

Geological Science

COORDINATOR: ELIZABETH B. SAFRAN

Earth is a laboratory in which grand experiments in physics, biology, and chemistry unfold and interact. Perched on the Pacific rim, Lewis & Clark is nestled in the crucible itself, surrounded by spectacular evidence of the behavior and functioning of our home planet. From the blasted remains of Mount St. Helens to the flood-gouged Columbia River Basalts, the landscapes of the Pacific Northwest provoke us to ask ourselves, "Why did this happen? When?" Geological science addresses itself to these questions. At Lewis & Clark, geology courses are designed to provide students with a basic understanding of major Earth processes while emphasizing environmental implications and regional issues.

Training in geological science enhances understanding of critical environmental problems, an invaluable asset for natural scientists, consultants, environmental lawyers, teachers, and all citizens. It also heightens appreciation for natural settings by illuminating the fascinating ways in which they evolve.

SPONSORING FACULTY

Elizabeth B. Safran, associate professor. Geomorphology.

GEOL 114 THE ORIGINS OF LIFE IN THE UNIVERSE

Clifton, Loening, Safran, Tufte

Content: Processes of stellar evolution and planet formation that set the stage for life on Earth. Theories and evidence from diverse scientific disciplines on the origins of life and how physical and chemical aspects of the environment contributed to the emergence and transformations of life-forms. Scientific evaluation of the possibility of extraterrestrial life. Attention is devoted both to the processes and content of scientific discovery. Lecture, discussion, laboratory. Cross-listed with Biology 114, Chemistry 114, and Physics 114. Not applicable toward any major.

Prerequisite and/or restriction: Mathematics 055 or equivalent.

Taught: Alternate years, 4 semester credits.

GEOL 150 ENVIRONMENTAL GEOLOGY

Safran

Content: Introduction to major geological processes that impact human activity. Emphasis on regional issues. Plate tectonics, loci of seismic and volcanic activity, distribution of mountain ranges, and sediment sources. Floods, landslides, mudflows, tsunamis. Assessment of anthropogenic shifts in landscape functioning. Consequences of standard logging practices, dams, channel modification. Chronic versus catastrophic environmentally significant events. Lecture and laboratory. Weekly laboratory includes two required daylong field trips, held on weekends.

Prerequisite and/or restriction: Mathematics 055.

Taught: Annually, 5 semester credits.

GEOL 240 SPATIAL PROBLEMS IN GEOLOGY

Safran

Content: Recognition and interpretation of spatial patterns of geological phenomena. Firsthand analysis of a current research question with a strong spatial component. Familiarization with the background of the research question and its broader context. Hypothesis development about geological processes from remote data (e.g., topographic data, satellite imagery), articulation of appropriate field tests for hypotheses. Development of analytical skills and use of Geographic Information Systems software. Lecture and laboratory.

Prerequisite and/or restriction: Geology 150.

Taught: Alternate years, 5 semester credits.

GEOL 280 THE FUNDAMENTALS OF HYDROLOGY

Staff

Content: The behavior and movement of water in natural and modified environments. Major components of the hydrologic cycle, including precipitation, interception, evaporation, evapotranspiration, runoff, groundwater. Introduction to river channel behavior, flood hazard calculation, water supply issues. Quantification, through measurements and calculations, of water fluxes through various pathways, with allusion to planning applications. Lecture and two required daylong field trips.

Prerequisite and/or restriction: Geology 150.

Taught: Alternate years, 4 semester credits.

GEOL 390 OREGON FIELD GEOLOGY WEST

Staff

Content: Field study of geologic processes at an active continental margin in western Oregon. Field focus on the Pacific Coast to the Cascade Mountains. Examination of evidence for subduction zone earthquakes, docked seamounts, and active stratovolcanoes. Interpretation of the landscape using the theory of plate tectonics, recognition of regional geologic hazards, and representation of interpretations via cross-sectional diagrams, stratigraphic columns, geologic maps, and chronologies. Emphasis on development of introductory-level field skills and communication of understandings gained to general audiences.

Prerequisite and/or restriction: Junior standing or the consent of the instructor.

Taught: Alternate years, 2 semester credits.

GEOL 391 OREGON FIELD GEOLOGY EAST

Staff

Content: Field study in north central and northeastern Oregon of Cenozoic paleostratigraphy and accretionary plate tectonics. Exploration of geologic formations exposed in the John Day River Basin and observation of fragments of ancient terranes to the east. Recognition of signatures of climate change in the fossil record and of evidence of past subduction and accretionary events on the western margin of North America. Attention to present-day geomorphological processes, such as landsliding and attendant influences on river channel processes. Emphasis on development of introductory-level field problem solving skills, including construction of stratigraphic columns, geologic maps, and geologic cross-sections. Focus on communicating understanding gained to general audiences.

Prerequisite and/or restriction: Junior standing or the consent of the instructor.

Taught: Alternate years, 2 semester credits.

History

CHAIR: ELLIOTT YOUNG

The Department of History seeks to ground students in the foundations of the human experience. It introduces them to cause-and-effect relationships in human affairs, and encourages them to understand the power and the complexity of the past in shaping the contemporary human condition. Departmental courses probe American, Latin American, Middle Eastern, European, and Asian history and address such topics as popular culture; the nature of ideology; social and political change; economic systems; migration; and the roles of race, gender, religion, and ethnicity.