

Geology (GEOL)

Courses

GEOL A111 Planet Earth 3 Credits

Introduces physical geology, study of earth and its materials. Includes processes that operate on and within earth. Formation of common rocks and minerals, and basics of mineral and rock identification and classification.

Registration Restrictions: MATH A055 or higher

Attributes: UAA Natural Sciences GER.

GEOL A111L Planet Earth Laboratory 1 Credit

Introduces students to laboratory skills in physical geology. Emphasizes practical skills such as the identification and classification of minerals and rocks. Covers the proper use and interpretation of topographic and geologic maps, and remote sensing data. Applies lab skills to solve real-world problems in the geosciences. Includes on-site interpretation of geology on a field trip led by the instructor.

Prerequisites: GEOL A111 with a minimum grade of C or concurrent enrollment.

Attributes: UAA Natural Sci Lab Only GER.

GEOL A115 Dangerous Earth 3 Credits

Introduces the study of applied environmental geology with a focus on geologic processes and linkages to how humans interact with the geologic environment. Includes both internal and external Earth processes and related topics such as climate change, earthquakes, volcanic eruptions, coastal processes, and mineral and energy resources.

Registration Restrictions: MATH A055 or higher

Attributes: UAA Natural Sciences GER.

GEOL A115L Dangerous Earth Laboratory 1 Credit

Investigates problems in environmental geology related to volcanic and earthquake hazards, surface and groundwater pollution, landslides, coastal processes, and waste disposal with emphasis on the local areas in Alaska. Includes several local field trips.

Registration Restrictions: MATH A055 or higher

Prerequisites: GEOL A115 with a minimum grade of C or concurrent enrollment.

Attributes: UAA Natural Sci Lab Only GER.

GEOL A121 Physical Geology for Science and Engineering Majors 4 Credits

Development of applied geology skills through the study of Earth, its materials, and processes operating on and within the planet. Laboratory training in geologic maps and identification and interpretation of minerals and rocks.

Registration Restrictions: MATH A055 or higher. Declared major in science or engineering and instructor approval.

GEOL A178 Introduction to Oceanography 3 Credits

Study of the oceans combining insights from geological, chemical, physical and biological oceanography. Topics include plate tectonics and the evolution of the ocean basins, the chemical composition of seawater, forces acting on water to generate waves and currents, interrelationships among physical, chemical and biological processes, and complex societal issues such as global climate change, fisheries management and pollution.

Registration Restrictions: Placement into Quantitative Skills GER

Crosslisted With: BIOL A178

Attributes: UAA Natural Sciences GER.

GEOL A190 Introductory Topics in Geology 1-3 Credits

Introductory study of a selected topic in geology.

Special Note: May be repeated with change of topic.

GEOL A221 Journey Through Time 4 Credits

Introduces the history of the Earth through geologic time, emphasizing North America. Includes major events in plate tectonics, the evolution of life forms and interpretation of the rock record. Lab includes invertebrate fossil identification, geologic map interpretation, stratigraphic principles and field trip.

Prerequisites: (GEOL A111 with a minimum grade of C and GEOL A111L with a minimum grade of C) or (GEOL A115 with a minimum grade of C and GEOL A115L with a minimum grade of C) or (GEOL A121 with a minimum grade of C) and (MATH A105 with a minimum grade of C or MATH A121 with a minimum grade of C or MATH A151 with a minimum grade of C or MATH A152 with a minimum grade of C or MATH A155 with a minimum grade of C or MATH A211 with a minimum grade of C or MATH A212 with a minimum grade of C or MATH A221 with a minimum grade of C or MATH A251 with a minimum grade of C or MATH A251F with a minimum grade of C or MATH A252 with a minimum grade of C or MATH A252F with a minimum grade of C or MATH A253 with a minimum grade of C or ALEKS Overall Test 1 with a score of 055 or ALEKS Overall Test 2 with a score of 055 or ALEKS Overall Test 3 with a score of 055 or ALEKS Overall Test 4 with a score of 055 or ALEKS Overall Test 5 with a score of 055).

Attributes: UAA Natural Science w/ Lab GER.

GEOL A225 Earth Surface Processes 3 Credits

Introduces the identification and mapping of landforms, and quantitative study of processes that shape the earth's surface. Combines theory, field observations, basic data analysis, and modeling to investigate geomorphic systems that affect humanity.

Prerequisites: GEOL A221 with a minimum grade of C.

GEOL A310 Professional Practices in Geology 3 Credits

Introduces workplace ethics, responsibilities, and expectations of geologists in a professional role. Practices research methods, writing, and presentation techniques in the geosciences. Includes research design, proposal writing, resume and job applications, scientific writing, critical review, and oral presentation techniques.

Registration Restrictions: Admission to the Bachelor of Science in Geological Sciences

Prerequisites: (GEOL A111 with a minimum grade of C and GEOL A111L with a minimum grade of C) or (GEOL A115 with a minimum grade of C and GEOL A115L with a minimum grade of C) or (GEOL A121 with a minimum grade of C) and (WRTG A211 with a minimum grade of D or WRTG A212 with a minimum grade of D or WRTG A213 with a minimum grade of D or WRTG A214 with a minimum grade of D or WRTG A2W with a minimum grade of D).

GEOL A315 Geological Data Visualization and Analysis 3 Credits

Introduces different types of geological data and basic computational methods for visualization and analysis. Provides skills to understand the nature of geoscience datasets and perform quantitative interpretation to fully understand many subject areas in geosciences.

Prerequisites: GEOL A225 with a minimum grade of C.

GEOL A320 Volcanology 3 Credits

The description and classification of volcanoes, volcanic eruptions, and volcanic deposits. Includes the history of volcanic studies, myths, and legends. Emphasis on the dynamics of volcanic eruptions, pyroclastic rocks, lava flows, and volcanic hazard assessment.

Prerequisites: GEOL A221 with a minimum grade of D.

GEOL A321 Mineralogy 4 Credits

Covers crystallography, including external form and internal order. Includes crystal chemistry, atomic structure, crystal structure, and compositional variation, nature and origin of physical properties of minerals. Mineral association, occurrence and paragenesis. Introduces x-ray crystallography and optical mineralogy. Laboratory includes determinative crystallography, optical mineralogy and systematic determinative mineralogy.

Prerequisites: (CHEM A105 with a minimum grade of C and CHEM A105L with a minimum grade of C) and ((GEOL A111 with a minimum grade of C and GEOL A111L with a minimum grade of C) or (GEOL A115 with a minimum grade of C and GEOL A115L with a minimum grade of C) or GEOL A121 with a minimum grade of C) and (MATH A105 with a minimum grade of C or MATH A121 with a minimum grade of C or MATH A151 with a minimum grade of C or MATH A152 with a minimum grade of C or MATH A155 with a minimum grade of C or MATH A211 with a minimum grade of C or MATH A212 with a minimum grade of C or MATH A221 with a minimum grade of C or MATH A251 with a minimum grade of C or MATH A251F with a minimum grade of C or MATH A252 with a minimum grade of C or MATH A252F with a minimum grade of C or MATH A253 with a minimum grade of C or ALEKS Overall Test 1 with a score of 055 or ALEKS Overall Test 2 with a score of 055 or ALEKS Overall Test 3 with a score of 055 or ALEKS Overall Test 4 with a score of 055 or ALEKS Overall Test 5 with a score of 055) and (PHYS A123 with a minimum grade of C and PHYS A123L with a minimum grade of C).

GEOL A322 Igneous and Metamorphic Petrology 4 Credits

Covers identification and classification of igneous and metamorphic rocks, interpretation of textures, structures, and mineralogy of rocks. Includes the study of chemical and physical principles controlling the formation of rocks, importance of various rock types in economic and industrial arenas. Extensive study of hand specimens with emphasis on composition, texture and structure.

Prerequisites: GEOL A310 with a minimum grade of C and GEOL A321 with a minimum grade of C.

GEOL A331 Sedimentology and Stratigraphy 4 Credits

Surveys sediments including origins, classification, transportation, composition, structures, and diagenesis. Includes stratigraphic principles of lithostratigraphy, biostratigraphy, magnetostratigraphy, chronostratigraphy, and seismic stratigraphy. Lab includes grain size analysis, sedimentary structures, correlation, and field practicum.

Prerequisites: GEOL A225 with a minimum grade of C and GEOL A310 with a minimum grade of C.

GEOL A333 Earthquakes and Seismic Hazards 3 Credits

Examines the geology of earthquake-prone regions in all tectonic settings and the impact that earthquakes have on society in terms of hazard assessment and preparation. Addresses fundamental reasons for failure along a fault surface in order to explain when, where and why earthquakes occur. Examines seismic waves, how they are measured, and the information they contain regarding the style of faulting that produced the earthquake. Also considers the study of ancient earthquakes, or paleoseismology, and its usefulness in predicting future earthquakes. Introduces deterministic and probabilistic methods of assessing the seismic hazard in active fault environments for enhanced earthquake preparation in high risk locations.

Prerequisites: GEOL A221 with a minimum grade of C.

GEOL A335 Structural Geology 4 Credits

Covers fundamental concepts of rock deformation: description and formation of geologic structures; brittle and ductile deformation; characteristic structures in different tectonic environments; concepts of stress, strain and brittle failure mechanics; and salt tectonics. Laboratory includes analysis of structure contours, geologic maps and cross sections, stereonet, kinematic analysis, and the Mohr circle technique.

Prerequisites: GEOL A331 with a minimum grade of C and (MATH A152 with a minimum grade of C or MATH A155 with a minimum grade of C or MATH A211 with a minimum grade of C or MATH A212 with a minimum grade of C or MATH A221 with a minimum grade of C or MATH A251 with a minimum grade of C or MATH A251F with a minimum grade of C or MATH A252 with a minimum grade of C or MATH A252F with a minimum grade of C or MATH A253 with a minimum grade of C) and PHYS A123 with a minimum grade of C and PHYS A123L with a minimum grade of C.

GEOL A345 Hydrogeology 3 Credits

Comprehensively covers the fundamentals of hydrogeology, including physical and hydraulic properties of subsurface aquifers, Darcy's Law and the groundwater flow equation, hydraulic head, storage and effective stress, regional groundwater flow, aquifer hydraulics, and water well design and development.

Special Note: Laboratory time will be used to enhance data analysis, mathematical and problem-solving skill sets.

Prerequisites: GEOL A315 with a minimum grade of C and GEOL A331 with a minimum grade of C and (MATH A251 with a minimum grade of C or MATH A251F with a minimum grade of C or MATH A252 with a minimum grade of C or MATH A252F with a minimum grade of C or MATH A253 with a minimum grade of C).

GEOL A350 Geomorphology 4 Credits

Study of landforms and processes that affect their development, including tectonics, geologic structures, bedrock lithology, streams, glaciers, groundwater, and oceans. Laboratory focuses on formation and genesis of landforms based on evidence from topographic maps and aerial photography.

Prerequisites: GEOL A221 with a minimum grade of D.

GEOL A361 Earth Resources and Society 3 Credits

A global-scale investigation of the state of water, energy and mineral resources and the linkages to society and the environment. Review of historical sources, uses and demands on water, energy and mineral resources and the connection to human population growth over time. Investigation of the scientific and social motivations for shifting how humans use water, energy and mineral resources.

Registration Restrictions: Junior or senior standing and completion of Tier 1 GER courses

Prerequisites: (GEOL A111 with a minimum grade of C or GEOL A115 with a minimum grade of C or GEOL A121 with a minimum grade of C or GEOL A221 with a minimum grade of C) and (ENVI A211 with a minimum grade of C or ENVI A212 with a minimum grade of C).

Attributes: UAA Integrative Capstone GER.

GEOL A436 Petroleum Geology 3 Credits

Formation of hydrocarbons, their migration and accumulation in the context of the petroleum system, and their exploration and extraction. Includes an introduction to subsurface datasets used in the petroleum industry and how to integrate them. Conventional and unconventional petroleum systems are discussed in the class using examples from Alaska and around the world.

Special Note: Not available for credit to students who have completed GEOL A636.

May Be Stacked With: GEOL A636

Prerequisites: GEOL A221 with a minimum grade of C.

GEOL A437 Depositional Systems and Dynamic Stratigraphy 3 Credits

Advanced skills in sedimentary geology that can be applied in oil/gas, hydrology, and mining. Includes greater detail in depositional environments, characteristics of resultant sedimentary deposits, and sequence stratigraphy using various geologic datasets. Emphasis on hands-on application of course concepts in outcrop, core and well-log data.

Special Note: Not available for credit to students who have completed GEOL A637.

May Be Stacked With: GEOL A637

Prerequisites: GEOL A221 with a minimum grade of C.

GEOL A441 Paleoclimatology 3 Credits

Examines the fundamentals of climate science, changes in Earth's climate, and methods used to reconstruct past climates. Use of paleoclimate data from proxy records like cores of ice, peatland and ocean sediments, and tree rings to help understand how Earth's atmosphere, oceans and land interact with climate through time.

Special Note: Not available for credit to students who have completed GEOL A641.

May Be Stacked With: GEOL A641

Prerequisites: GEOL A221 with a minimum grade of C.

GEOL A444 The Cryosphere 3 Credits

Examines the components of the cryosphere: sea ice, freshwater ice, snow, glaciers, permafrost and ice sheets. Addresses how the cryosphere is changing, including interconnections with Earth systems such as climate. Explores various datasets and models, from the Arctic to the Antarctic, to learn about the fundamental geoscience processes that govern this critical Earth system component.

Prerequisites: GEOL A225 with a minimum grade of C.

GEOL A448 Structural Geology and Geomechanics 3 Credits

Examines the classification, origin, and evolution of all types of rock fractures with application to structural analysis, oil and gas reservoirs, resource recovery, engineering geology, hydrogeology, and hazards analysis. Applies continuum and rock mechanics principles to brittle deformation, including rock strength and failure criteria, stress states in the lithosphere, stress tensors, and linear elastic fracture mechanics theory.

Special Note: Students may need to provide their own transportation to a field trip location. Not available for credit to students who have completed GEOL A648.

May Be Stacked With: GEOL A648

Prerequisites: GEOL A335 with a minimum grade of C.

GEOL A461 Geochemistry 3 Credits

Introduction to principles and applications of inorganic geochemistry. Emphasis on crystal structures and substitution in crystals, equilibrium geochemistry, dissociation of acids and bases, and mineral stability. Applying the laws of thermodynamics, Eh-pH diagrams, and oxidation-reduction reactions to geologic problems. Principles of radioactivity and geochronometers for age determination. A review of applications of stable isotopes to geologic problems.

Special Note: Not available for credit to students who have completed GEOL A661.

Registration Restrictions: Admission to the Bachelor of Science in Geological Sciences

May Be Stacked With: GEOL A661

Prerequisites: CHEM A106 with a minimum grade of C and GEOL A322 with a minimum grade of C.

GEOL A463 Environmental Geochemistry 3 Credits

Principles and applications of environmental geochemistry on a global scale. Geochemical cycles and chemical mass balance of elements. Chemical weathering and the composition of natural waters. Processes affecting the distribution of trace elements in geologic environments. Stable isotope fractionation and applications to modeling environmental systems. Review of specific cases of modern environmental geochemistry problems.

Special Note: Not available for credit to students who have completed GEOL A663.

May Be Stacked With: GEOL A663

Prerequisites: GEOL A461 with a minimum grade of C.

GEOL A465 Isotope Geochemistry 3 Credits

Examine principles and applications of radiogenic and stable isotopes with emphasis on application in the hydrologic, earth, and ecosystem sciences. Focuses on both traditional and environmental aspects of isotope geochemistry and biogeochemistry and some special applications to other fields of study such as anthropology, archaeology, and forensics. A class research project will include field sampling, sample analysis, and interpretation.

May Be Stacked With: GEOL A665

Prerequisites: CHEM A106 with a minimum grade of D and GEOL A461 with a minimum grade of D.

GEOL A468 Geomicrobiology 3 Credits

Examines the mutual interactions between geology and microbiology. Emphasizes microbial processes that affect local and global environments including biogeochemical cycles, co-evolution, microbe-mineral interactions and life in extreme environments.

Crosslisted With: MBIO A468

Prerequisites: MBIO A340 with a minimum grade of C or GEOL A360 with a minimum grade of C.

Attributes: UAA Integrative Capstone GER.

GEOL A476 Applied Geophysics 3 Credits

Overview of geophysical techniques used for subsurface visualization, mapping and interpretation, with applications to natural resource exploration, geotechnical investigations and environmental studies. Techniques include gravity, magnetic, electric, seismic and well logging. Applications of mathematics and physics-based principles to image shallow and deep subsurface at local and regional scales.

Special Note: Not available for credit to students who have completed GEOL A676.

Registration Restrictions: Instructor permission required for non-majors. Background in calculus-based mathematics or physics is required for geology non-majors.

May Be Stacked With: GEOL A676

Prerequisites: GEOL A335 with a minimum grade of C and (MATH A251 with a minimum grade of C or MATH A251F with a minimum grade of C) and PHYS A124 with a minimum grade of C and PHYS A124L with a minimum grade of C.

GEOL A477 Integrated Subsurface Mapping and Analysis 3 Credits

Integration of different geologic and geophysical data for subsurface interpretation and energy exploration. Application of state-of-the-art technologies on real datasets for subsurface mapping, quantitative basin analysis, technical assessment of hydrocarbon prospects, and uncertainty analysis in active and team-based learning environments.

Special Note: Optionally, a group of five students may be selected to participate in the nationally competitive Imperial Barrel Award (IBA) competition organized by the American Association of Petroleum Geologists. GEOL A476 or GEOL A676 is recommended prior to enrollment in this course, but not required. Not available for credit to students who have completed GEOL A677.

May Be Stacked With: GEOL A677

Prerequisites: GEOL A315 with a minimum grade of C and GEOL A335 with a minimum grade of C.

GEOL A480 Geologic Field Methods 3 Credits

Introduces principles and applications of basic geologic field methods including construction of bedrock geologic maps and cross-sections. Emphasizes field note taking, geologic mapping, stratigraphic section measurement and construction. Requires students to complete several field projects including written summary reports.

Special Note: Students may be required to provide their own transportation to and from field sites.

Prerequisites: GEOL A310 with a minimum grade of C and GEOL A322 with a minimum grade of C and GEOL A335 with a minimum grade of C and GEOL A350 with a minimum grade of C.

GEOL A490 Advanced Topics in Geology 1-4 Credits

Detailed study of a selected topic in geology.

Special Note: May be repeated for credit with change of subtitle. Not available for credit to students who have completed GEOL A690 with same subtitle.

May Be Stacked With: GEOL A690

Prerequisites: GEOL A221 with a minimum grade of C.

GEOL A492 Geology Seminar 1 Credit

Lecture series with invited professional geologists, discussion of relevant professional papers and research. Topical nature of material.

Special Note: May be repeated under different subtitles for a maximum of 3 credits.

Prerequisites: GEOL A221 with a minimum grade of D.

GEOL A495 Geology Internship 1-3 Credits

Work experience in an approved position with supervision and training in various agencies and businesses. Exposes student to work environment beyond the campus setting, to acquire essential practical skills and enhance self-confidence and career direction.

Special Note: May be repeated, but only 3 credits count toward major requirements.

Registration Restrictions: Junior standing

GEOL A498 Student Research 1-3 Credits

Student research conducted on specific subjects in geology. Research topic to be approved and directed by a faculty member in the Department of Geological Sciences.

Special Note: May be repeated for a maximum of 6 credits.

Registration Restrictions: Faculty permission.

GEOL A499 Senior Thesis 3 Credits

Planning, preparation and completion of senior thesis for the BS in Geological Sciences.

Special Note: May be repeated for a maximum of 6 credits.

Registration Restrictions: Senior standing and faculty permission.

GEOL A636 Advanced Petroleum Geology 3 Credits

Advanced study of the formation of hydrocarbons, their migration and accumulation in the context of the petroleum system, and their exploration and extraction. Emphasizes interpretation of subsurface data used in the petroleum industry and their integration. Conventional and unconventional petroleum systems from Alaska and around the world included.

Registration Restrictions: Graduate standing

Special Note: Not available for credit to students who have completed GEOL A436.

May Be Stacked With: GEOL A436

GEOL A637 Advanced Depositional Systems and Dynamic Stratigraphy 3 Credits

Advanced skills in sedimentary geology that can be applied in oil/gas, hydrology, and mining. Includes greater detail in depositional environments, characteristics of resultant sedimentary deposits, and sequence stratigraphy using various geologic datasets. Emphasis on hands-on application of course concepts in outcrop, core and well-log data.

Special Note: Not available for credit to students who have completed GEOL A437.

Registration Restrictions: Graduate standing

May Be Stacked With: GEOL A437

GEOL A641 Paleoclimatology 3 Credits

Examines the fundamentals of climate science, changes in Earth's climate, and methods used to reconstruct past climates. Use of paleoclimate data from proxy records like cores of ice, peatland and ocean sediments, and tree rings to help understand how Earth's atmosphere, oceans and land interact with climate through time.

Special Note: Not available for credit to students who have completed GEOL A441. Graduate students have additional student learning outcomes and course expectations.

May Be Stacked With: GEOL A441

GEOL A648 Advanced Structural Geology and Geomechanics 3 Credits

Classification, origin and evolution of all types of rock fractures with application to structural analysis, oil and gas reservoirs, resource recovery, engineering geology, hydrogeology and hazards analysis. Application of continuum and rock mechanics principles to brittle deformation, including rock strength and failure criteria, stress states in the lithosphere, stress tensors and linear elastic fracture mechanics theory.

Special Note: Students may need to provide their own transportation to a field trip location. Not available for credit to students who have completed GEOL A448.

Registration Restrictions: Graduate standing or instructor permission.

May Be Stacked With: GEOL A448

GEOL A661 Advanced Geochemistry 3 Credits

Introduction to principles and applications of inorganic geochemistry. Emphasis on crystal structures and substitution in crystals, equilibrium geochemistry, dissociation of acids and bases, and mineral stability. Applying the laws of thermodynamics, Eh-pH diagrams, and oxidation-reduction reactions to geologic problems. Principles of radioactivity and geochronometers for age determination. A review of applications of stable isotopes to geologic problems.

Special Note: Not available for credit to students who have completed GEOL A461.

Registration Restrictions: Graduate standing or instructor permission

May Be Stacked With: GEOL A461

GEOL A663 Environmental Geochemistry 3 Credits

Principles and applications of environmental geochemistry on a global scale. Geochemical cycles and chemical mass balance of elements. Chemical weathering and the composition of natural waters. Processes affecting the distribution of trace elements in geologic environments. Stable isotope fractionation and applications to modeling environmental systems. Review of specific cases of modern environmental geochemistry problems. Independent research project required.

Special Note: Students are required to have background in physical and historical geology. Not available for credit to students who have completed GEOL A463.

Registration Restrictions: Graduate standing or instructor approval

May Be Stacked With: GEOL A463

GEOL A665 Isotope Geochemistry 3 Credits

Principles and applications of radiogenic and stable isotopes with emphasis on applications in the hydrologic, earth and ecosystem sciences. Focus on both traditional and environmental aspects of isotope geochemistry and biogeochemistry and some special applications to other fields of study such as anthropology, archaeology and forensics. A class research project will include field sampling, sample analysis and interpretation. Independent research project required.

Registration Restrictions: Graduate standing

May Be Stacked With: GEOL A465

Prerequisites: CHEM A106 with a minimum grade of D and GEOL A461 with a minimum grade of D.

GEOL A676 Applied Geophysics 3 Credits

Overview of geophysical techniques used for subsurface visualization, mapping and interpretation, with applications to natural resource exploration, geotechnical investigations and environmental studies.

Techniques include gravity, magnetic, electric, seismic and well logging. Applications of mathematics and physics-based principles to image shallow and deep subsurface at local and regional scales.

Special Note: Not available for credit to students who have completed GEOL A476.

Registration Restrictions: Graduate standing or instructor permission.

May Be Stacked With: GEOL A476

GEOL A677 Integrated Subsurface Mapping and Analysis 3 Credits

Integration of different geologic and geophysical data for subsurface interpretation and energy exploration. Application of state-of-the-art technologies on real datasets for subsurface mapping, quantitative basin analysis, technical assessment of hydrocarbon prospects, and uncertainty analysis in active and team-based learning environments.

Special Note: A group of five students will be selected to participate at the Imperial Barrel Award (IBA) competition organized by the American Association of Petroleum Geologists (AAPG). Not available for credit to students who have completed GEOL A477.

May Be Stacked With: GEOL A477

GEOL A678 Petroleum Geophysics and Petrophysics 3 Credits

Principles and methods in seismic analysis and petrophysics, with emphasis on hydrocarbon exploration from conventional and unconventional reservoirs and CO₂ storage. Extensive practical training on 2D/3D seismic data analysis, and integration with petrophysical logs to interpret structural and stratigraphic features, analyze subsurface lithology, pore fluid, and map reservoir geobodies.

Registration Restrictions: Graduate standing or instructor permission. Basic understanding of structural geology and/or stratigraphy required.

GEOL A688 Professional Project 3 Credits

Individualized professional project in an area of geological sciences as related to the profession. Project topic must be approved by the graduate committee.

Registration Restrictions: Graduate standing or instructor permission.

GEOL A689 Geology Graduate Professional Practices 3 Credits

Professional development of graduate students in preparation for careers in the geosciences.

Registration Restrictions: Graduate students must take this course by the end of the second semester of their degree program.

GEOL A690 Graduate Topics in Geology 1-4 Credits

Intensive study of narrowly defined topic in geology with emphasis on current problems. Independent research project required.

Special Note: Students are required to have background in physical and historical geology. May be repeated for a maximum of 9 credits with change of subtitle. Not available for credit to students who have completed GEOL A490 with the same subtitle.

Registration Restrictions: Graduate standing or instructor approval.

May Be Stacked With: GEOL A490

GEOL A698 Directed Research 1-6 Credits

Thesis-specific research for the Master of Science in Applied Geological Sciences. Research topic must be approved by thesis advisor.

Special Note: May be repeated for a maximum of 9 credits.

Registration Restrictions: Graduate standing and thesis advisor approval

GEOL A699 Graduate Thesis 1-3 Credits

Preparation and completion of thesis for the Master of Science in Applied Geological Sciences.

Special Note: May be repeated for a maximum of 3 credits.

Registration Restrictions: Graduate standing and permission of graduate advisor required.