR 410	Environmental Geology	3
GEO 370	Numerical Methods in Geography	3
EAR 490	Sr Sem In Earth Sciences	1
Elective to meet 120 units		3
Elective to meet 120 units		1-3
	Hours	**14-16**
	Total Hours	**120-130**

2-Year Roadmap (transfer students)

Course	Title	Hours
First Year		
Fall		
GEO 415	Geographic Information Systems	3
CHE 110 or PHY 120 or BIO 120	General Chemistry I or Elements Of Physics I or Principles of Biology I	3-5
Major Elective Course		3
Major Elective Course		3
GWAR satisfying course		3
	Hours	**15-17**
Spring		
EAR 376	Field Mapping	3
GEO 412	Rivers and Streams	3
CHE 112 or PHY 122 or BIO 122	General Chemistry II or Elements Of Physics II or Principles of Biology II	3-5
GE Area C3 or D3		3
Elective to meet 120 units		3
	Hours	**15-17**
Second Year		
Fall		
EAR 450	Plate Tectonics and the Rock Cycle	4
EAR 460	Global Change	3
Major Elective Course		3
GE Area B5 Integrative Studies in the Natural Sciences		3
GE Area C3 or D3		3
	Hours	**16**
Spring		
EAR 370	The World Ocean	3
EAR 410	Environmental Geology	3
GEO 370	Numerical Methods in Geography	3
EAR 490	Sr Sem In Earth Sciences	1
Elective to meet 120 units		3

Elective to meet 120 units	3
Hours	**16**
Total Hours	**62-66**