Geology (GEO)

GEO 1010 PP Introduction to Geology 3:3:0 Fall, Spring, Summer
Studies planet Earth: its materials, structure, dynamics, and surface features. Taken alone it is designed for non-science students who want a broad introduction to earth science and a greater appreciation of their physical surroundings. Taken in conjunction with laboratory exercises in GEO 1015, the class is sufficiently rigorous to articulate as an introductory geology class.

GEO 1015 Introduction to Geology Laboratory 1:0:2 Fall, Spring, Summer
Designed to be taken in conjunction with GEO 1010. Includes the identification of rocks, minerals, basic land forms and structures. Studies geologic processes occurring in desert, glacial, mountainous and other environments. Taken with GEO 1010, the class will articulate as an introductory earth science class. Course Lab fee of $11 for transportation, lab applies.

GEO 101H PP Introduction to Geology 3:3:0 Fall, Spring
Studies the structural and dynamic systems of the earth that create our environment. Stresses geology and related topics chosen for astronomy and meteorology. Course Lab fee of $10 for transportation, lab applies.

GEO 1020 (Cross-listed with: BIOL 1200) PP Prehistoric Life 3:3:0 Spring
* Prerequisite(s): BIOL 1010 or GEO 1010 recommended
Studies prehistoric life. Uses the concepts of biology and physical science. Studies major groups of ancient animals and plants as found in the rock record. Includes aspects and fundamental concepts of biology, ecology, and geology.

GEO 102H PP Introduction to Geology Laboratory 1:0:2 On Sufficient Demand
Includes identification of basic land forms and structures. Studies the geologic processes occurring in desert, glacial, mountainous, and other environments. Includes an extended outdoor activity to the Grand Canyon or Capital Reef National Park. Course Lab fee of $10 for transportation, lab applies.

GEO 1080 PP Introduction to Oceanography 3:3:0 Fall, Spring
Introduces the origin and development of the oceans, marine geology and its effect on life in the seas. Discusses waves, tides, currents, and their impact on shorelines, the ocean floor, and basins. Examines physical processes as they relate to oceanographic concepts. Includes media as an alternative to the actual oceanic experience. Completers should have a basic knowledge and appreciation of the ocean's impact to the world's ecology.

GEO 1085 PP Introduction to Oceanography Laboratory 1:0:2 Spring
A basic laboratory experience in the physical aspects of Oceanography. Introduces applied skills in Oceanography such as Marine Geology and Oceanographic Chemistry. Studies the physical parameters that allow marine life to flourish. Uses maps to study the structure of the sea floor and its relationship to plate tectonics. Provides hands-on experiences with salinity and marine chemistry.

GEO 1220 PP Historical Geology 3:3:0 Fall, Spring
Examines the origin and development of the Earth. Studies the succession of animals and plants from trilobites through dinosaurs and eventually to man himself, following the changing earth environment in the process. Designed for non-science students who desire an understanding of the history of the Earth. Taken in conjunction with laboratory exercises in GEO 1225, the class is sufficiently rigorous to articulate as an introductory earth science class.

GEO 1225 Historical Geology Laboratory 1:0:2 Fall, Spring
Designed to be taken in conjunction with GEO 1220. Identifies fossils in correlation with their paleoenvironments and geologic time periods. Illustrates and duplicates methodology of the science of historical geology. Taken with GEO 1220, the class will articulate as an introductory earth science class. Course lab fee of $10 applies.

GEO 2020R (Cross-listed with: BIOL 2020R) Science Excursion 1:0:2 Fall, Spring
For students interested in the natural world. Explores a wide variety of topics in science, including geology, botany, astronomy, zoology, ecology, and archeology. Consists of a minimum of a four-day field trip. Participants should gain an increased understanding of several fields of scientific study. Graded as credit/no credit. May be repeated as many times as desired for interest, however a maximum of 3 credits may count toward graduation.

GEO 204R (Cross-listed with: BIOL 204R) PP Natural History Excursion 3:1:6 On Sufficient Demand
* Corequisite(s): BIOL 2070
For students interested in the natural world. Promotes an in-depth look at a wide variety of topics in science, including geology, botany, astronomy, zoology, ecology, and archeology. Consists of 15 hours of lecture plus an appropriate field trip. Participants should gain an interdisciplinary understanding of science and nature.

GEO 2070 PP Natural History of the Colorado Plateau 3:1:4 On Sufficient Demand
* Corequisite(s): BIOL 2070
Addresses the geological component of the Natural History Course taught in conjunction with BIOL 2070 at the Capitol Reef Field Station during the summer months. Teaches students about the rocks and strata of the area, the processes that mold the landscape, and the relationships between the physical and biological aspects of the ecosystem, including humans. Provides an intense, hands-on field course where faculty and students participate together in a natural setting. Requires students to live and learn at the field station for most of the course.

GEO 3000 Environmental Geochemistry 3:3:0 Fall
* Prerequisite(s): GEO 1010, (MATH 1050 or MATH 1055), CHEM 1220, University Advanced Standing
Introduces low temperature, environmental geochemistry with a focus on the use of quantitative measures to understand surficial geologic processes. Includes equilibrium thermodynamics and kinetics of chemical reactions, aqueous solutions, sorption and complexation, oxidation-reduction reactions, organic geochemistry, and the chemistry of the continental, marine, and atmospheric environments. Numerous examples will be introduced to demonstrate how the conceptual framework can be applied in solving practical problems.

GEO 3080 Earth Materials 3:3:0 Fall
* Prerequisite(s): GEO 1010, GEO 1015, and University Advanced Standing; CHEM 1210 or other chemistry course recommended
* Corequisite(s): GEO 3085
Investigates the physical characteristics, chemical properties, formation, and distribution of geologically significant igneous and metamorphic rocks and minerals. Develops ability to examine rocks and minerals, and analyze their chemical properties to understand geologic processes. Involves field trips, including the possibility of weekend trips. Course lab fee of $22 for transportation, lab applies.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEO 3085</td>
<td>Earth Materials Laboratory</td>
<td>Fall</td>
<td>1:0:3</td>
<td>GEO 1010, GEO 1015, and University Advanced Standing; CHEM 1210 or other chemistry recommended</td>
</tr>
<tr>
<td>GEO 3100</td>
<td>Geologic Hazards</td>
<td>Fall</td>
<td>4:3:3</td>
<td>GEO 1010, GEO 1015, and University Advanced Standing; CHEM 1210 or other chemistry recommended</td>
</tr>
<tr>
<td>GEO 3105</td>
<td>Isotope Geochemistry Laboratory</td>
<td>Spring</td>
<td>3:3:3</td>
<td>GEO 1010, CHEM 1220, or Instructor Approval and University Advanced Standing</td>
</tr>
<tr>
<td>GEO 3200</td>
<td>Forensic Geology</td>
<td>Fall</td>
<td>4:3:3</td>
<td>CHEM 1210 and CHEM 1215 or higher and University Advanced Standing</td>
</tr>
<tr>
<td>GEO 3400</td>
<td>Geomorphology</td>
<td>Spring</td>
<td>4:3:3</td>
<td>MATH 1050 or MATH 1055 or equivalent, University Advanced Standing, and one of the following lecture and lab pairs: GEO 1010 and GEO 1015 or (GEOG 1000 and GEOG 1005)</td>
</tr>
<tr>
<td>GEO 3500</td>
<td>Sedimentary Geology</td>
<td>Spring</td>
<td>4:3:3</td>
<td>GEO 1010, CHEM 1220, and University Advanced Standing</td>
</tr>
<tr>
<td>GEO 3700</td>
<td>Structure and Tectonics</td>
<td>Spring</td>
<td>4:3:3</td>
<td>GEO 1220, GEO 3080, (PHYS 2010 or PHYS 2210), and University Advanced Standing</td>
</tr>
<tr>
<td>GEO 4080</td>
<td>Petrology</td>
<td>Spring</td>
<td>4:3:3</td>
<td>GEO 3080, CHEM 1220, and University Advanced Standing</td>
</tr>
<tr>
<td>GEO 4200</td>
<td>Teaching Methods in Science</td>
<td>Spring</td>
<td>3:2:2</td>
<td>Acceptance into Secondary Education program, senior-level standing, instructor approval, and University Advanced Standing</td>
</tr>
<tr>
<td>GEO 4500</td>
<td>Sedimentary Geology</td>
<td>Spring</td>
<td>4:3:3</td>
<td>GEO 3080, GEO 1220, GEO 1225, and University Advanced Standing; CHEM 1210 or other chemistry recommended</td>
</tr>
</tbody>
</table>

For additional information about specific courses, including field trips and lab fees, please refer to the course descriptions in the text.
**GEO 4510**

**Paleontology**

*Prerequisite(s): GEO 1220, GEO 1225, GEO 3080, (BIOL 1010 or BIOL 1610), and University Advanced Standing; GEO 4500 recommended*

Exposes students to a wide variety of topics encompassed within the field of paleontology. Offers substantial knowledge of the major groups of life represented in the fossil record. Discusses the most fundamental concepts in paleontology, such as key principles of evolution and paleoecology. Offers an understanding of what paleontologists do, why the field is so crucial, and why all earth scientists should have at least a basic understanding of paleontology. Requires two weekend field trips (dates will be discussed in class). Course lab fee of $21 for transportation, lab applies.

**GEO 4600**

**Field Experience**

*Prerequisite(s): GEO 3080, GEO 3700, GEO 4500, and University Advanced Standing*

An intensive field course giving students hands-on experience with several aspects of earth science field work. Involves field work for 8 to 10 hours per day, three to five days per week, for four to six weeks. Course lab fee of $500 for practical experience applies.

**GEO 480R**

**Earth Science Seminar**

*Prerequisite(s): (GEO 3080 or ENVT 3790 or Instructor Approval) and University Advanced Standing*

Exposes students to current research topics in Earth Science and related fields. Provides an opportunity for students to attend bi-weekly lectures presented by department faculty and invited speakers. Lectures are usually a summary of the speaker's recent research results, or investigative projects in an earth science industry. May be repeated for a maximum of 2 credits toward graduation.

**GEO 482R** *(Cross-listed with: ENVT 482R)*

**Geologic Environmental Internship**

*Prerequisite(s): (GEO 1010 or ENVT 1110), (12 credit hours of any GEO, GEOG, or ENVT courses), declared major in any Earth Science program, and University Advanced Standing*

Engages students in supervised geologic or environmental work in a professional setting. Requires approval by the Chair of the Department of Earth Science. Includes maintaining a journal of student experiences and preparing a paper summarizing their experience. A maximum of 3 credit hours may be counted toward graduation. May be graded credit/no credit.

**GEO 489R**

**Student Research**

*Prerequisite(s): GEO 1015, Junior or Senior standing, instructor approval, and University Advanced Standing*

Provides students the opportunity to conduct research under the mentorship of an Earth Science department faculty member. Includes any combination of literature reviews, original research, and/or participation in ongoing departmental projects. Involves students in the methodology of original geologic research. Requires preparation and presentation of oral and/or written reports, typically presented in a public forum. May be repeated for a maximum of 8 credits toward graduation.

**GEO 490R**

**Special Topics in Geology**

*Prerequisite(s): GEO 1010, GEO 1015, Junior or Senior standing, instructor approval, and University Advanced Standing*

Explores or examines special topics in geology. Topics vary depending on student demand and current topics of significance in geology. May be repeated for a maximum of 8 credits toward graduation.

**GEO 495R**

**Independent Study**

*Prerequisite(s): GEO 1010, GEO 1015, and University Advanced Standing*

Requires an independent study program to be developed with one or more Earth Science faculty member and approved by a committee of Earth Science faculty. Includes some combination of literature review, field work, numerical analysis, and/or laboratory analysis. Involves the preparation of a written report. An oral presentation may also be required. May be repeated for up to 4 credits.

**GEO 525R**

**Advanced Topics for Geology Teachers**

*Prerequisite(s): Departmental Approval*

For licensed teachers or teachers seeking to recently their earth science or integrated science endorsements from the Utah State Office of Education. Teaches principles of geology and pedagogy of teaching geology for teachers in public or private schools. Emphasis will be placed on correlation with the Utah Core Curriculum, the National Science Education Standards, and the Benchmarks of Project 2061. Topics will vary.