COURSES FOR GEOLOGICAL SCIENCES

Geological Sciences Courses

GEO501 Paleoclimatology
Hours 3
Survey of the variability of global climate through geologic time and investigation of the mechanisms of change.
Prerequisite(s): MATH 126 or MATH 146; and PH 102

GEO502 Communicating Geology
Hours 3
Evaluate and develop effective scientific communication skills including writing, oral presentations and poster presentations.
Prerequisite(s): None

GEO503 Petroleum System Analysis
Hours 3
The course will cover the geologic events that lead to the formation of petroleum systems and plays. Geologic events form sedimentary basins by causing subsidence and delivery of sediments to a basin. This sedimentary fill is modified by compaction as well as the transport of heat and reactive fluids through the rock matrix during sedimentation and lithification. These processes determine the amount and nature of oil and/or gas accumulation and production in a basin. Petroleum system analysis requires the integration of geology, geophysics, petrophysics, geochemistry, and risk analysis. The generated basin models incorporate data obtained directly from outcrops via geologic mapping, petrographic thin section analysis, geochemical data, seismic reflection profiles and well log analysis if there are wells drilled for oil and gas exploration in a sedimentary basin.
Prerequisite(s): Department of Geological Sciences Graduate student standing or Instructor’s consent.

GEO505 Introduction to Environmental Biogeochemistry
Hours 3
An introduction to fundamental concepts in biogeochemistry, a scientific discipline that integrates the study of geological, physical, chemical, and biological principles that govern the natural environment. The course discusses the lithosphere, hydrosphere, atmosphere, and biosphere, and emphasizes their interactions and connectivity through the cycles of elements and energy. Students will learn through lectures, discussions, field trips, and laboratory exercises.

GEO507 Seismology
Hours 3
This course provides an overview of earthquake seismology for both undergrad and graduate geoscience students. Topics include elastic wave propagation, seismic ray theory, travel time interpretation, surface wave dispersion and seismic tomography.
Prerequisite(s): MATH 126 or MATH 146

GEO510 Soil & Groundwater Restoration
Hours 3
Methods for restoring contaminated soil and groundwater by examining the factors and processes influencing the efficacy of remediation systems. An emphasis will be placed on the scientific principles upon which soil and groundwater remediation is based.

GEO511 Contaminant Transport in Porous Media
Hours 3
This course will cover topics related to the transport and fate of contaminants in subsurface systems. Specifically, this course will discuss the many factors and processes influencing contaminant transport such as the effects of dispersion, inter-phase mass transfer, transformation reactions, and porous-media heterogeneity. In addition, representative conceptual/mathematical models describing contaminant transport phenomena will be discussed.
Prerequisite(s): MATH 125, PH 102, CH 102, GEO 306 or equivalents; and/or with instructor’s permission.

GEO515 Metamorphic Petrology
Hours 3
Study of metamorphic processes, types, textures, and petrogenesis and the use of metamorphic rocks for understanding tectonism. Offered on demand.

GEO516 Volcanology
Hours 3
Rheologic properties of magmatic systems and application of these principles to the understanding of volcanic processes. Offered on demand.

GEO522 Sedimentary Basin Analys
Hours 3
Examination of the evolution and development of sedimentary basins. Emphasis is on sedimentary, tectonic, and geochemical processes and their influence in petroleum generation, accumulation, and preservation. Offered on demand.
Prerequisite(s): GEO 365 and GEO 367 and GEO 210

GEO525 Adv Topics In Geology
Hours 1-6
Advanced topics in the following areas: economic geology, geochemistry, geohydrology, geophysics, geomorphology, mineralogy, paleontology, petrology, sedimentation, stratigraphy, structural geology, and tectonics. Offered on demand.

GEO535 Graduate Seminar
Hours 1
Oral presentations on current geological topics. Offered fall and spring semesters.

GEO536 Graduate Seminar
Hours 1
Oral presentations on current geological topics. Offered fall and spring semesters.
This course serves as an introduction to cosmochemistry and analytical techniques. The course will examine notable topics, geological concepts and analytical methods used to better understand our Solar System. The course will be part-lecture and part discussion/seminar based, where students will read journal articles on topics and make short presentations for discussion, to develop scientific curiosity and critical thinking. Writing proficiency within the discipline is required for a passing grade in this course.

Prerequisite(s): Some background in geochemical/astronomy themes is strongly encouraged. GEO 566 or permission of the instructor

**GEO583 Global Tectonics**

Hours 3

Study of tectonics, plate motions, and tectonic environments. Includes discussion of controlling factors, driving forces, and resulting structures with emphasis on island arcs, trenches, backarc basins, transform boundaries, and continental margins. Offered alternate spring semesters or on demand.

Prerequisite(s): GEO 365 and GEO 367

**GEO597 Geological Internships**

Hours 3

Field and laboratory projects with government and industry.
GE0598 Non-Thesis Research
Hours 1-6

Non-Thesis Research.

GE0599 Thesis Research
Hours 1-12

This independent research course partially fulfills required master's-level research thesis hours toward the master's degree in Geology (Geological Sciences). The course is conducted under the guidance of the thesis advisor. Material covered will be of an advanced nature aimed at providing master's students with an understanding of the latest research and current developments within the field. Discussion and advisor guidance will be directed towards readings of research articles and development of research methodology, with the aim of producing an original research contribution that represents a novel development in the field, or a novel perspective on a pre-existing topic in the field.

GE0602 Communicating Geology
Hours 3

Evaluate and develop effective scientific communication skills including writing, oral presentations and poster presentations.

Prerequisite(s): None

GE0626 Adv Topics In Geology
Hours 1-6

Advanced topics in the following areas: economic geology, geochemistry, geohydrology, geophysics, geomorphology, mineralogy, paleontology, petrology, sedimentation, stratigraphy, structural geology, and tectonics. Offered on demand.

GE0635 Graduate Seminar
Hours 1

Oral presentations on current geological topics. Offered fall and spring semesters.

GE0636 Graduate Seminar
Hours 1

Oral presentations on current geological topics. Offered fall and spring semesters.

GE0698 Non-Dissertation Res
Hours 1-12

Non-Dissertation Res.

GE0699 Dissertation Research
Hours 1-12

This independent research course partially fulfills required doctoral-level research dissertation hours toward the doctoral (Ph.D.) degree in Geology (Geological Sciences). The course is conducted under the guidance of the dissertation advisor. Material covered will be of an advanced nature aimed at providing doctoral students with an understanding of the latest research and current developments within the field. Discussion and advisor guidance will be directed towards readings of research articles and development of research methodology, with the aim of producing an original research contribution that represents a novel development in the field, or a novel perspective on a pre-existing topic in the field.