

Earth and Environmental Sciences

Includes origin of the solar system, evolution of atmosphere and oceans, origin of life, rise and fall of the dinosaurs, plate tectonics, and ice ages. G.E. Integration IB. *Does not satisfy Division 1 pre-1999 G.E. curriculum.* (Formerly GEOL 112)

EES 113. Stream Habitat Restoration (3)

Prerequisites: EES 1 or BIOL 1A or BIOL 10 or instructor's consent. Investigation of stream geology, hydrology, and biology relevant to restoring stream habitat. Includes collecting and interpreting lab and field data. Field trips required. (2 lecture, 3 lab hours) (Formerly GEOL 113)

EES 114. Engineering Geology (3)

Prerequisites: EES 1 and MATH 5 or 72 or 75. Introduction to techniques and theory of geotechnical investigations. Includes field and lab techniques in soil and rock mechanics, rock logging, geophysics, slope stability, engineering hydrogeology, stereo analysis, seismic engineering. Recommended for students in geology or civil engineering. Field trips required. (2 lecture, 3 lab hours) (Formerly GEOL 114)

EES 117. Hydrogeology (3)

Prerequisites: EES 1; MATH 72 or 75; and EES 124 and MATH 76 recommended. The hydrologic cycle; surface water processes; stream flow and hydrograph; properties of porous geologic materials; principles of groundwater flow; water wells; geology of groundwater occurrence; water quality and pollution. Field trip required. (2 lecture, 3 lab hours) (Formerly GEOL 117)

EES 118. Applied Geophysics (3)

Prerequisites: EES 1, PHYS 2A and completion of or concurrent enrollment in PHYS 2B. Presents an overview of geophysics as applied to problems in exploration, engineering, and environmental geology. Emphasizes hands-on methods of data acquisition and interpretation that entry-level geologists will most likely encounter including gravity, magnetics, seismic refraction, ground-penetrating radar, down-hole surveys, and electrical resistivity. Field instrumentation is used throughout. (2 lecture, 3 lab hours) (Formerly GEOL 118)

EES 122. Stratigraphy (3)

Prerequisites: EES 2, 30, 102 (may be taken concurrently). Stratigraphic principles and recognition of stratigraphic units. Emphasis on tectonostratigraphic concepts. (2 lecture, 3 lab/field hours) (Formerly GEOL 122)

EES 124. Geochemistry (3)

Prerequisites: CHEM 1A and 1B and EES 1 or 15; EES 12 and 101 recommended. Chemistry applied to earth processes and evolution. Reactions involved in origin and transformations of natural waters, rocks, and minerals. Crystal chemistry and behavior of elements and isotopes. Field trip required; laboratory project. (2 lecture, 3 lab hours) (Formerly GEOL 124)

EES 125. Global Paleoclimates (3)

Prerequisite: EES 1 and either MATH 2, 5, or 75. Introduction to processes and mechanisms behind what is thought to be gradual and abrupt climate change over the last 500 million years. Discussion of investigation methods in paleobiology, paleogeography, and paleoceanography. Proxies interpretation for building age models and correlation of marine and terrestrial records. (Formerly GEOL 150T)

EES 130T. Advanced Problems in Geology (1-3; max total 6 if no topic repeated)

Prerequisite: senior standing in geology. Topics or problems in the following fields: engineering geology, geology of North America, field geology, micropaleontology, advanced ground water geology, sedimentation and sedimentary rocks, geochemistry, geophysics, volcanic geology and marine geology. Some topics may have labs. (Formerly GEOL 130T)

EES 150T. Studies in Earth Science (1-3; max total 6)

Applicable to the geology major only with prior departmental approval. Prerequisite: EES 1. Earth science topics designed for students minoring in geology, with an interest in earth science, in teacher training, and for elementary and secondary teachers. (Formerly GEOL 150T)

EES 154. Introductory Earth Science (3)

Not applicable to the B.S. in Geology. Appropriate for liberal studies majors and K-6 teachers. Earth systems interactions demonstrated through hands-on activities, experiments, and field work. Topics include recognition, origin, and use of rocks and minerals; geologic time and fossils; interpretation of landscapes and the rock record; and plate tectonics. (2 lecture, 2 lab hours, 1 hour arranged) (Formerly GEOL 154)

EES 155. Discovering Earth Science (3)

Not applicable to the B.S. in Geology. Prerequisites: EES 1 or 112, or instructor's permission. Appropriate for students and 7-12 teachers seeking a secondary school science credential. Activity-based discovery of earth science and its integration with other sciences. Topics include energy in the earth system, geochemical cycles, dynamic interactions between the lithosphere, atmosphere, and hydrosphere, and origin/evolution of the earth. (2 lecture, 2 lab hours, 1 hour arranged) (Formerly GEOL 155)

EES 160. Field Studies

(1-4; max total 4)

Prerequisite may be specified by instructor. Field trips during weekends or winter/spring recess to geologically important and significant areas such as the Grand Canyon, Baja California, the Sierra Nevada, Death Valley. (Formerly GEOL 160)

EES 167. Oceans, Atmosphere, and Climate Change (3)

Prerequisites: G.E. Foundation and Breadth Area B. Integrated introduction to oceans, atmosphere, and climate change: their origin and evolution; plate tectonics; ocean currents, waves, and tides; atmospheric circulation and El Niño; production and life; and environmental issues and concerns. G.E. Integration IB. (Formerly GEOL 167)

EES 168. California's Earth System (3)

Prerequisites: G.E. Foundation and Breadth Area B. Not applicable to B.S. in Geology. Interaction of earth, water, air, and life in California's earth system over geologic time. Human interaction with the environment. G.E. Integration IB. (Formerly GEOL 168)

EES 177. Quantitative Methods for Earth Science (3)

Prerequisites: EES 1; MATH 75. Applications of mathematical techniques and quantitative methods in earth science; introduction to basic skills, including statistical methods, numerical techniques, matrix operations, and spatial analysis. (2 lecture, 3 lab hours) (Formerly GEOL 177)

EES 178. Geostatistics (3)

Prerequisites: EES 1 or EES 4; MATH 75 recommended. Principles and application of geostatistics and visualization techniques in geo-environmental sciences. Topics include spatial and temporal correlation, variograms, kriging, and factor analysis. Techniques are used for evaluation of mineral deposits and characterization of an environment with limited sampling data. (2 lecture, 3 lab hours, 1 day required field tests) (Formerly GEOL 178)