Geology

California Lutheran University's Geology Department offers a challenging curriculum for students who are interested in exploring for energy and economic resources, analyzing geologic hazards and mitigating the human impact on the environment.

The program emphasizes learning through course work, as well as through extensive fieldwork. The department works closely with the other related disciplines of chemistry, physics, biology, mathematics and geography. Through their studies and research projects, CLU geology majors will learn how the Earth's processes and life have changed over time.

Southern California offers a unique opportunity for CLU students to study firsthand many of the geologic wonders of the world. Numerous field trips are offered during the year to places such as Death Valley, the Grand Canyon, Owens Valley and the eastern Sierra Nevada.

Along with being accepted in graduate schools around the country, many CLU geology majors have entered careers in petroleum geology, geophysics and the environmental geology fields. In both the public and private sectors, geologists are hired to study groundwater pollution, earthquake hazards and landslides, as well as to work in the mining industry, petroleum industry or in research laboratories.

Bachelor of Arts in Geology

35 credits minimum, 22 credits upper division.

GEOL 111/111L	Physical Geology and Physical Geology Lab	4
GEOL 112/112L	Historical Geology and Historical Geology Lab	4
GEOL 311/311L	Crystallography and Mineralogy and Crystallography and Mineralogy Lab	5
GEOL 312/312L	Petrology and Petrology Lab	5
GEOL 331/331L	Invertebrate Paleontology and Invertebrate Paleontology Lab	4
GEOL 332/332L	Stratigraphy and Sedimentation and Stratigraphy and Sedimentation Lab	4
GEOL 335/335L	Structural Geology and Structural Geology Lab	5
GEOL 421	Field Geology	4
Total Hours		35

Required Supporting Courses

PHYS 201/201L	Mechanics and Thermodynamics-Algebra and Mechanics and Thermodynamics-Algebra Lab	4
CHEM 151/151L	General Chemistry and General Chemistry Lab	5
MATH 251	Calculus I	4
Total Hours		13

Bachelor of Science in Geology

38 credits minimum, 30 credits upper division.

GEOL 111/111L	Physical Geology and Physical Geology Lab	4
GEOL 112/112L	Historical Geology and Historical Geology Lab	4
GEOL 311/311L	Crystallography and Mineralogy and Crystallography and Mineralogy Lab	5
GEOL 312/312L	Petrology and Petrology Lab	5
GEOL 331/331L	Invertebrate Paleontology and Invertebrate Paleontology Lab	4

GEOL 332/332L	Stratigraphy and Sedimentation and Stratigraphy and Sedimentation Lab	4
GEOL 335/335L	Structural Geology and Structural Geology Lab	5
GEOL 421	Field Geology	4
GEOL 485	Seminar	2-4
Total Hours		37-39

Required Supporting Courses

PHYS 201/201L	Mechanics and Thermodynamics-Algebra and Mechanics and Thermodynamics-Algebra Lab	4
PHYS 202/202L	Electricity, Magnetism, and Optics - Algebra and Electricity, Magnetism, and Optics - Algebra Lab	4
CHEM 151/151L	General Chemistry and General Chemistry Lab	5
CHEM 152/152L	General Chemistry II and General Chemistry II Lab	5
MATH 251	Calculus I	4
MATH 252	Calculus II	4
Total Hours		26

Minor in Geology

16 credits minimum, 8 credits minimum at upper division level.

GEOL 111	Physical Geology	3
GEOL 111L	Physical Geology Lab	1
GEOL 112	Historical Geology	3
GEOL 112L	Historical Geology Lab	1
Upper Division Geology Credits		8
Total Hours		16

Courses

Lower Division

GEOL 111. Physical Geology. (3).
A systematic analysis of the Earth, inside and out, its rocks, minerals, soils and water. This involves the study of the processes by which these materials are formed and are constantly changed, including how mountains are created and then eroded by streams, wind and glaciers. Volcanoes, earthquakes and plate tectonics are also covered. Field trips. Lecture, 3 hours/week.

GEOL 111L. Physical Geology Lab. (1).
Hands-on study of rocks and minerals, topographic and air photo interpretation and a variety of geologic exercises that help understand the geologic processes and landforms studied in GEOL 111. Laboratory, 2 hours/week. Prerequisite or corequisite: GEOL 111.

GEOL 112. Historical Geology. (3).
The study of the ancient distribution of land and sea and change in life through geologic time. Lecture, 3 hours/week. Prerequisite: GEOL 111.

GEOL 112L. Historical Geology Lab. (1).
Includes fossil identification, geologic map interpretation and paleogeographic problems. Prerequisite or corequisite: GEOL 112.

GEOL 118. The Oceans. (4).
A general survey of geological and biological processes in the oceans with a strong environmental emphasis. Laboratory exercises and field trips complement lecture material. (cross-listed with BIOL 118).

GEOL 118L. The Oceans Lab. (0).

GEOL 152. Introduction to Environmental Science. (3).
An examination of the relationship between people and the physical environment. Topics include geologic hazards such as volcanoes and earthquakes; pollution of land, air and water; park conservation; energy alternatives; and global challenges such as ozone depletion and human-induced climate change. Lecture, 3 hours/week; Laboratory, 2 hours/week.

GEOL 152L. Introduction to Environmental Science Lab. (1).

GEOL 212. Dinosaurs. (4).
A survey of the non-avian dinosaurs includes: anatomical comparisons of the major dinosaur groups, plus flying and swimming vertebrates of the Mesozoic Era: new discoveries such as dinosaur eggs and nesting sites, the emergence of birds, soft tissue preservation, and the search for genetic material; a review of the process of fossilization; the paleogeography of the Mesozoic world; and the geological background relevant to dinosaur studies. Lab activities are integrated into the meeting times of the lecture course.

GEOL 224/224L. Planetary Geology. (4,0).
This course will focus on the Earth and its local planetary neighbors utilizing the vast amount of information that has been and continues to be acquired by space probes as well as manned lunar missions. Exposure to comparisons with other nearby planets and planetary objects will allow a better understanding of the Earth, especially our impact on climate and resources. New discoveries and observations in planetary geology demonstrate how the field of geology has changed dramatically since the inception of the "space age". This class will provide students with new insights into planetary evolution, the impact of the space program on our societal needs, and challenge them to critically evaluate data. Lecture, 3 hours/week; Laboratory, 2 hours/week.

GEOL 282. Selected Topics. (4).

GEOL 282L. Sel Top Lab. (0).

GEOL 285. Interim Travel Course. (1-2).

Upper Division

GEOL 311. Crystallography and Mineralogy. (5).
Covers morphological crystallography, crystal chemistry, relation of mineral properties to their internal structure, recognition of selected minerals in hand specimen and optical techniques used for mineral identification (use of the polarizing microscope). Lecture, 3 hours/week; Laboratory, 6 hours/week. Prerequisites or corequisites: GEOL 112; CHEM 151.

GEOL 311L. Crystallography and Mineralogy Lab. (0).

GEOL 312. Petrology. (5).
The study of the origin, occurrence, classification and identification of igneous and metamorphic rocks in hand specimen. Lecture, 4 hours/week; Laboratory, 3 hours/week. Prerequisite: GEOL 311.

GEOL 312L. Petrology Lab. (0).

GEOL 331. Invertebrate Paleontology. (4).
A survey of the study of ancient life as revealed in the fossil record. Lecture stresses evolutionary theory and the history of life; lab surveys major invertebrate fossil taxa with emphasis on taxonomy and functional morphology. Lecture, 3 hours/week; Laboratory, 3 hours/week. Prerequisite: GEOL 112.

GEOL 331L. Invertebrate Paleontology Lab. (0).

GEOL 332. Stratigraphy and Sedimentation. (4).
The study of sedimentary rocks, sites of deposition, postdepositional changes and sedimentary tectonics. Lecture, 3 hours/week; Laboratory, 3 hours/week.

GEOL 332L. Stratigraphy and Sedimentation Lab. (0).

GEOL 335. Structural Geology. (5).
The discussion of primary and secondary rock structures, with particular reference to crustal deformation. Lecture, 3 hours/week; Laboratory, 6 hours/week.

GEOL 335L. Structural Geology Lab. (0).

GEOL 395. Water Resources. (3).
An introduction to the principles of surface and groundwater hydrology and to problems related to water utilization. Includes water distribution and availability, alternatives for increasing future water supply, water pollution and mitigation, and water rights law.

GEOL 395L. Laboratory and Field Studies in Water Resources. (1).
Water sampling and testing; simulation of groundwater movement and contaminant migration; stream-table modeling of fluvial landforms. Field trips to study geologic and hydrologic characteristics of areas important to water supply in California and the Southwest.

GEOL 405. Geophysics. (4).
An interdisciplinary study of how to use geophysical observations of the Earth's gravitational and magnetic fields, seismic wave velocities and subsurface electrical resistivity to solve geological and environmental problems. Specific field methods using geophysical instruments will be taught along with the interpretation of the collected data. Lecture, 3 hours/week; Laboratory 3 hours/week. Prerequisites: PHYS 201 & PHYS 202 or PHYS 211 & PHYS 212. GEOL 111 or GEOL 152 recommended. (cross-listed with PHYS 405).

GEOL 405L. Geophysics Lab. (0).

GEOL 421. Field Geology. (4).
Studies the field methods used in geology, including surveying, plane tabling, geologic mapping and section measuring. Prerequisite: GEOL 335.

GEOL 482. Selected Topics. (1-4).

GEOL 482L. Selected Topics Lab. (0).

GEOL 485. Seminar. (2-4).

GEOL 490. Independent Study. (1-4).

GEOL 492. Internship. (1-4).
(graded P/NC only).