Geology is the study of the origin and evolution of the earth, using the principles of mathematics, chemistry, physics, and biology. Geologists study rocks, minerals, and fossils in an effort to draw conclusions about the Earth's observable surface processes, as well as those processes taking place inside the Earth. They attempt to determine how the Earth was formed and how it is being changed by natural and man-made activities. Geologists are often involved in remediating environmental problems caused by mining, construction, and manufacturing.

**Career Opportunities**

Geologist • Geophysicist • Groundwater Geologist • Oil and Gas Geologist • Mineralogist • Paleontologist • Marine Geologist • Environmental Geologist • Photogeologist • Seismologist • Consulting Geologist • Soils Engineer • Land Use Planner • Volcanologist • Planetary Geologist • Geochemist • Economic Geologist • Mining Geologist • Hydrologist • Government Geologist • Coal Geologist • Glacial Geologist • Vertebrate Paleontologist • Geology Professor • Earth Science Teacher • Forensic Geologist

**General Science Degree**

This program provides a broad study in the fields of biological and physical sciences in preparation for transfer to a four-year program and continuation of studies in upper-division science courses.

**Student Learning Outcomes**

Upon completion of this program, the student will be able to:

- evaluate new and accepted ideas about the natural universe using scientific methods.
- analyze a wide variety of natural phenomena using basic definitions and fundamental theories of biological or physical sciences.
- apply appropriate quantitative and qualitative methods to interpret and analyze pertinent data.
- describe the basic definitions and fundamental theories of an introductory natural science.
- articulate orally and/or in writing the importance of continuous examination and modification of accepted ideas as a fundamental element in the progress of science.
- recognize ethical components of scientific decision making and apply personal and social values within the process of decision making in scientific endeavors.

**Requirements for Degree** 18 Units

A minimum of 18 units from the following: ................................. 18

Transfer level science courses including one laboratory course in a physical science and one laboratory course in a biological science. Courses may be selected from anthropology (physical), astronomy, biology, biotechnology, chemistry, geography (physical), geology, natural resources, physical science, physics, and psychology (biological).

**Associate Degree Requirements:** The General Science Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

**Courses**

**GEOL 300  Physical Geology  3 Units**
Advisory: MATH 100 and ENGRD 116, ENGWR 51, or ESLW 310; or placement through the assessment process.

General Education: AA/AS Area IV; CSU Area B1; IGETC Area 5A

Course Transferable to UC/CSU

General Education: CSU Area B3; IGETC Area 5A

Corequisite: GEOL 305

**GEOL 301  Physical Geology Laboratory 1 Unit**

Corequisite: GEOL 300

General Education: CSU Area B1; CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

Hours: 54 hours LAB

This course encompasses the study and identification of common rocks and minerals, the interpretation and recognition of geologic structures and landforms, interpretation of maps, aerial photographs, remote sensing images, seismic information, analysis of geologic hazards, and field observations of the local geology.

**GEOL 305  Earth Science 3 Units**

Advisory: MATH 32 or 39, and ENGWR 102 or 103, and ENGRD 116 with a grade of “C” or better; or ESLR 320 and ESLW 320 with a grade of “C” or better.

General Education: AA/AS Area IV; CSU Area B1; IGETC Area 5A

Course Transferable to UC/CSU

Hours: 54 hours LEC

This is an introductory science course covering major topics in geology, oceanography, meteorology, and astronomy. It focuses on Earth as a dynamic and continually evolving planet and emphasizes the relationships between human-Earth interactions. Field trips may be required.

**GEOL 306  Earth Science Laboratory 1 Unit**

Corequisite: GEOL 305

General Education: CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

Hours: 54 hours LAB

This course emphasizes scientific methods, critical thinking skills, and systematic Earth science laboratory procedures. Topics include weather analysis, rock and mineral identification, study of geologic
concepts by means of topographic and geologic maps, and exercises in astronomy and oceanography. This course is not available for credit to students who have completed GEOL 300 or GEOL 301.

**GEOL 310 Historical Geology** 3 Units  
Advisory: GEOL 300 or 305; (ENGWR 102 or 103) or ESLW 310, (ENGRD 116 or ESLR 310), and MATH 100 with a grade of "C" or better.  
General Education: AA/AS Area IV; CSU Area B1; IGETC Area 5A  
Course Transferable to UC/CSU  
Hours: 54 hours LEC  
This course covers geologic history of the earth as shown by the changing of land and sea and by the succession of fauna and flora. Stratigraphic and other techniques for interpreting the sequence of past geological events are studied. Field trips may be required.

**GEOL 311 Historical Geology Laboratory** 1 Unit  
Corequisite: GEOL 310  
Advisory: GEOL 300 and 301  
General Education: CSU Area B3; IGETC Area 5A  
Course Transferable to UC/CSU  
Hours: 54 hours LAB  
This course is a laboratory study in historical geology. Principles of physical geology and paleontology are applied in the reconstruction of the history of the earth. Exercises in stratigraphy, paleontology and interpretation of geologic maps are utilized. Field trips may be required.

**GEOL 320 Global Climate Change** 3 Units  
Same As: GEOG 305  
Advisory: (ENGWR 102 or 103) or ESLW 310, (ENGRD 116 or ESLR 310), and MATH 100 with a grade of "C" or better.  
General Education: AA/AS Area IV (effective Summer 2010); CSU Area B1; IGETC Area 5A  
Course Transferable to UC/CSU  
Hours: 54 hours LEC  
This course explores the history and mechanisms of climate change in Earth’s past, as well as the methods that scientists use to investigate climate change. It also focuses on climate change in Earth’s recent history (the past few million years) and the role that humans have had in climate change, especially since the industrial revolution. Additionally, it investigates the effects of climate change in today’s world and discusses possible technological and political solutions to this vast and increasingly important problem. Field trips may be required.

**GEOL 325 Environmental Hazards and Natural Disasters** 3 Units  
Same As: GEOG 307  
General Education: AA/AS Area IV; CSU Area B1; IGETC Area 5A  
Course Transferable to UC/CSU  
Hours: 54 hours LEC  
This course covers the environmental effects and applications of Earth-related processes. It focuses on earthquakes, volcanic eruptions, landslides, and flooding. Topics also include the availability and exploitation of natural resources, waste disposal, and global climate change. Humans as a force in environmental change are emphasized. The course addresses geology, engineering, environmental studies, natural resources, geography, and science education. One field trip is required. Not open to students who have completed GEOG 307.

**GEOL 330 Introduction to Oceanography** 3 Units  
Same As: GEOG 308  
Advisory: GEOL 300 or GEOL 300  
General Education: AA/AS Area IV; CSU Area B1; IGETC Area 5A  
Course Transferable to UC/CSU  
Hours: 54 hours LEC  
This course is an integrated study of water on earth emphasizing physical oceanography. Topics include ocean and shoreline processes, plate tectonics, sea floor morphology, types and distribution of sea floor sediment, ocean sediment transport, ocean chemistry, ocean currents, marine resources, and environmental concerns. Regional oceanographic features are emphasized and a field trip to gain familiarity with regional physical shoreline features is required. This course is not open to students who have completed GEOG 308.

**GEOL 331 Introduction to Oceanography Lab** 1 Unit  
Same As: GEOG 309  
Corequisite: GEOG 308 or GEOL 330; GEOL 330 or GEOG 308  
Advisory: GEOL 301 or GEOL 301  
General Education: CSU Area B3; IGETC Area 5A  
Course Transferable to UC/CSU  
Hours: 54 hours LAB  
This course is a laboratory investigation of water on Earth, emphasizing the shape of the sea floor, marine navigation, plate tectonics, sea floor materials and their utilization, the spatial distribution of ocean sediment, the physical and chemical nature of sea water, currents, tides, and marine weather. This course is not open to students who have completed GEOG 309.

**GEOL 342 Geology of the National Parks** 3 Units  
Advisory: GEOL 300 and 301  
General Education: AA/AS Area IV; CSU Area B1  
Course Transferable to UC/CSU  
Hours: 54 hours LEC  
This course introduces Earth's geologic story as revealed by the rocks and landscapes in our National Parks. Attention is on how natural earth processes have shaped our National Parks and National Monuments. This course covers geological processes, such as volcanism, plutonism, deformation, sedimentation, glaciation, shoreline and fluvial activities, as displayed in our western parks and monuments as well as the methods used to study them. Field trips may be required.

**GEOL 345 Geology of California** 3 Units  
Advisory: MATH 32 or 39; and ENGWR 102 or 103, and ENGRD 116 with a grade of "C" or better; or ESLR 320 and ESLW 320 with a grade of "C" or better.  
General Education: AA/AS Area IV; CSU Area B1; IGETC Area 5A  
Course Transferable to UC/CSU  
Hours: 54 hours LEC  
This course provides a survey of the physical and historical aspects of California geology, emphasizing the linkage of geology and people through economic and social impacts. It is recommended for non-majors and majors in geology and is of particular value to science, engineering, environmental studies, education, and economics majors. Field trips may be required.

**GEOL 390 Field Studies in Geology** .5-4 Units  
Same As: GEOG 390  
Course Transferable to CSU  
Hours: 3-24 hours LEC; 18-144 hours LAB  
This course involves field trips to selected locations of geologic interest. Course content varies according to field trip destination but may include topics in physical geology, environmental geology, economic geology, and/or introduction to tools and techniques used for geosciences field research (e.g. map and compass, the Global Positioning System (GPS), Geographic Information Systems (GIS), etc.). Field excursions are required and field trip expense fees may be required. This course may be taken 4 times using different field trip destinations.