

GEOL 4006: Topics in Geological Sciences-Mathematical Science

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 4007: Topics in Geological Sciences-Physical Science

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 4100: Groundwater Hydrology

(cross-leveled with GEOL 7100). 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 4120: Engineering Geology

(cross-leveled with GEOL 7120). 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 4130: Groundwater Modeling

(cross-leveled with GEOL 7130). Use of leading groundwater flow and contamination modeling software. Theory of groundwater flow, solute transport, and selected numerical solution techniques. Applications to water resource, environmental, and geological problems.

Credit Hours: 3

Prerequisites: GEOL 4100 or equivalent

GEOL 4150: Structural Geology

(cross-leveled with GEOL 7150). The mechanical behavior of earth materials. Analysis of the geometry and mechanics of faults, fractures, and folds. Laboratory includes problems on stresses and strains associated with deformation, geometric analysis of deformation structures, and interpretation of geologic maps.

Credit Hours: 4

Prerequisites: GEOL 1100 or GEOL 2130 or GEOL 1200 and MATH 1140 or MATH 1160 or MATH 1500

GEOL 4180: Solar System Science

(same as PHYSCS 4180, ASTRON 4180; cross-leveled with GEOL 7180). Investigates physical states, interior structures and comparative geology of solar system bodies: planets, moons, asteroids, comets, sun. Solar system formation and evolution.

Credit Hours: 3

Prerequisites: MATH 1700 and PHYSCS 1220 or PHYSCS 2760 or instructor's consent

GEOL 4200: Economic Geology with Laboratory

Geochemistry of ore deposits. Introduction to types of mineral deposits, genesis of ore, and current areas of research. Laboratory emphasizes hand-specimen and polished-section studies of a wide variety of ore deposit types.

Credit Hours: 4

Prerequisites: GEOL 4900

GEOL 4300: Introduction to Low-Temperature Geochemistry

Introduction to the chemical alteration of rock-forming minerals in weathering environments and to factors controlling the chemical composition of subsurface water.

Credit Hours: 3

Prerequisites: GEOL 3300 or instructor's consent

GEOL 4318: Environmental Soil Chemistry

(same as SOIL 4318 and ENV_SC 4318; cross-leveled with GEOL 7318, SOIL 7318, ENV_SC 7318). Study of chemical constituents and processes occurring in soils. Topics include soil minerals and weathering processes, organic matter, solution chemistry, oxidation-reduction reactions and adsorption processes.

Credit Hours: 3

Prerequisites: SOIL 2100 or GEOL 2400, CHEM 1320 and CHEM 1330. Junior standing or instructor's consent

GEOL 4350: Taphonomy

(cross-leveled with GEOL 7350). The purposes of this course are to 1) analyze patterns in the history of life and 2) to recognize the biased processes that led to its preservation. We will accomplish these goals by examining two disparate fossil preservation pathways: 1) Konservat lagerstätten: fossil deposits that are notorious for the exceptional and rare preservation of soft tissues and 2) Konzentrat lagerstätten: fossil deposits that are exceptional for the enormous amount of fossilized skeletal material they contain. Through careful examination of both the rare and the hyper-abundant, we can address the fundamental question of paleobiology: how literally can the fossil record be read as the history of life? Graded on A-F basis only.

Credit Hours: 3

Prerequisites: GEOL 2350, GEOL 2360

GEOL 4370: Conservation Paleobiology

(cross-leveled with GEOL 7370). Humans are having an undeniable influence on Earth systems, including the biosphere. Climate change, habitat destruction, over-hunting/harvesting, pollution, and invasive species are among the primary stressors of modern biodiversity. How have ecosystems responded to such stressors in the past? How do we determine what a "pristine" ecosystem looks like when planning ecosystem restoration? Paleontologists are uniquely equipped to address these questions using the fossil record. In this course we will review the important questions in this emerging discipline, learn about the tools used to address these questions, and learn from case studies involving invertebrate, vertebrate, and plant fossils from a variety of environments.

Credit Hours: 3