
GEOL 4500: Organic Geochemistry

(cross-leveled with GEOL 7500). Topics include chemistry of petroleum-forming reactions and their kinetic parameters; use of organic-chemical criteria in source-rock evaluation; carbon isotope fractionation in organic precursors of biological molecules; early history of earth's atmosphere.

Credit Hours: 3**Prerequisites:** instructor's consent

GEOL 4650: Plate Tectonics

(cross-leveled with GEOL 7650). Formation, evolution, and structure of the earth. Rules, causes, and implications of plate tectonics with emphasis on present-day features.

Credit Hours: 3**Prerequisites:** GEOL 3250 or GEOL 4150 or instructor's consent

GEOL 4650W: Plate Tectonics - Writing Intensive

Formation, evolution, and structure of the earth. Rules, causes, and implications of plate tectonics with emphasis on present-day features.

Credit Hours: 3**Prerequisites:** GEOL 3250 or GEOL 3650 or instructor's consent

GEOL 4680: Neotectonics and Earthquake Geology

(cross-leveled with GEOL 7680). Introduction to techniques and concepts of active crustal deformation from the geological and geodetic perspectives. Topics include tectonic geomorphology, paleoseismology, Quaternary dating, tectonic geodesy, numerical models of faults, and earthquake hazard assessment.

Credit Hours: 3**Prerequisites:** GEOL 3650 or GEOL 4650

GEOL 4750: Microanalysis for Geological Sciences

(cross-leveled with GEOL 7750). This course is intended to provide a working knowledge of electron and X-ray microbeam analytical instruments - both in principle and in practice. Lectures will focus on the physics of how these instruments collect data, and how these data can be interpreted. In addition, students will gain hands-on experience with operating these instruments, specifically on their own samples, as well as preparing their samples for microanalysis and interpreting/manipulating the resulting data. Graded on A-F basis only.

Credit Hours: 3**Prerequisites:** Instructor's Consent (instrument time is limited so enrollment must also be limited)

GEOL 4800: Introduction to Geophysics

(cross-leveled with GEOL 7800). Introduction to the fundamentals of geophysical methods and their applications in geology, environmental studies, and exploration. Topics include seismic, gravity, magnetic, and electric methods.

Credit Hours: 3**Prerequisites:** GEOL 1100 or GEOL 2130 or GEOL 1200 and MATH 1700 or instructor's consent

GEOL 4900: Igneous and Metamorphic Petrology with Laboratory

Introduction to igneous and metamorphic rock associations and rock-forming processes. Emphasis on understanding the evolution of the Earth in view of igneous and metamorphic rock petrogenesis.

Credit Hours: 4**Prerequisites:** GEOL 3250**Recommended:** GEOL 3300

GEOL 4950: Senior Thesis

Research conducted in an area of the Geological Sciences under the auspices of a member of the faculty. Under normal circumstances, this research should be completed over two semesters. May be repeated for a maximum of 3 hours credit.

Credit Hour: 1-3

GEOL 4992: Geology Field Camp

Field study of sedimentary, igneous and metamorphic rocks. Facies analysis of sedimentary rocks, mapping of folded and faulted sedimentary strata and fabric analysis of an igneous-metamorphic terrane. Excursion to Yellowstone and Grand Teton National Parks.

Credit Hours: 6**Recommended:** GEOL 2350, GEOL 4150, and GEOL 3800

GEOL 7002: Topics in Geological Sciences-Biological/Physical/Mathematics

Organized study of selected topics. Subjects and earnable credit may vary. May be repeated with departmental consent.

Credit Hour: 1-99**Prerequisites:** instructor's consent

GEOL 7085: Problems in Geological Sciences**Credit Hour:** 1-8**Prerequisites:** instructor's consent

GEOL 7100: Groundwater Hydrology

(cross-leveled with GEOL 4100). Analysis of groundwater occurrence, flow, recovery, and solute transport within shallow levels of the Earth's crust.

Credit Hours: 3**Prerequisites:** GEOL 1100 or GEOL 2130 or GEOL 1200, and PHYSCS 1210 or PHYSCS 2750, and MATH 1400 or MATH 1500

GEOL 7120: Engineering Geology

(cross-leveled with GEOL 4120). Fundamentals of earth materials and geological processes and their applications in engineering works and environmental sciences. Includes properties of minerals and rocks, rock and soil mechanics, surficial geological processes, and practice of engineering.

Credit Hours: 3**Prerequisites:** GEOL 1100 or GEOL 2130 or GEOL 1200 and MATH 1500, or instructor's consent

GEOL 7130: Groundwater Modeling

(cross-leveled with GEOL 4130). Use of leading groundwater flow and contamination modeling software. Theory of groundwater flow, solute