Courses

GEO 1010. Introduction to Geology (PS, GC). 3 Hours.
Fulfills Physical Science General Education requirement. Focuses on the physical dynamics of the natural environment, delineating its geosphere, hydrosphere, atmosphere, and biosphere components, and their global patterns of interaction. Highlights the processes of science that underpin this systemic view of the world. Emphasizes issues of resource availability, along with their political and social ramifications. Particular emphasis is placed on the challenges natural hazards present to civilization, worldwide. The extraordinary geology of the region surrounding DSU is featured in many textbook and lecture examples. One field trip required. GEO 1015 OR GEO 2000R lab course recommended. Course fee required. FA, SP, SU.

GEO 1015. Introduction to Geology Lab. 1 Hour.
A laboratory course to be taken concurrently with Geology 1010. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Explain and employ the scientific method. 2. Identify and classify minerals and for what they are used. 3. Identify the three types of rocks (igneous, sedimentary, and metamorphic), explaining how they form, and detailing their classifications. 4. Explain how stratigraphic and radiometric dating work and are used in determining the age of a rock. 5. Explain and modeling the fundamentals of how plate tectonics works, including the formation of geologic structures and the mechanics of earthquakes. 6. Identify pertinent features generated by surface processes from photographs and diagrams. Course fee required. Corequisite: GEO 1010. FA, SP.

GEO 1020. Life of the Past (PS). 3 Hours.
Fulfills General Education Physical Science requirement for non-Science majors. General survey of historical Geology focusing on the relationship between the tectonic history of the Earth, the evolution of life through time, and the histories of the Earth and life and the complex interactions between them. GEO 1025 lab course recommended but not required. One field trip required. Course fee required. Offered upon sufficient student need.

GEO 1025. Life of the Past Laboratory (LAB). 1 Hour.
A laboratory course to be taken concurrently with GEO 1020. Lab fee required. 2 lab hours per week. Offered upon sufficient student need. Corequisite: GEO 1020.

GEO 1040. Introduction to Dinosaurs (PS). 3 Hours.
Fulfills General Education Physical Science requirement. Utilizes the popular subject matter of dinosaurs to teach basic principles of geology, biology, physics, chemistry, and astronomy, with some basic math (algebra). Successful completion of this interdisciplinary course contributes to an understanding of science and scientific concepts as well as their applications in a multitude of disciplines. GEO 1045 lab course recommended but not required. One field trip required. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Explain and employ the scientific method. 2. Explain and model the fundamentals of how plate tectonics works, including the formation of geologic structures. 3. Identify the three types of rocks (igneous, sedimentary, and metamorphic), explaining how they form, and detailing their classifications. 4. Identify the types of fossils and detailing how they form, how they occur in sedimentary rocks, and how sedimentary rocks tell about ancient environments. 5. Explain how stratigraphic and radiometric dating work and are used in determining the age of a rock or fossil. 6. Identify various vertebrate skeletal anatomical structures. 7. Identify and explaining the principles of evolution and systematics as a classification system based on evolution. 8. Accurately reading cladograms and explaining how they are generated. 9. Identify the kinds of dinosaurs (in a systematic and anatomical framework). 10. Explain how we understand dinosaurs as living animals - their restoration, behavior, diet, reproduction, physiology, growth, and extinction. Course fee required. FA.

GEO 1045. Introduction to Dinosaurs Laboratory (LAB). 1 Hour.
A laboratory course to be taken concurrently with GEO 1040. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Explain and employ the scientific method. 2. Identify and classify sedimentary rocks, and explaining how their sediments are generated and how they affect fossilization. 3. Explain and model the fundamentals of how plate tectonics works, including the formation of geologic structures. 4. Identify the types of fossils. 5. Explain how sedimentary processes work and can be recognized, and the basics of taphonomy. 6. Explain how stratigraphic and radiometric dating work and are used in determining the age of a rock. 7. Identify various vertebrate anatomical structures and hypothesizing their functional morphologies. 8. Explain evolution by natural selection. 9. Employ the fundamentals of phylogenetic practices. 10. Identify basic characteristics of ornithischian and saurischian dinosaurs and hypothesize their functions. Course fee required. Corequisite: GEO 1040. FA.

GEO 1050. Geology of the National Parks (PS). 3 Hours.
Fulfills General Education Physical Science requirement. General survey of Physical Geology emphasizing the geology of Utah’s scenic national parks and monuments, as well as state parks, to investigate the geologic history of and processes shaping the region, inherent geologic hazards, and natural resource use and availability. Corequisite: GEO 1055. Offered upon sufficient student need.

GEO 1055. Geology National Parks Lab (LAB). 1 Hour.
Field trip portion of GEO 1050. An eight-day/seven-night field trip featuring national parks and monuments, usually over Spring Break, to experience geologic processes shaping the landscape, interpret past environments/climates that created the resources utilized by society, and observe first-hand how our Earth has changed through geologic time and, in fact, is ever-changing. Requires hiking on park trails over uneven surfaces for average of three miles a day. Elevations up to 8300 feet. Lab fee required. Offered upon sufficient student need. Corequisite: GEO 1050.
GEO 1060. Introduction to Environmental Geology (PS). 3 Hours.
Fulfills General Education Physical Science requirement for non-Science majors. Emphasizes relationship between human beings and the geologic environment, including geologic hazards, mineral and energy resources, and environmental issues, including causes and impacts of environmental threats. Offered upon sufficient student need.

GEO 1080. Introduction to Oceanography. 3 Hours.
Fulfills General Education Physical Science requirement. Conveys the essential principles of ocean science, including an understanding of the earth's oceans focusing on sea floor topography and composition, plate tectonics, seawater dynamics and chemistry, atmospheric and ocean currents, waves, coastal land forms, and marine life as well as recognition of the close linkage of weather, climate, and humans to the oceans. GEO 1085 lab course recommended but not required. Offered upon sufficient student need.

GEO 1085. Intro to Oceanography Lab. 1 Hour.
A laboratory course in oceanography. Lab fee required for travel to marine laboratories and coastal regions in California. Offered upon sufficient student need.

GEO 1110. Physical Geology. 3 Hours.
Fulfills a General Education Physical Science requirement for students majoring in the Sciences or Engineering, including Civil Engineering, Geology, Range Management, Forestry, etc. Covers the study of the physical features of the earth and the processes that shape those features. Successful completion gives students the background necessary for further study in the sciences. Corequisite: GEO 1115. FA.

GEO 1115. Physical Geology Lab. 1 Hour.
Lab portion of GEO 1110. Three Saturday field trips required. Lab fee required. Corequisite: GEO 1110. FA.

GEO 1220. Historical Geology. 3 Hours.
Conceptual examinations of how the atmosphere, biosphere, hydrosphere, and lithospheres interact to create major structural and stratigraphic features (emphasizing North America) and how life has evolved through deep time. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Outline the history of how modern geology was developed. 2. Explain how stratigraphic and radiometric dating work and are used in determining the age of a rock. 3. Explain the natures of sedimentary rocks and their depositional environments and how they can be interpreted and inferred from the stratigraphic record. 4. Explain what fossils are and how they are useful in interpreting the stratigraphic record. 5. Explain how evolution works and has produced the lineages recorded in the fossil record. 6. Explain and modeling the fundamentals of how plate tectonics works. 7. Outline the major geological events during Earth history. 8. Outline the major evolutionary events during Earth history. Prerequisite: GEO 1110. Corequisite: GEO 1225. SP.

GEO 1225. Historical Geology Lab. 1 Hour.
Lab accompanying GEO 1220. Local field trip required. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Outline the history of how modern geology was developed. 2. Explain how stratigraphic and radiometric dating work and are used in determining the age of a rock. 3. Explain the natures of sedimentary rocks and their depositional environments and how they can be interpreted and inferred from the stratigraphic record. 4. Explain what fossils are and how they are useful in interpreting the stratigraphic record. 5. Explain how evolution works and has produced the lineages recorded in the fossil record. 6. Explain and modeling the fundamentals of how plate tectonics works. 7. Outline the major geological events during Earth history. 8. Outline the major evolutionary events during Earth history. Course fee required. Prerequisite: GEO 1115. Corequisite: GEO 1220. SP.

Fulfills General Education Laboratory Sciences requirement. Provides an opportunity for students to study topics such as depositional environments, plate tectonics, gradation, rock dating, geologic time, Earth history, and environmental issues in a field research setting through travel to Grand Canyon, Zion, and Bryce Canyon National Parks. The class will be held over a 4-5 day period. Overnight stays at the Tanner Field Station required. Repeatable up to 2 credits. FA, SU.

GEO 2700R. Field Methods in Geoscience Research. 1 Hour.
A preparatory course for undergraduate participation in collaborative research projects in the geosciences. Repeatable for a max of 3 credits. Corequisite: GEO 1115. Course fee required.

GEO 2990. Seminar in Geology. 0.5-3 Hours.
For students wishing instruction that is not available through other regularly scheduled courses in this discipline. Occasionally, either students request some type of non-traditional instruction, or an unanticipated opportunity for instruction presents itself. This seminar course provides a variable credit context for these purposes. As requirements, this seminar course must first be pre-approved by the department chair; second, it must provide at least nine contact hours of lab or lecture for each credit hour offered; and third, it must include some academic project or paper (i.e., credit is not given for attendance alone). This course may include standard lectures, travel and field trips, guest speakers, laboratory exercises, or other non-traditional instruction methods. Note that this course is an elective and does not fulfill general education or program requirements.

GEO 3060. Environmental Geology. 3 Hours.
Geological attributes of environmental settings with emphasis on the analysis of geologic conditions pertinent to resource availability, urban planning, recognition and assessment of geologic hazards, and environmental issues through geochemical investigation of Earth's atmosphere, hydrosphere and lithosphere. Prerequisites: GEO 1110 (Grade C or higher) AND GEO 1115 (Grade C or higher). Offered upon sufficient student need.
GEO 3180. Paleontology. 4 Hours.
Reviews theories, principles, and applications of paleontology, as well as the characteristics of important groups of fossil organisms and their geologic distributions and paleoecologies. Course includes lab. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Explain the nature of the fossil record. 2. Explain and employ the principles of evolution, speciation, systematics, and extinction. 3. Explain and employ the principles of functional morphology and paleoecology. 4. Explain and employ the principles of paleobiogeography and biostatigraphy. 5. Identify the fundamental characteristics and evolutionary histories of various groups of organisms, including plants, "protists," poriferans, cnidarians, "lophophorates" (brachiopods and bryozoans), arthropods, molluscs, echinoderms, and chordates via their body and trace fossils. Course fee required. Prerequisites: GEO 1220 and GEO 1225, or instructor permission. FA (even).

GEO 3400. Water Resources. 3 Hours.
A detailed examination of the water cycle, including: precipitation, surface water, ground water, glaciers, water conservation, water management, and water pollution with special emphasis on the water resources of Utah and neighboring areas. Prerequisites: GEO 1110/1115 AND CHEM 1210/1215. Offered upon sufficient student need.

GEO 3550. Sedimentology & Stratigraphy. 4 Hours.
Explores the origins, classification, and occurrences of sedimentary rocks and their distributions in space and time. Course emphasizes the description and interpretation of sedimentary rocks and the philosophy and application of stratigraphic principles. Offered upon sufficient student need. Course fee required. Prerequisites: GEO 1220 AND GEO 1225.

GEO 3910. Applied Geologic Investigation of Iceland. 3 Hours.
Iceland, the land of fire and ice, offers students an experiential learning opportunity to study nearly every basic topic in Geology. Both tectonic processes powered by Earth's internal energy such as plate boundaries, volcanoes, earthquakes, and geysers, and gradation processes powered by the sun such as glaciers, rivers, shorelines, weathering and erosion are observed first hand. Environmental issues like resource use and its relationship to climate change and utilizing geothermal as a green energy resource to generate electricity are also examined. Course participants will meet for an hour a week during the semester then travel to Iceland for a six day travel abroad experience. Pre-trip classes include the above topics to prepare students to understand their experiences in Iceland. The fee covers airfare, lodging, transportation, activities, trip insurance and most meals. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Find evidence that meets the criteria of science in recognizing and differentiating hypotheses, theories and/or laws using the Plate Tectonic setting and glacier resources of Iceland. 2. Apply the concepts of both stratigraphic and radiometric dating to interpret physical and biologic events in Earth history using geologic processes, biologic evolution and/or anthropogenic landscape and climate change as evidenced in Iceland. 3. Identify Iceland’s geologic and geographic landforms and explain both their formation (origin) and potential geologic hazards. 4. Identify Iceland’s economically important Earth materials and natural resources and describe their importance, their renewability, how they are recovered and their impacts on global climate change, politics, and economics. 5. Describe the theory of plate tectonics including the history of its development, details of its mechanisms and processes, and the central role tectonics plays in shaping our planet both internally and externally, including tectonic hazards, as evidenced in Iceland. Course fee required. SP.