EARTH SCIENCE

Earth Science Program Learning Outcomes (https://catalog.csudh.edu/program-learning-outcomes/natural-behavioral-sciences/earth-science-geography-learning-outcomes/)

College of Natural and Behavioral Sciences
Department of Earth Science and Geography
Bachelor of Science
Degree Roadmap
Minor

Faculty

John Keyantash, Department Chair
Parveen Chhetri, Brendan McNulty, Ashish Sinha, Ralph Saunders
Instructional Support Tech Office: LIB A-127, (310) 243-3368
Department Office: NSM B-202, (310) 243-3377

Emeriti Faculty

Rodrick Hay, David Sigurdson, Jamie Webb

Program Description

The Earth Science major is one of two programs housed in the Department of Earth Science and Geography. The Earth Science degree is a cross-disciplinary program that trains students for careers involving earth system science, which broadly includes the physical science behind the interactions of the lithosphere, atmosphere, and hydrosphere. The Earth Science program also examines the contribution of those systems to natural landscapes and geological hazards, during the modern era and through geological time. Importantly, it also considers the relationship of human populations to these geosystems.

If you are curious about the answers to the following questions, Earth Science might be the right major for you:

- How and when did the Earth form? How has Earth evolved? What is the history of life on Earth? When did the mass extinctions occur, and what caused them?
- What is plate tectonics, and how do tectonic plates interact? How do mountains form? How, where and why do volcanoes form? What causes earthquakes? Can we predict them? Why or why not? How do tsunamis form?
- What are the different drainage patterns for river systems? How do flowing water and ice sculpt the landscape? How does the generation of hydroelectricity change the characteristics of flowing rivers?
- What is groundwater, why is it important to humans, and what are the implications of groundwater contamination?
- What has Earth's climate been like in the past? How might climate change in the future? What is the greenhouse effect and ocean acidification? What is the carbon cycle, and why is it important?
- What are the differences between non-renewable, renewable and perpetual natural resources? What is the nature of supply vs. demand in regard to water, petroleum, coal, minerals, and other natural resources? What are the pros and cons of various energy sources including nuclear, solar, wind, geothermal, hydroelectric and carbon-based fuels?

Features

The faculty have expertise in plate tectonics and field geology; hydrology, atmospheric science, historical geology and climate change; landscape change, remote sensing, and geographic information systems; and human, political and historical geography. The broad expertise of the faculty provides an unusual opportunity for motivated undergraduate students to work closely with their professors and gain "hands-on" experience within domestic and international research projects.

Academic Advisement

Majors should consult with their advisor prior to registration each semester. Records of student progress toward the degree are accessible online through MyCSUDH. Students should check their progress regularly.

Preparation

For high school students, the best preparation for the Earth Science major is a well-rounded program of high school courses in humanities, natural sciences, mathematics, and written and oral communication. Community college transfer students should have completed an introductory course in geology or physical geography. Other introductory courses in the physical or biological sciences, including field courses, are encouraged.

Career Possibilities

The Earth Science major prepares students for a wide range of employment opportunities within government, industry and non-profit organizations. Specific fields include environmental protection and consulting; natural resource management; air and water quality monitoring; geologic hazards and geotechnical investigation and water and power generation utilities. The Earth Science degree also provides excellent training for graduate programs.

Students may prepare for a career teaching at the secondary level (middle and high school) by completing an approved "Subject Matter Preparation Program" for Geoscience. Completion of such a program is the first step in meeting the state requirements for a teaching credential. As the program requirements for the Subject Matter Preparation Program routinely change, interested students should consult with the appropriate advisor for current information.

Graduation With Honors

An undergraduate student may be a candidate for graduation with Honors in Earth Science provided he or she meets the following criteria:

1. A minimum of 36 units in residence at CSU Dominguez Hills;
2. A minimum grade point average of at least 3.5 in all courses used to satisfy the upper division requirements in the major;
3. Recommendation by the faculty of the Earth Science and Geography Department.

Elective Requirements

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

Bachelor of Science in Earth Science

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.

General Education Requirements (49 units)

See the "General Education (https://catalog.csudh.edu/general-information/double-counting-general-education-courses/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/graduate-writing-examination/)" 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)

A. Lower Division Required Courses (23-28 units)

EAR 100 Physical Geology (3)
or
GEO 200 Physical Geography (3)
EAR 101 Physical Geology Laboratory (1)
EAR 200 Earth History & Evolution (3)
EAR 201 Earth History Lab (1)
MAT 131 Elementary Statistics and Probability (3)
and
MAT 171 Survey of Calculus for Management and Life Sciences (4)
or
MAT 191 Calculus I (5)
and
MAT 193 Calculus II (5)
CHE 110 General Chemistry I (5)
CHE 112 General Chemistry II (5)
or
PHY 120 Elements Of Physics I (4)
and
PHY 122 Elements Of Physics II (4)
or
BIO 120 Principles of Biology I (3)
BIO 121 Principles of Biology Lab I (1)
and
BIO 122 Principles of Biology II (3)
BIO 123 Principles of Biology II Lab (1)

B. Upper Division Requirements (35 units)

1. Required Courses (26 units)

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)

2. Elective Courses (9 units)

GEO 310 Geomorphology (3)
GEO 315 The Weather (3)
GEO 357 Urban Environmental Geography (3)
GEO 380 Biogeography (3)
GEO 408 Remote Sensing and Image Processing (3)
GEO 416 Earth's Climates (3)
GEO 420 Natural Resources (3)
GEO 433 Environmental Analysis (3)
EAR 476 Groundwater (3)
EAR 495 Advanced Top In Ear Sci (3)
EAR 496 Internship In Earth Sci (1-3)

Minor in Earth Sciences (19 units)

The Minor in Earth Sciences requires completion of 19 units. The lower division requirement includes courses which may be used to satisfy other university requirements such as General Education or the major.

Requirements

A. Lower Division Required Courses (7 units)

EAR 100 Physical Geology (3)
EAR 101 Physical Geology Laboratory (1)
GEO 200 Physical Geography (3)

B. Upper Division Requirements (12 units)

Any 12 units of upper division Earth Sciences (EAR) courses are sufficient to fulfill this requirement. Alternatively, the student may complete any six units of upper division Earth Sciences courses with six units selected from the geography courses listed below:

GEO 310 Geomorphology (3)
GEO 315 The Weather (3)
GEO 412 Rivers and Streams (3)
GEO 416 Earth's Climates (3)