GEOSCIENCES (GEO)

GEO 003, UNDERGRADUATE RESEARCH, 0 Credits
Engage in research activities appropriate to the discipline; and through the research experience, acquire skills, techniques, and knowledge relevant to the field of study. In consultation with a faculty mentor, engage in research activity, and make and execute a plan for a project.

GEO 004, INTERNSHIP, 0 Credits
Provides basic personal and professional skills that can be used within and outside of a work setting. Through practice, this experience guides students in building and maintaining positive professional relationships, networking/mentoring relationships, and enhances students’ understanding of the connection between theory and practice in their respective disciplines.

GEO 100, *NATURAL DISASTERS: HOLLYWOOD VERSUS REALITY, 4 Credits
Introduction to natural hazards, as seen through the lens of popular media. Course will explore the causes and consequences of natural disasters via in-class exercises and activities designed to develop students’ skills in scientific analysis and problem solving. (Bacc Core Course)
Attributes: CPPS – Core, Pers, Physical Science

GEO 101, *THE SOLID EARTH, 4 Credits
Solid earth processes and materials. Earthquakes, volcanoes, earth structure, rocks, minerals, ores. Solid earth hazard prediction and planning. Geologic time. Lec/lab. (Bacc Core Course)
Attributes: CPPS – Core, Pers, Physical Science

GEO 199, SPECIAL STUDIES, 1-16 Credits
Equivalent to: GEO 199H
This course is repeatable for 16 credits.

GEO 201, *PHYSICAL GEOLOGY, 4 Credits
Study of earth’s interior. Tectonic processes and their influence on mountains, volcanoes, earthquakes, minerals, and rocks. Field trip(s) required; transportation fee charged. Lec/lab. (Bacc Core Course)
Attributes: CPPS – Core, Pers, Physical Science
Equivalent to: GEO 201H

GEO 202, *EARTH SYSTEMS SCIENCE, 4 Credits
Surficial processes (glaciers, rivers), climate, soils, vegetation, and their interrelationships. Field trip(s) required; transportation fee charged. Lec/lab. (Bacc Core Course)
Attributes: CPPS – Core, Pers, Physical Science
Equivalent to: GEO 201H, GEO 202H

GEO 203, *EVOLUTION OF PLANET EARTH, 4 Credits
History of earth and life as interpreted from fossils and the rock record. Field trip(s) required; transportation fee charged. Lec/lab. (Bacc Core Course)
Attributes: CPPS – Core, Pers, Physical Science

GEO 221, *ENVIRONMENTAL GEOLOGY, 4 Credits
Introductory geology emphasizing geologic hazards (volcanoes, earthquakes, landslides, flooding), geologic resources (water, soil, air, mineral, energy), and associated environmental problems and mitigation strategies. Lec/lab. (Bacc Core Course)
Attributes: CPPS – Core, Pers, Physical Science
Available via Ecampus

GEO 295, INTRODUCTION TO FIELD GEOLOGY, 3 Credits
Two-week course taught in the fall program in various locations throughout the west. Collect field data to make geological maps, cross-sections, columns, and reports. Serves as an introduction to upper-level course work for Geology degree. Lec/lab.
Prerequisite: GEO 201 with C- or better

GEO 305, *LIVING WITH ACTIVE CASCADE VOLCANOES, 3 Credits
The impact of volcanic activity on people, infrastructure, and natural resources; how and why volcanic activity in the Cascade Range occurs; volcano monitoring and hazard assessment. Field trip required, transportation fee charged. (Bacc Core Course)
Attributes: CSST – Core, Synthesis, Science/Technology/Society
Available via Ecampus

GEO 306, *MINERALS, ENERGY, WATER AND THE ENVIRONMENT, 3 Credits
Formation, occurrence, and use of earth resources including metallic minerals, building materials, energy resources including fossil fuels and nuclear energy, and water resources. Environmental consequences of resource use including surface and groundwater pollution, waste disposal, air pollution and acid rain, and global climate change. Implications of resource use and availability for economic development and geopolitical relations.
Attributes: CSGI – Core, Synth, Global Issues
Available via Ecampus

GEO 307, *NATIONAL PARK GEOLOGY AND PRESERVATION, 3 Credits
National parks as classrooms to study geological processes and the importance of preserving natural landscapes. Field trip(s) required; transportation fee charged. (Bacc Core Course)
Attributes: CSST – Core, Synthesis, Science/Technology/Society
Equivalent to: GEO 307H
Available via Ecampus

GEO 308, *GLOBAL CHANGE AND EARTH SCIENCES, 3 Credits
Study of global change over different time scales during the history of the earth, with emphasis on evolution of its atmosphere, plate tectonics, paleoclimates, and mass extinctions. (Bacc Core Course)
Attributes: CSGI – Core, Synth, Global Issues
Available via Ecampus
GEO 309, *ENVIRONMENTAL JUSTICE, 3 Credits
Technical and social issues surrounding the unequal exposure to environmental hazards based on race and the environmental justice movement that has grown to address charges of such environmental racism. (Bacc Core Course)
**Attributes:** CPDP – Core, Perspective, Difference/Power/Discrimination
**Prerequisite:** WR 121 with C- or better or WR 121H with C- or better
Available via Ecampus

GEO 310, EARTH MATERIALS I: MINERALOGY, 4 Credits
Principles of crystal morphology, and structure. Characteristics, identification, and origins of minerals. Lec/lab.
**Prerequisite:** (GEO 201 with D- or better or GEO 221 with D- or better) and ((CH 121 with D- or better or (CH 231 with D- or better and CH 261 [D-]) or (CH 231H [D-] and CH 261H [D-])

GEO 315, EARTH MATERIALS II: PETROLOGY, 4 Credits
Origin, identification and classification of igneous, sedimentary, and metamorphic rocks. Field trip(s) required, transportation fee charged. Lec/lab.
**Prerequisite:** GEO 310 with D- or better

GEO 322, SURFACE PROCESSES, 4 Credits
Examination of surficial processes and terrestrial landforms of the earth, including slopes, rivers, glaciers, deserts, and coastlines. Field trip(s) required, transportation fee charged. Lec/lab.
**Prerequisite:** (GEO 102 with D- or better or GEO 102H with D- or better or GEO 202 with D- or better or GEO 202H with D- or better or GEO 203 with C- or better) and (MTH 251 [C-] or MTH 251H [C-]) and (PH 201 [D-] or PH 201H [D-] or PH 211 [D-] or PH 211H [D-])

GEO 331, *ASTROBIOLOGY: LIFE BEYOND EARTH, 3 Credits
Evaluates the potential distribution of life in the Universe, presents the science and technology used to search for life, and explores the societal impacts of its discovery.
**Attributes:** CSST – Core, Synthesis, Science/Technology/Society
**Recommended:** Completion of 12 credits of biological and physical science in the Bacc Core

GEO 340, STRUCTURAL GEOLOGY, 4 Credits
Analysis of geometry and kinematics of geologic structures including brittle and ductile faults, folds, joints, deformation fabrics. Field trip(s) required; transportation fee charged. Lec/lab.
**Prerequisite:** GEO 201 with D- or better
**Equivalent to:** GEO 450

GEO 352, *OREGON: GEOLOGY, PLACE, AND LIFE ON THE RING OF FIRE, 4 Credits
Provides an overview of the geology of Oregon in the context of the Pacific Northwest including tectonic setting, geologic features and landscapes, as well as topics and concepts of interest to society in general. Lessons will include discussion of the relationship between people and the landscape, incorporating the concept of ethnographic landscapes–geologic structures, natural resources and geologic hazards that are part of the identity of a place. Emphasizes written and graphic communication skills. Field trip required, transportation fee charged. Lec/lab. (Bacc core course)
**Attributes:** CSST – Core, Synthesis, Science/Technology/Society
**Equivalent to:** GEO 352H

GEO 352H, *OREGON: GEOLOGY, PLACE, AND LIFE ON THE RING OF FIRE, 4 Credits
Provides an overview of the geology of Oregon in the context of the Pacific Northwest including tectonic setting, geologic features and landscapes, as well as topics and concepts of interest to society in general. Lessons will include discussion of the relationship between people and the landscape, incorporating the concept of ethnographic landscapes–geologic structures, natural resources and geologic hazards that are part of the identity of a place. Emphasizes written and graphic communication skills. Field trip required, transportation fee charged. Lec/lab. (Bacc core course)
**Attributes:** CSST – Core, Synthesis, Science/Technology/Society; HNRS – Honors Course Designator
**Equivalent to:** GEO 352

GEO 370, STRATIGRAPHY AND SEDIMENTOLOGY, 4 Credits
Basic principles of sedimentology and stratigraphy. Sedimentology is largely concerned with classifying and interpreting the origin of sedimentary rocks. Stratigraphy provides formal rules and strategies for organizing sedimentary (and other) rocks into a temporal framework. Reconstruction of Earth history with various approaches centered on paleoclimatology, paleogeography, paleooceanography, and tectonics. Lec/lab.
**Prerequisite:** GEO 201 with C- or better and GEO 203 [C-]
**Equivalent to:** GEO 470

GEO 380, *EARTHQUAKES IN THE PACIFIC NORTHWEST, 3 Credits
Earthquake hazards in the Northwest; responses to reducing earthquake risk at state, local, and personal levels. (Bacc Core Course)
**Attributes:** CSST – Core, Synthesis, Science/Technology/Society
Available via Ecampus

GEO 399, SPECIAL TOPICS, 1-16 Credits
**Equivalent to:** GEO 399H, GEO 399H
This course is repeatable for 16 credits.

GEO 399H, SPECIAL TOPICS, 1-16 Credits
**Attributes:** HNRS – Honors Course Designator
**Equivalent to:** GEO 399
This course is repeatable for 16 credits.
GEO 400, FIELD TRIPS, 1-16 Credits
Participation in group field trips that are not a part of any other course. Transportation fee is charged. Students may prepare guides for trips. Faculty sponsor must be prearranged. Graded P/N. This course is repeatable for 48 credits.

GEO 401, RESEARCH, 1-16 Credits
Independent, original research subjects guided by faculty conferences and resulting in a brief written report. Faculty sponsor must be prearranged. This course is repeatable for 24 credits.

GEO 403, THESIS, 1-16 Credits
Independent, original study that culminates in a senior thesis. Faculty sponsor must be prearranged. This course is repeatable for 24 credits.

GEO 405, READING AND CONFERENCE, 1-16 Credits
Independent reading in specialized topics guided by and discussed in faculty conferences. Faculty sponsor must be prearranged. This course is repeatable for 24 credits.

GEO 407, SEMINAR, 1-16 Credits
Graded P/N. Equivalent to: GEO 407H
This course is repeatable for 12 credits.

GEO 407H, SEMINAR, 1-16 Credits
Graded P/N. Attributes: HNRS – Honors Course Designator Equivalent to: GEO 407
This course is repeatable for 12 credits.

GEO 408, WORKSHOP, 1-16 Credits
This course is repeatable for 12 credits.

GEO 410, INTERNSHIP, 1-15 Credits
Pre-career professional experience under joint faculty and employer supervision. Graded P/N. This course is repeatable for 48 credits.

GEO 412, IGNEOUS PETROLOGY, 4 Credits
Petrogenesis of igneous rocks. Petrographic analysis using polarizing microscopes. Field trip may be required, transportation fee charged. Lec/lab. Prerequisite: GEO 315 with D- or better Recommended: GEO 415 [C-]

GEO 415, EARTH MATERIALS III: PETROGRAPHY, 4 Credits
Microscope-based study of minerals and igneous, sedimentary and metamorphic rocks. Representation and interpretation of geological processes based on microscopic observation. Lec/lab. Prerequisite: GEO 201 with D- or better and GEO 310 [D-] and GEO 315 [D-] Equivalent to: GEO 320

GEO 427, ^VOLCANOLOGY, 4 Credits
A survey of volcanoes: their distribution, forms, composition, eruptive products, eruptive styles, and associated phenomena. Field trip may be required; transportation fee charged. Offered alternate years. Lec/lab. (Writing Intensive Course) Attributes: CWIC – Core, Skills, WIC Prerequisite: GEO 315 with D- or better

GEO 430, *GEOCHEMISTRY, 4 Credits
Principles of geochemistry applied to problems of earth science. Attributes: CWIC – Core, Skills, WIC Prerequisite: GEO 315 (may be taken concurrently) with D- or better and ((CH 121 with D- or better and CH 122 [D-]) or ((CH 231 [D-] or CH 231H [D-]) and (CH 261 [D-] or CH 261H [D-]) and (CH 232 [D-] or CH 232H [D-]) and (CH 262 [D-] or CH 262H [D-]))

GEO 431, ENVIRONMENTAL GEOCHEMISTRY, 3 Credits
An introduction to natural processes at and near the earth’s surface, as well as an examination of the impact of human activities on the natural environment. Study includes discussion of the sources, transformations, transport, and fate of contaminants. Field trip(s) required; transportation fee charged. Prerequisite: (CH 121 with D- or better and CH 122 [D-] and CH 123 [D-]) or ((CH 231 [D-] or CH 231H [D-]) and (CH 232 [D-] or CH 232H [D-]) and (CH 233 [D-] or CH 233H [D-]))

GEO 432, APPLIED GEOMORPHOLOGY, 3 Credits
Effect of landform processes upon human activity; consequences of resource management strategies on erosional balance within landscape; identification of mitigation of natural hazards; role of geomorphic process studies in environmental planning. Taught as seminar, themes TBA. Field trip(s) may be required; transportation fee charged. Equivalent to: GEO 449 Recommended: GEO 322

GEO 433, COASTAL GEOMORPHOLOGY, 3 Credits
Morphodynamic approach to coastal landforms, processes and evolution including the impacts and response of humans to coastal change. Prerequisite: (PH 211 with D- or better and PH 212 [D-]) and GEO 322 [D-] and MTH 251 [D-] and (PH 212 [D-] or PH 212H [D-]) and GEO 322 [D-] and MTH 252 [D-]

GEO 440, ECONOMIC GEOLOGY, 4 Credits
Principles of the origin, distribution, and importance of metallic mineral deposits formed by magmatic, hydrothermal, and sedimentary processes. Lec/lab. Prerequisite: GEO 315 with D- or better Recommended: GEO 340 [C-]

GEO 441, EARTH MATERIALS III: PETROGRAPHY, 4 Credits
Microscope-based study of minerals and igneous, sedimentary and metamorphic rocks. Representation and interpretation of geological processes based on microscopic observation. Lec/lab. Prerequisite: GEO 201 with D- or better and GEO 310 [D-] and GEO 315 [D-] Equivalent to: GEO 320
GEO 463, GEOPHYSICS AND TECTONICS, 4 Credits
Geophysical observations as constraints on geologic interpretation. Lec/lab. (Writing Intensive Course)
Attributes: CWIC – Core, Skills, WIC
Equivalent to: GPH 463
Recommended: MTH 251 [D] and (PH 202 [D] or PH 212 [D])

GEO 481, GLACIAL GEOLOGY, 4 Credits
Mass balance of glaciers, physics of glacial flow, processes of glacial erosion and deposition, glacial meltwater, glacial isostasy and eustasy, and Quaternary stratigraphy. Field trip(s) may be required; transportation fee charged. Lec/lab. Offered alternate years.
Recommended: GEO 202 [C]

GEO 484, INTRODUCTION TO BIOGEOCHEMISTRY, 3 Credits
Interdisciplinary course, applying concepts from chemistry, physics, biology and geology to Earth systems including terrestrial, ocean and freshwater environments; water and energy cycles; carbon, nitrogen, phosphorus and sulfur cycles; biogeochemical cycles through Earth history.
Prerequisite: MTH 111 with D- or better and ((CH 121 with D- or better and CH 122 [D-]) or (CH 231 [D-] and CH 261 [D-] and CH 232 [D-] and CH 262 [D-]))

GEO 486, QUATERNARY PALEOClimATOLOGY, 3 Credits
Introduction to geochronology, climate proxies, climate forcing, and climate modeling applied to paleoclimate problems. Emphasis on Quaternary climate history.
Prerequisite: (GEO 202 with D- or better or GEO 203 with D- or better) and (CH 122 [D-] or CH 222 [D-] or (CH 232 [D-] or CH 232H [D-]) and (CH 262 [D-] or CH 262H [D-] or CH 272 [D-]))

GEO 487, HYDROGEOLOGY, 4 Credits
Prerequisite: MTH 252 with D- or better or MTH 252H with D- or better

GEO 488, QUATERNARY STRATIGRAPHY OF NORTH AMERICA, 3 Credits
Stratigraphic principles applied to Quaternary deposits. Survey Quaternary dating methods. Proxy records of glaciation and climate change. Quaternary stratigraphy of North America, emphasizing stratigraphic records of ice sheets, glaciers, and pluvial lakes. Offered alternate years.
Recommended: GEO 481 or GEO 581

GEO 495, ADVANCED FIELD GEOLOGY, 6 Credits
Six-week summer program in central Oregon. Collect field data to make geological maps, cross-sections, columns, and reports. Fee charged.
Prerequisite: GEO 295 with C- or better and GEO 315 [C] and GEO 340 [C-] and GEO 370 [C]

GEO 497, FIELD MAPPING OF ORE DEPOSITS, 3 Credits
Eight-day field trip over spring vacation to a mineral district in the western United States, emphasizing detailed mapping of outcrops, trenches, and underground workings. Students prepare final maps and a report suitable for presentation to management or publication during spring term. Transportation fee charged. Not offered every year.
Recommended: GEO 440 [C] and GEO 495 [C-]

GEO 499, SPECIAL TOPICS, 0-16 Credits
Equivalent to: GEO 499H
This course is repeatable for 16 credits.

GEO 500, FIELD TRIPS, 1-16 Credits
Participation in group field trips that are not a part of any other course. Transportation fee is charged. Students may prepare guides for trips. Faculty sponsor must be prearranged. Graded P/N.
This course is repeatable for 48 credits.

GEO 501, RESEARCH, 1-16 Credits
Independent, original research subjects guided by faculty conferences and resulting in a brief written report. Faculty sponsor must be prearranged.
This course is repeatable for 24 credits.

GEO 503, THESIS, 1-16 Credits
Independent, original study that culminates in a senior thesis. Faculty sponsor must be prearranged.
This course is repeatable for 99 credits.

GEO 505, READING AND CONFERENCE, 1-16 Credits
Independent reading in specialized topics guided by and discussed in faculty conferences. Faculty sponsor must be prearranged.
This course is repeatable for 16 credits.

GEO 507, SEMINAR, 1-16 Credits
Graded P/N.
This course is repeatable for 48 credits.

GEO 508, WORKSHOP, 1-16 Credits
This course is repeatable for 24 credits.

GEO 510, INTERNSHIP, 1-15 Credits
Pre-career professional experience under joint faculty and employer supervision. May not be used to meet minimum credit hour requirements for graduate degrees in geosciences. Graded P/N.
This course is repeatable for 16 credits.

GEO 512, IGNEOUS PETROLOGY, 4 Credits
Petrogenesis of igneous rocks. Petrographic analysis using polarizing microscopes. Field trip may be required, transportation fee charged. Lec/lab.

GEO 516, INTERPRETATION OF GEOLOGIC MAPS, 3 Credits
Development of skills in formulating geologic problems, using geologic maps, and developing solutions by the scientific method.
GEO 518, GEOSCIENCE COMMUNICATION, 3 Credits
Professional development of the skills of technical editing and writing for geoscientists. Practice the craft of presentation development and delivery, and the broader issues of problem development, and manuscript and proposal writing specific to geoscience graduate students.

GEO 527, VOLCANOLOGY, 4 Credits
A survey of volcanoes: their distribution, forms, composition, eruptive products, eruptive styles, and associated phenomena. Field trip may be required; transportation fee charged. Offered alternate years.

GEO 530, GEOCHEMISTRY, 4 Credits
Principles of geochemistry applied to problems of earth science.

GEO 531, ENVIRONMENTAL GEOCHEMISTRY, 3 Credits
An introduction to natural processes at and near the earth's surface, as well as an examination of the impact of human activities on the natural environment. Study includes discussion of the sources, transformations, transport, and fate of contaminants. Field trip(s) required; transportation fee charged.

GEO 532, APPLIED GEOMORPHOLOGY, 3 Credits
Effect of landform processes upon human activity; consequences of resource management strategies on erosional balance within landscape; identification of mitigation of natural hazards; role of geomorphic process studies in environmental planning. Taught as seminar, themes TBA. Field trip(s) may be required; transportation fee charged.

GEO 533, COASTAL GEOMORPHOLOGY, 3 Credits
Morphodynamic approach to coastal landforms, processes and evolution including the impacts and response of humans to coastal change.

GEO 535, GEOCHEMICAL ANALYSIS TECHNIQUES, 3 Credits
An introduction to the theory, techniques and instrumentation used for the chemical analysis of earth materials, with emphasis on analysis of solid earth material samples (predominantly, but not restricted to, rocks). Includes discussions of laboratory safety, relevant statistical approaches, basic physical and chemical principles of analysis, sample preparation techniques and data processing and reporting. Course also includes a large component of hands-on experience with instrumentation available in-house in the College of Earth, Ocean, and Atmospheric Sciences. Lec/lab.
Prerequisite: GEO 530 with C or better

GEO 536, STRUCTURAL AND NEOTECTONIC FIELD METHODS, 3 Credits
Field-intensive mapping experience emphasizing a topical issue in active tectonics, neotectonics, earthquake geology, or structural geology. One-week field trip required; transportation fee charged. Weekly discussions during quarter. Offered alternate years.

GEO 537, TECTONIC GEOMORPHOLOGY, 3 Credits
Exploration of linkages between patterns of erosion, crustal deformation, and landscape evolution from geomorphic, geologic, geophysical, and modeling perspectives. Field trip required; transportation fee charged. Offered alternate years.

GEO 540, ECONOMIC GEOLOGY, 4 Credits
Principles of the origin, distribution, and importance of metallic mineral deposits formed by magmatic, hydrothermal, and sedimentary processes. Lec/lab.

GEO 550, COASTAL HAZARDS: PROCESSES, RESPONSE, AND ADAPTATION, 3 Credits
Coastal hazards and the associated risks they pose to rapidly expanding coastal communities. Examination of coastal hazards from a trans-disciplinary perspective including the physical processes, the coastal response, and coastal adaptation/management options for dealing with the hazards. Emphasizes probabilistic and other user-inspired approaches for assessing coastal vulnerability to the various hazards.

GEO 561, GEOLOGY OF EARTHQUAKES, 3 Credits
Tectonics of the present day as based on surface geology, geodesy, seismicity, and crustal structure; description of active faults and folds; use of neotectonics in evaluation of earthquake hazard. Field trip(s) may be required; transportation fee charged. Offered alternate years.

GEO 563, GEOPHYSICS AND TECTONICS, 4 Credits
Geophysical observations as constraints on geologic interpretation. Lec/lab.
Equivalent to: GPH 563

GEO 581, GLACIAL GEOLOGY, 4 Credits
Mass balance of glaciers, physics of glacial flow, processes of glacial erosion and deposition, glacial meltwater, glacial isostasy and eustasy, and Quaternary stratigraphy. Field trip(s) may be required; transportation fee charged. Lec/lab. Offered alternate years.

GEO 586, QUATERNARY PALEOCLIMATOLOGY, 3 Credits
Introduction to geochronology, climate proxies, climate forcing, and climate modeling applied to paleoclimate problems. Emphasis on Quaternary climate history.

GEO 588, QUATERNARY STRATIGRAPHY OF NORTH AMERICA, 3 Credits
Stratigraphic principles applied to Quaternary deposits. Survey Quaternary dating methods. Proxy records of glaciation and climate change. Quaternary stratigraphy of North America, emphasizing stratigraphic records of ice sheets, glaciers, and pluvial lakes. Offered alternate years.
GEO 597, FIELD MAPPING OF ORE DEPOSITS, 3 Credits
Eight-day field trip over spring vacation to a mineral district in the western United States, emphasizing detailed mapping of outcrops, trenches, and underground workings. Students prepare final maps and a report suitable for presentation to management or publication during spring term. Transportation fee charged. Not offered every year.
Recommended: GEO 440 [C-] or GEO 540 [C-]

GEO 599, SPECIAL TOPICS, 0-16 Credits
This course is repeatable for 24 credits.

GEO 600, FIELD TRIPS, 1-16 Credits
Participation in group field trips that are not part of any other course. Transportation fee charged. Students may prepare guide for trips. Faculty sponsors must be arranged. Graded P/N.
This course is repeatable for 84 credits.

GEO 601, RESEARCH, 1-16 Credits
This course is repeatable for 36 credits.

GEO 603, THESIS, 1-16 Credits
This course is repeatable for 999 credits.

GEO 605, READING AND CONFERENCE, 1-16 Credits
This course is repeatable for 16 credits.

GEO 606, PROJECTS, 1-16 Credits
This course is repeatable for 84 credits.

GEO 607, SEMINAR, 1-16 Credits
Graded P/N.
This course is repeatable for 48 credits.

GEO 608, WORKSHOP, 1-16 Credits
This course is repeatable for 24 credits.

GEO 622, IGNEOUS PETROLOGY, 3 Credits
Controls on the distribution of major and trace elements; theory, applications, and examples. Field trip(s) may be required; transportation fee charged. Offered alternate years.
Recommended: GEO 412 [C-] or GEO 512 [C-]

GEO 633, GEOCHRONOLOGY AND ISOTOPE GEOLOGY, 3 Credits
Measurements of cosmic and geologic time by radioactive decay. Use of radiogenic and stable isotopic tracers in geology. Offered alternate years.
Equivalent to: OC 633

GEO 666, STABLE ISOTOPE GEOCHEMISTRY, 3 Credits
Study of the principles governing terrestrial stable isotope distributions, with application to geologic, oceanographic, atmospheric and planetary processes. The primary focus is on isotopes of the light elements such as oxygen, hydrogen, carbon and sulfur, but may include other isotope systems, including Sr/Nd isotopes as geochemical tracers, noble gases, and metal isotopes (eg. Mo, Cu, Fe).

GEO 684, GLOBAL BIOGEOCHEMICAL CYCLES, 4 Credits
An in-depth treatment of global biogeochemical cycles, focusing on cycles of carbon, oxygen, nitrogen, phosphorus, and sulfur in the atmosphere, hydrosphere, and lithosphere. CROSSTIGHTED as GEO 684/SOIL 684.
Equivalent to: SOIL 684

GEO 691, MASS AND HEAT TRANSPORT IN THE ENVIRONMENT, 4 Credits
Quantitative treatment of processes affecting transport in lakes, streams, and groundwater: advection; diffusion; dispersion. Lec/lab. Offered alternate years.

GEO 694, TOPICS IN ORE GENESIS, 1-3 Credits
In-depth examination of published research on selected mineral deposits to build an understanding of environments and processes of ore formation. Offered alternate years.
This course is repeatable for 6 credits.

GEO 699, SPECIAL TOPICS, 1-16 Credits
This course is repeatable for 24 credits.