

Geology (GEOL)

GEOL 102 OUR DYNAMIC EARTH: INTRO GEOL (3)

Lecture, 2 hours; laboratory, 3 hours. A study of the minerals, rocks and landforms that make up our earth in the context of the dynamic forces that form them. Emphasis on local geology, including earthquakes and other environmental aspects. Laboratory study of minerals, rocks and maps. Required one-day weekend field trip. Fee required. Satisfies GE, category B1 (Physical Sciences) and GE laboratory requirements.

GEOL 105 THE AGE OF DINOSAURS (3)

Lecture, 3 hours. The life and death of dinosaurs as evidenced by the fossil record will be studied to show how geology and biology combine in the discipline of paleontology. The evolution of dinosaurs over a 150 million- year time span sets the stage to investigate several interesting and ongoing controversies surrounding dinosaurs, including: why dinosaurs became extinct, the metabolism of dinosaurs, and the relationship between birds and dinosaurs. Satisfies GE, category B1 (Physical Sciences).

GEOL 107 INTRODUCTION TO EARTH SCIENCE (3)

This course studies the operation of the Earth system and its solar system home. It introduces the fundamental aspects of 4 major areas: astronomy; geology, including plate tectonics, and the planetary history of the Earth and its moon; physical oceanography; and weather and climate. There is no lab. The course is designed to prepare students for the earth science and astronomy parts of the SET examination. The prerequisite is that a student must be enrolled in the AMCS, LIBS, CALS, or ENSP credential program. This class is not allowable as a prerequisite for upper-division Geology courses.

GEOL 110 NATURAL DISASTERS (3)

A course to examine the interaction between natural processes and human activities and the often costly and fatal results. Course emphasis will be on the principles underlying natural disasters such as earthquakes, volcanic eruptions, landslides, floods, severe weather, coastal processes, asteroid impacts, fires, great dyings, and population growth. Many examples will be drawn from the northern California area. Extensive internet work for current information. Course content may vary with instructor. Satisfies GE, category B3 (Physical Sciences, Specific Emphasis).

GEOL 120 REGIONAL FIELD GEOLOGY (3)

Lecture, 1 hour; 10-day required field trip. Field study of rocks, minerals and landforms, and the processes that form them. A 10-day field trip to the Death Valley area is taken during spring vacation. Not intended for geology majors. Fee required. Satisfies GE, category B3 (Physical Sciences, Specific Emphasis) and laboratory requirements. Prerequisites: GEOL 102 or concurrent enrollment; students must be in good physical condition.

GEOL 205 MINERALOGY (4)

Lecture 1 hour; laboratory, 3 hours. Principles of crystal chemistry, properties and origin of common rock-forming minerals. Laboratory sessions emphasize hand specimen mineral identification through determination of both physical and chemical characteristics. Prerequisites: completion of or concurrent enrollment in GEOL 303 and CHEM 115A/116A.

GEOL 301 NATURAL HIST OF THE HAWAIIAN ISLANDS (3)

Lecture, 3 hours. The origin and evolution of the flora and fauna of the most isolated archipelago in the world; geologic history and context of volcanic oceanic islands; conservation biology efforts to save the rare and endangered species of Hawaii. Satisfies GE, category B3 (Specific Emphasis in Natural Sciences). Prerequisite: BIOL 115 or 121/122.

GEOL 303 ADVANCED PRINCIPLES OF GEOLOGY (4)

Lecture, 3 hours; laboratory, 3 hours. Advanced treatment of the principles, methods and tools of geology emphasizing the materials that constitute the earth and the processes that act or have acted on them. Required of all prospective geology majors; recommended for those strongly interested in science. Satisfies GE, category B3 (Physical Sciences, Specific Emphasis) and laboratory requirements. Prerequisite: GEOL 102; strong science background recommended.

GEOL 304 GEOLOGIC MAPPING AND REPORT WRITING (1)

Field studies and report preparation done in conjunction with GEOL 303. Required weekend field trips. Prerequisite: concurrent enrollment in GEOL 303. Students must be in good physical condition.

GEOL 305 OPTICAL MINERALOGY (3)

Lecture, 1 hour; laboratory, 6 hours. Introduction to crystallography and the principles of optical mineralogy. Laboratory exercises are devoted to understanding the properties of crystal lattices and the fundamentals of mineral identification with the petrographic microscope. Prerequisites: MATH 107 and completion of or concurrent enrollment in GEOL 205 and 303.

GEOL 306 ENVIRONMENTAL GEOLOGY (3)

Lecture, 3 hours. Study of geological principles and processes as they relate to our natural environment emphasizing interaction between human activities and the geological environment. Major topics include the nature and behavior of rocks and soils; earthquakes and their associated hazards; landslides, slope stability and building construction; groundwater and pollution; stream processes and flooding; shoreline processes and coastal development; engineering geology and construction of highways and dams; development of natural resources, conservation and ecology. Specific content varies year to year, depending on instructor. Prerequisite: GEOL 102 or consent of instructor.

GEOL 307 IGNEOUS AND METAMORPHIC PETROLOGY (4)

Lecture, 2 hours; laboratory, 6 hours. A study of the origin, properties, classification and occurrence of igneous and metamorphic rocks. Laboratory exercises in the classification and description of minerals, textures and structures of the more common rock types. Laboratory work will emphasize both hand specimen analysis and microscopic petrography. Prerequisites: GEOL 305 and completion of or concurrent enrollment in CHEM 115B/116B.

GEOL 308 IGNEOUS AND METAMORPHIC PETROLOGY FIELD COURSE (1)

Field studies done in conjunction with GEOL 307. Required weekend field trips. Fee required. Prerequisites: GEOL 304 and concurrent enrollment in GEOL 307. Students must be in good physical condition.

GEOL 323 HYDROLOGY (3)

Lecture, 3 hours. Water as a natural resource, the hydrologic cycle, distribution of water on the earth. Atmospheric water, soil water, runoff and groundwater as related to water supply and use. Applications to problems of flood control, water management and water pollution, with special emphasis on California and Sonoma County. Prerequisites: GEOL 102 or consent of instructor; MATH 106 or 107.

GEOL 326 STRATIGRAPHY AND EARTH HISTORY (4)

Lecture, 3 hours; laboratory, 3 hours. The principles of stratigraphy and historical geology will be discussed, with special emphasis given to the application of these principles to the geologic development of North America. The geologic history of California will be treated in detail. The use of sedimentary rocks, fossils, and structural and tectonic principles will be discussed, especially as they relate to our understanding of historical geology. Laboratory work will include a study of sedimentary rocks and their properties, fossils and their occurrence and distribution, the construction and interpretation of various types of stratigraphic maps, and detailed studies of selected maps representative of the various geologic provinces of North America. Required field trip. Prerequisite: GEOL 303 or consent of instructor.

GEOL 395 COMMUNITY INVOLVEMENT PROGRAM (1-4)

CIP involves students in community problems such as tutoring, aiding in school science classes, and advisement of county agencies. A total of 6 units of CIP credit may be applied toward a degree. May be taken by petition only. Not applicable to the geology major.

GEOL 396 INTERNSHIP IN GEOLOGY (1-4)

Professional geologic work for a geologic firm or agency. Forty-five hours of work per unit. Not applicable to the geology major. Prerequisite: GEOL 303 and consent of instructor.

GEOL 406 X-RAY MINERALOGY (2)

Lecture, 1 hour; laboratory 3 hours. Introduction to the use of x-ray diffraction techniques. Prerequisites: CHEM 115A/116A and GEOL 305 or concurrent enrollment, and consent of instructor.

GEOL 410 GEOPHYSICS (4)

Lecture, 2 hours; laboratory 3 hours. The principles of physics as they are related to the earth. Physical basis for the methods of geophysical investigation: seismology, gravity, magnetics and electromagnetics. Application of geophysical methods to geological problems such as oil exploration and plate tectonics. Fieldwork and analysis of geological problems using geophysical instruments. Extensive use of computer. Required field trips. Prerequisites: GEOL 102 or 303, MATH 161 and PHYS 114.

GEOL 411 SEDIMENTARY PETROLOGY (4)

Lecture, 3 hours; laboratory, 3 hours. The description, classification and origin of sedimentary rocks. Discussion of weathering and origin of sediment, sediment transportation and sedimentary structures, clastic and nonclastic classification, and petrology. Hand specimen and thin section petrography and other techniques for studying sedimentary rocks will be used in the laboratory. Prerequisites: GEOL 307 and 308.

GEOL 412 SEDIMENTARY PETROLOGY FIELD COURSE (1)

Field studies done in conjunction with GEOL 411. Required weekend field trips. Prerequisites: GEOL 308 and concurrent enrollment in GEOL 411. Students must be in good physical condition.

GEOL 413 PALEONTOLOGY (4)

Lecture, 3 hours; laboratory 3 hours. The study of fossils in their geological context. Topics include taxonomy, morphology, evolution, biogeography, extinction and biostratigraphy of the main groups of invertebrate, vertebrate and plant fossils. Laboratory work will include becoming familiar with stratigraphically important fossil groups and the use of fossils in solving both geological and biological problems. Prerequisite: GEOL or 303 for majors, GEOL 102 for non-majors.

GEOL 414 PALEONTOLOGY FIELD COURSE (1)

Field studies done in conjunction with GEOL 413. Required weekend field trips. Prerequisites: GEOL 303 for majors, GEOL 102 for non-majors, and concurrent enrollment in GEOL 413. Students must be in good physical condition.

GEOL 417 STRUCTURAL GEOLOGY (4)

Lecture, 3 hours; laboratory, 3 hours. Introduction to theoretical and experimental rock deformation; description and genesis of folds, faults and related minor structures; interior structure of the earth, plate tectonics and regional structural history. Prerequisites: GEOL 303, 304 and MATH 107.

GEOL 418 STRUCTURAL GEOLOGY FIELD COURSE (1)

Field studies done in conjunction with GEOL 417. Required weekend field trips. Prerequisite: previous or concurrent enrollment in GEOL 417. Students must be in good physical condition.

GEOL 420 FIELD GEOLOGY (4)

Lecture, 1 hour; 12 days of fieldwork. Principles of geologic mapping, interpretation of geologic maps, preparation of field reports. Fee required. Prerequisites: GEOL 411, 412, 417 and 418. Students must be in good physical condition.

GEOL 422 GEOCHEMISTRY (3)

Lecture, 3 hours. Introductory cosmochemistry and origin of the elements; meteorites; the earth as a chemical system, chemistry of processes at the surface of the earth; mineral crystal chemistry; introduction to geochronology and stable isotope variations in nature; thermodynamics and its geological application; geochemical prospecting. Prerequisite: GEOL 303, CHEM 115AB/116AB, MATH 161, or consent of instructor.

GEOL 425 ECONOMIC GEOLOGY (3)

Lecture, 3 hours. Classification, origin and alteration of metallic ore deposits. Laboratory sessions on hand sample identification of ore and alteration minerals and petrographic analysis of selected ore suites. Prerequisites: previous or concurrent enrollment in GEOL 307 and CHEM 115B/116B.

GEOL 427 ADVANCED FIELD GEOLOGY (4)

A minimum of five weeks of detailed mapping in igneous, metamorphic and sedimentary rocks, and the preparation of field reports and geological maps. Students may also complete this course at another university, but should do so only in consultation with the geology department. Students must demonstrate equivalence in terms of field hours and course content to GEOL 427. Prerequisite: senior standing in geology. GEOL 420 strongly recommended.

GEOL 495 SPECIAL STUDIES (1-4)

Individual study, under guidance of an advisor, of an advanced field, laboratory or literature problem. Students must qualify and adhere to the department policy on independent study as outlined below. Prerequisite: approval of advisor. Department policy on independent study: (1) The student must have a 3.00 or higher grade point average (2) The student must have demonstrated ability to work independently and do quality work in field classes. (3) The student must have submitted a detailed proposal of work to do, schedule and results expected. (4) The student must have a faculty sponsor who is willing to advise the project and will set up a schedule of meetings for this purpose. This will be reported on the standard University Special Studies form and signed by the student, faculty advisor and department chair. (5) A copy of all documents and two copies of the final paper or report will be filed with the department office before a grade will be assigned.

GEOL 496 SELECTED TOPICS IN GEOLOGY (1-3)

An intensive study of an advanced topic in geology. May be repeated for additional credit with new subject matter. Prerequisite: adequate preparation for topic under consideration. Additional fee may be required.

GEOL 498 GEOLOGY PRACTICUM (1-4)