UVM Geology majors work closely with a faculty internationally recognized for its scientific research, yet dedicated to teaching undergraduate students. Vermont’s landscape is rich in geological features, offering outstanding field study experience; in addition, the department offers exciting geological exploration in other regions.

Coursework addresses critical topics, such as the origin and evolution of mountains, actively evolving landscapes, geochemical interactions between the biosphere and geosphere, and global climate change. Study in these areas is complemented by opportunities to assist faculty pursuing rigorous and significant research around the world.

Students graduate with skills valued in a wide range of careers. In small, hands-on courses students learn measurement techniques, observation, and data analysis while working with state-of-the-art instrumentation. Small group projects encourage cooperative learning, and presentation of results develops excellent communication skills. The foundation of the Geology Department curriculum is “problem-based learning,” which prepares its graduates to solve real-world issues they will face upon graduation.

**MAJORS**

**GEOLOGY MAJORS**


Geology B.S. ([http://catalogue.uvm.edu/undergraduate/artsandsciences/geology/geologybs/](http://catalogue.uvm.edu/undergraduate/artsandsciences/geology/geologybs/))

**MINORS**

**GEOLOGY MINORS**


**GRADUATE**

Geology M.S.

See the online Graduate Catalogue ([http://catalogue.uvm.edu/graduate/](http://catalogue.uvm.edu/graduate/)) for more information.

**Courses**

**GEOL 001. Earth System Science. 0 or 4 Credits.**

Introduction to the earth as a closed system, the cycling of materials and energy within it, and its interactions with the hydrosphere and atmosphere. No credit for GEOL 001 and either GEOL 005, GEOL 006, GEOL 008, or GEOL 011.

**GEOL 005. Mt - Lake: Geol Lake Chmpln Bsn. 4 Credits.**

Scientific principles applied to the geology and geologic history of the Lake Champlain Basin. Credit not given for both GEOL 005 and either GEOL 001, GEOL 006, GEOL 008, or GEOL 011.

**GEOL 006. How the Earth Works. 3 Credits.**

Introduces how the Earth works through examination of interactions between geosphere, hydrosphere, atmosphere and biosphere that produce Earth’s climates and environments. Credit not given for both GEOL 006 and either GEOL 001, GEOL 005, GEOL 008, or GEOL 011.

**GEOL 007. SU: Earth Hazards. 0 or 3 Credits.**

Understand geological and societal causes of death and destruction by earthquakes, landslides, floods, volcanoes, storms, and avalanches around the world.

**GEOL 011. Geology Using Google Earth. 3 Credits.**

An illustration of dynamic processes that have shaped our planet, and views the results of those processes using Google? Earth. Credit not given for both GEOL 011 and either GEOL 001, GEOL 005, Geol 006, or GEOL 008.

**GEOL 055. Environmental Geology. 0 or 4 Credits.**

Introduction to geologic processes and materials pertinent to environmental problems: ground water movement, supply, and contamination, waste disposal, flooding, subsidence, and landslides. Local field trips. Designed for intended Natural Science majors.

**GEOL 062. Earth Env & Life Through Time. 0 or 4 Credits.**

This course presents an overview of how the Earth has changed over time and how this has influenced the history of life. Prerequisites: GEOL 001, GEOL 005, or GEOL 055.

**GEOL 090. Internship. 1-3 Credits.**

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

**GEOL 095. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**GEOL 096. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**GEOL 097. Independent Study. 1-18 Credits.**

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

**GEOL 101. Field Geology. 4 Credits.**

Geological evolution of western Vermont as seen through actual field mapping in the Burlington area. Specifically designed for sophomores majoring or minorin in Geology or related sciences. Prerequisite: GEOL 001 or GEOL 005 or GEOL 055.
GEOL 110. SU: Earth Materials. 0 or 4 Credits.
Exploration of the building blocks of the Earth (elements, minerals, and rocks) and their connection to the Earth's past, present, and possible sustainable future. Prerequisite: GEOL 001 or GEOL 005 or GEOL 055.

GEOL 116. Glacial Geology. 4 Credits.
Examines the Dynamics of glacier flow and landforms glaciers produce. Lectures, labs, and field trips emphasize processes in both modern and ancient glaciers. Prerequisite: GEOL 001, GEOL 005, or GEOL 055.

GEOL 135. Environmental Geochemistry. 4 Credits.
Application of many basic principles of chemistry to selected environmental problems in geosciences (e.g. acid mine drainage, carbon dynamics, weathering, and contaminant metal mobility). Prerequisite: CHEM 031.

GEOL 151. Geomorphology. 0 or 4 Credits.
Examines, using lectures, labs, and field-based independent study research projects, processes which change Earth's surface and the history of landscape development. Considers fundamental geologic constraints on environmental problems. Prerequisite: GEOL 001, GEOL 005, GEOL 007, OR GEOL 055. Cross-listed with: GEOG 144.

GEOL 161. SU: Field Methods in Geophysics. 0-4 Credits.
This course is an introduction to field geophysical methods with an emphasis on ground-penetrating radar, seismic refraction, electromagnetic profiling, and applications to geologic problems. Prerequisite: GEOL 101.

GEOL 172. Regional Geology. 0-4 Credits.
Field study of a selected region including multi-week summer trip to the area in question. Not more than four credits allowed toward major.

GEOL 185. Geocomputing. 3 Credits.
Introduction to a variety of computing tools commonly used in sciences and geosciences in particular. Hands-on experience is at the heart of the teaching of this class; real data are used to resolve specific problems. Prerequisite: Sophomore standing.

GEOL 190. Internship. 1-18 Credits.
On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

GEOL 191. Teaching Assistantship. 1-3 Credits.
Undergraduate student service as a teaching assistant, usually in an introductory-level course in the discipline, for which credit is awarded. Offered at department discretion.

GEOL 195. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

GEOL 196. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

GEOL 197. Independent Study. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

GEOL 198. Undergraduate Research. 1-18 Credits.
Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

GEOL 201. Advanced Field Geology. 3 Credits.
Advanced field mapping techniques, analysis of field data, preparation of geological maps and reports. Prerequisite: GEOL 101.

GEOL 217. Vermont Field Geology. 4 Credits.
Field observations of rocks and surficial materials across northern Vermont are utilized to decipher the region's geologic history. Readings complement field work. Prerequisite: Graduate student standing.

GEOL 231. Petrology. 4 Credits.
The course covers the scope and methods of igneous, sedimentary and metamorphic petrology, and the geologic environments and processes relevant to the major rock types. Prerequisite: GEOL 110.

GEOL 233. Environmental Isotope Geochem. 3 Credits.
Course focuses on stable isotope geochemistry of low temperature processes occurring on and near the earth surface through lecture, laboratory, and seminar. Prerequisite: CHEM 031.

GEOL 234. Global Biogeochemical Cycles. 3 Credits.
Integrated perspective on biogeochemical cycles describing the transformation and movement of chemical substances in the natural environment, as seen on the global context. Prerequisite: CHEM 031.

GEOL 235. Geochemistry of Natural Waters. 3 Credits.
Basic concepts of chemical equilibria applied to natural waters, including thermodynamics, pH, oxidation-reduction, weathering, and solution equilibria. Prerequisite: Prerequisite: CHEM 032.

GEOL 240. Tectonics. 3 Credits.
Applications of igneous and metamorphic petrology to problems in tectonophysics, including petrochemistry of the earth's crust and upper mantle and the internal structure of orogenic belts. Prerequisites: GEOL 101, GEOL 110.

GEOL 246. X-ray Diffractometry. 3 Credits.
This course focuses on identification and characterization of materials using X-ray diffractometry. The course will include exercises using a modern powder diffractometer. Prerequisite: CHEM 032.
GEOL 249. Crystal Chemistry. 3 Credits.
A hands-on course involving crystal structure solutions, wherein grading will be based on various class projects, not examinations. Students will gain a deep understanding of how Nature arranges matter on Earth, and how to determine the atomic arrangement of compounds using X-ray diffractometry. Prerequisites: GEOL 110 or GEOL 246; or Chemistry, Physics, or Material Science major and minimum Junior standing; or graduate standing in Chemistry, Physics, or Material Science.

GEOL 260. Structural Geology. 0 or 4 Credits.
Examines processes and problems concerning the mechanical behavior of the Earth's crust and surface. Includes rock deformation stress, strain, and the interpretation of geological structures. Prerequisites: GEOL 101, GEOL 110.

GEOL 263. Geochronology. 3 Credits.
This course will survey the basic concepts of radioactive decay, mass spectrometry, and isotopic systems commonly used to quantify the timing of geologic events. Prerequisite: GEOL 110.

GEOL 266. Microstructures. 3 Credits.
This course will focus on deformation of rocks and minerals at the microscopic scale and the practical use of photographic analyses to unravel tectonic histories. Prerequisite: GEOL 260.

GEOL 290. Internship. 1-18 Credits.
On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

GEOL 291. Capstone: Fall Geol Seminars. 1 Credit.
Seminar on current topics in the geosciences, including attendance at weekly departmental visiting speaker series, reading and analysis of related scholarly publications, oral/written reports. Prerequisite: Geology majors and Geology minors only.

GEOL 292. Capstone: Spring Geol Seminars. 1 Credit.
Seminar on current topics in the geosciences, including attendance at weekly departmental visiting speaker series, reading and analysis of related scholarly publications, oral/written reports. Prerequisite: Geology majors and Geology minors only.

GEOL 293. Teaching Assistantship. 1-3 Credits.
Undergraduate student service as a teaching assistant, usually in an introductory-level course in the discipline, for which credit is awarded. Offered at department discretion.

GEOL 295. Advanced Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

GEOL 296. Advanced Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

GEOL 297. Independent Study. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

GEOL 298. Undergraduate Research. 1-18 Credits.
Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.