

Department of
Geology

**Dan Moore, Department Chair**

*Robb Clayton, Glenn Embree, Forest Gahn, William (Bill) Little,
Mark Lovell, Dan Moore*

Linda Mitchell, Lab Supervisor (208) 496-1948

Jeanine Nielson, Secretary (208) 496-1905

<http://www.byui.edu/Geology/>

Introduction

Geology offers students career opportunities both as professional geologists and as teachers in secondary education (Earth Science). Both career paths are currently in high demand. Graduates in Earth Science are employable with their bachelor's degree while the professional geologist's track generally requires a graduate degree. The current financial rewards for geologists are significant and generally require living close to a major city. The education major provides greater flexibility in choosing where to live. In addition to our major programs, we are also home for a minor in geology and education minors in Earth Science and Natural Science. The education Natural Science option is especially attractive for individuals planning to teach in smaller school districts. Within the State of Idaho, upon successful completion of required exams the candidate is able to teach all science categories.

Career opportunities for geologists include mineral or energy exploration and development, geological engineering, geophysics, environmental geology, water resources, computer applications to geology including GIS, paleontology, etc. Likely employers include energy companies, consulting firms, local and federal government agencies, and academic institutions. The broad multidiscipline background of a major in geology is great preparation for careers in business, law, or many other fields.

Most geoscience concepts are best understood by leaving the classroom and spending time studying the rocks and geologic features where they exist. Field trips off-campus provides students field experiences, enabling them to experience geologic features first hand. The unique location of BYU-Idaho offers an exceptional opportunity to study geology, visiting some of the most famous geologic localities in the world. Local and regional field trips to Yellowstone and Grand Teton Nation Parks, Snake River Plain volcanic and hydrologic features, Hebgen Lake and Borah Peak earthquake localities, and the Grand Canyon in Arizona, provide for more effective learning, enhanced student understanding of geologic processes, and a superior preparation for future careers.

Study of Geology offers the non-science majors an opportunity to fill Physical Science General Education requirements and gain a better understanding of their natural environment. Students must achieve a minimum grade of "C-" on all required courses.

Natural Science Field Expedition

The Intermountain West is the outdoor classroom for Field Expedition which is taught during the second half of summer term. This program offers students an experiential approach to the study of Geology, Biology, Religion, and other courses as available. Since these are the only classes taken during that half of the term, most of the time is spent in the field away from the BYU-Idaho campus. This program is required for all Earth Science education majors and minors.

Field trip fee is \$950. Applicants must be accepted by BYU-Idaho before entering this program. For information visit our website accessible from the home page of the Department of Geology at <http://www.byui.edu/geology/> or contact Dan Moore (moored@byui.edu), telephone (208) 496-1902 or Mark Lovell (Lovellm@byui.edu), telephone (208) 496-1903. Mailing address for both instructors is: Geology Department, BYU-Idaho, Rexburg, ID 83460-0510. Send applications to Dan Moore at the address listed.

BS in Earth Science Education

General Education Requirements

I. Reading and Writing: <i>Take 1 course:</i> ENG 111 3 ENG 111C 3 AND <i>Take 1 course:</i> ENG 316 3 ENG 316C 3 II. Mathematics: <i>Take 1 course:</i> MATH 110 3 MATH 112 4 III. Basic Skills: <i>Take 1 course:</i> CS 100 1	IV. Arts: <i>Take 1 course:</i> ART 101 3 ART 104 3 ART 160 3 ART 201 3 ART 202 3 DANCE 101 3 HFED 140 3 HORT 230 3 HUM 101 3 HUM 201 3 HUM 202 3 MUSIC 100 3 MUSIC 101 3 TA 115 3 TA 117 3 AND <i>Take this course:</i> FA 100 0-1	V. Letters: <i>Take 1 course:</i> PH 314 3 VI. Biological Science: <i>Take 4 credits:</i> AGRON 122 4 AGRON 270 4 BIO 100 3 BIO 102 1 BIO 118 4 BIO 120 4 BIO 130 4 BIO 150 3 BIO 150L 1 BIO 176 4 BIO 200 4 BIO 202 4 BIO 208 4 BIO 221 3 BIO 222 1 BIO 230 4 BIO 250 4 BIO 264 4 BIO 265 4 BIO 268 8	VII. Physical Science: <i>Take 4 credits:</i> CHEM 105 4 VIII. American Institutions: <i>Take 1 course:</i> AMHER 170 3 ECON 111 3 HIST 120 3 HIST 121 3 POLSC 110 3 IX. Social Science: <i>Take 1 course:</i> ED 270 3	Religion Requirement: (Book of Mormon) <i>Take these courses:</i> REL 121 2 REL 122 2 OR <i>Take this course:</i> REL 221 AND (Scripture Based Courses) <i>Take 6 credits:</i> REL 211 3 REL 212 2 REL 301 3 REL 301H 3 REL 302 3 REL 302H 3 REL 324 3 AND (Other Religion Courses) <i>Take 4 credits:</i> REL 100 2 REL 130 2 REL 215 2 REL 234 2 REL 235 2 REL 261 2 REL 264 2 REL 333 2 REL 341 2 REL 342 3 REL 351 2 REL 352 2 REL 360 4 REL 370 2 REL 431 2 REL 471 3 REL 475 2
Total GE Credits=44				

Major Requirements

No Double Counting of Major Courses

Education Core: <i>Take these courses:</i> ED 200 2 ED 492 12 SECED 280 3 SECED 410 3 SPED 322 2 <hr style="width: 100px; margin-left: 0;"/> 22	Take these courses: GEOL 111 3 GEOL 111L 1 GEOL 112 3 GEOL 112L 1 GEOL 137 3 GEOL 137L 1 GEOL 250 4 GEOL 380 4 GEOL 404 3 GEOL 405 3 MATH 111 2 PH 127 3 PH 127L 1 <hr style="width: 100px; margin-left: 0;"/> 32	Program Notes:
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Total Major Credits=32

Education Core Credits=22

Education Majors Require an Education Minor for Graduation

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Summer---- NO

Summer-Fall---- YES

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Geology Minor		
Minor Requirements		
Take these courses: GEOL 111L 1 GEOL 112 3 GEOL 112L 1 GEOL 380 4 <hr style="width: 50%; margin-left: 0;"/> 9 Take 1 course: GEOL 101 3 GEOL 104 3 GEOL 111 3 <hr style="width: 50%; margin-left: 0;"/> 3 Take 1 course: GEOL 250 4 GEOL 350 4 <hr style="width: 50%; margin-left: 0;"/> 4	Take 3 courses: Geog 230 3 GEOL 311 4 GEOL 370 4 GEOL 390 1-3 GEOL 404 3 GEOL 411 3 GEOL 412 3 GEOL 420 3 GEOL 435 3 GEOL 440 3 GEOL 445 3 GEOL 480 3 <hr style="width: 50%; margin-left: 0;"/> 7	Program Notes:
Total Minor Credits=23		
This minor is available on the following tracks:		
Fall-Winter---- YES	Winter-Summer---- NO	Summer-Fall---- YES

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Minor in Natural Science Education	
Minor Requirements	
Take these courses: BIO 204 4 BIO 208 4 CHEM 105 4 CHEM 106 4 GEOL 111 3 GEOL 111L 1 GEOL 112 3 GEOL 112L 1 PH 105 3 PH 105L 1 PH 106 3 PH 106L 1 <hr style="width: 50%; margin-left: 0;"/> 32	Program Notes: <i>Students wishing to minor in Natural Science must major in Ag Ed, Biology Ed, Chemistry Ed, Earth Science Ed or Physics Ed. In nearly all cases, about 12 credits from GE and major requirements will apply to the minor requirements, leaving the actual number of additional credits needed for the minor at 20.</i>
Total Minor Credits=32	
This minor is available on the following tracks:	
Fall-Winter---- YES	Winter-Summer---- YES
Summer-Fall---- YES	

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Minor in Earth Science Education	
Minor Requirements	
Take these courses: GEOL 111 3 GEOL 111L 1 GEOL 112 3 GEOL 112L 1 GEOL 250 4 GEOL 137 3 GEOL 137L 1 PH 127 3 PH 127L 1 <hr style="width: 50%; margin-left: 0;"/> 20	Program Notes:
Total Minor Credits=20	
This minor is available on the following tracks:	
Fall-Winter---- YES	Winter-Summer---- NO
Summer-Fall---- YES	

Course Descriptions

Credits*

- GEOL 101 Introduction to Geology (3:3:0)**
 Fulfills GE Physical Science requirement.
 General non-technical course for the non-science student who desires a broad introduction to Geology. Students should also take Geol 102 Lab. Students who take Geology 101 may not also receive credit for Geology 111. This class is also taught as part of the off-campus Discovery and Natural Science Field Expedition programs. Contact the directors of these programs for fees and other information.
 (Fall, Winter, Summer)
- GEOL 102 Introduction to Geology Lab (1:0:1)**
 Fulfills GE Physical Science requirement.
 Fee: \$5.00
 Prerequisite: Concurrent enrollment in or previous completion of Geol 101 or 104.
 General experience with (1) mineral and rock identification and interpretation and (2) the use and geologic interpretation of topographic maps.
 (Fall, Winter, Summer)
- GEOL 103 Life of the Past (3:3:0)**
 Fulfills GE Physical Science requirement.
 A non-technical study of the development of life and major events of earth history. For non-science students.
- GEOL 103L Life of the Past Lab (1:0:2)**
 Fulfills GE Physical Science requirement.
 Fee: \$7.00
 Lecture/lab experience with rock and fossil identification as well as application of basic geologic principles.
- GEOL 104 Natural Disasters and Resources (3:3:0)**
 Fulfills GE Physical Science requirement.
 Fee: \$12.00
 For the non-science majors emphasizing physical geology related to geologic hazards, mineral and energy resources, and the environmental consequences of urban and rural development. Associated lab for this class is Geol 102. Students who take Geol 104 may not receive credit for Geol 111.
 (Fall, Winter, Summer)
- GEOL 110 Earth Science (3:3:0)**
 Fulfills GE Physical Science requirement.
 Prerequisite: Concurrent enrollment in Geology 110L.
 This course is designed to enhance the student's understanding of their natural environment and how to relate it to their lives. It will cover basic concepts and methods used in geology, astronomy and meteorology. It helps prepare Education majors with the knowledge necessary to teach these concepts in the classroom.
 (Fall, Winter)
- GEOL 110L Earth Science Lab (1:0:2)**
 Fulfills GE Physical Science requirement.
 Fee: \$7.00
 Prerequisite: Must have taken Geol 110, concurrent enrollment in Geol 110 or instructor approval.
 Lab studies and field trips emphasize rock, mineral, and fossil classification and interpretation; map and photo interpretation; as well as weather and astronomical observation and interpretation. Emphasis on learning and teaching directed towards elementary education majors.
 (Fall, Winter)

- GEOL 111 Physical Geology (3:3:0)**
 Fulfills GE Physical Science requirement.
 For majors in Geology, Engineering, Forestry, Construction and other programs. Includes a study of our earth and the processes that formed its features. Students who take Geology 111 must register for Geology 111L. Students who take Geology 111 may not receive credit for Geology 101 or Geology 104.
 (Fall, Winter, Summer)
- GEOL 111L Physical Geology Lab (1:0:2)**
 Fulfills GE Physical Science requirement.
 Fee: \$35.00
 Prerequisite: Concurrent enrollment in Geol 111 or instructors' consent.
 Mineral and rock identification and interpretation, as well as, map and photo interpretation. Students who take Geology 111 lab may not receive credit for Geology 102.
 (Fall, Winter, Summer)
- GEOL 112 Historical Geology (3:3:0)**
 Prerequisite: Geol 101, 104, 110, or 111.
 A study of the geological history of the earth and the evolution of its life forms. For geology and related majors. Students who take Geol 112 may not receive credit for Geol 103. Students taking Geol 112 are required to take Geol 112L.
 (Fall, Winter)
- GEOL 112L Historical Geology Lab (1:0:2)**
 Fee: \$25.00
 Prerequisite: Concurrent enrollment in Geol 112.
 Two hour lecture/lab per week. Examination of the principles of historical geology, along with the study of fossils, special attention given to identification, type of preservation and environments of fossils. Geologic map studies are included.
 (Fall, Winter)
- GEOL 137 Oceanography and Weather (3:3:0)**
 Fulfills GE Physical Science requirement.
 Prerequisite: Must also take Geol 137Lab
 An introductory study of oceanography and weather including major features of oceans (topography, chemistry, geologic history, waves, tides, currents, environmental diversity, etc.), weather, climate, methods of weather forecasting and the environmental impact of man.
 (Fall, Winter)
- GEOL 137L Oceanography & Weather Laboratory (1:0:2)**
 Fulfills GE Physical Science requirement.
 Fee: \$5.00
 Lab is designed to give the student experience in observing and analyzing basic oceanographic and weather related phenomena.
 (Fall, Winter)
- GEOL 210 Introduction to Field Geology (1:0:0)**
 Fee: \$120.00
 Prerequisite: Geol 111 Lab, Geol 112 or instructor's consent.
 Must be taken concurrently with Geol 311 and Geol 370.
 One week field course covering basic methods of observing, collecting, and recording field data. Students register for this course as part of the fall semester. Field work for the course takes place the week prior to the start of the fall semester.
 (Fall)

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- GEOL 250 Rocks and Minerals (4:3:3)**
Fee: \$35.00
Prerequisite: Geol 101 & 102, or Geol 104 & 102 or Geol 110 & 110L, or Geol 111 & 111L or Instructor's consent.
Hand specimen study of common rocks and minerals, including their identification, classification, and interpretation. Recommended for Earth Science Secondary Education majors, and Geology Minors as well as, any other students interested in rocks and minerals. Not for Geology Majors.
(Fall, Summer))
- GEOL 290 Directed Study (1-3:0:0)**
Prerequisite: Consent of Instructor.
Faculty-student consultation will determine a special area of study and/or research problems that will give students greater preparation for advanced work in geology and related fields. Term of enrollment, credit, and other details will be arranged with instructor. Contact the instructor prior to registering for credit.
(Fall, Winter, Summer)
- GEOL 311 Structural Geology (4:3:3)**
Fee: \$10.00
Prerequisite: Geol 111 Lab & Geol 112. Must be taken concurrently with Geol 210 and Geol 370.
Fundamentals of rock deformation and rock structures. Introduction to tectonics. Field Trips.
(Fall)
- GEOL 350 Mineralogy & Petrology (4:3:3)**
Fee: \$35.00
Prerequisite: Geol 111, Geol 112; Chem 105 or Chem 111
The constitution, origin, and identification of minerals. The genesis, interpretation, and identification of igneous and metamorphic rocks.
(Fall)
- GEOL 370 Stratigraphy & Sedimentation (4:3:3)**
Fee: \$10.00
Prerequisite: Geol 111 or 101, Geol 112. Must be taken concurrently with Geol 210 and Geol 311.
Covers the origin, classification, distribution and correlation of sedimentary rock bodies and their use in interpreting geological history.
(Fall)
- GEOL 380 Regional Geology (4:0:0)**
Fee: \$650.00
Prerequisite: Geol 101 & 102 or Geol 111 & Geol 111L; Geol 250 or 350, or instructor's consent.
Travel to different geologic regions to learn the local stratigraphy and geologic history. Written reports will summarize observations from each area visited. A final oral presentation, summarizing all observations will take place on campus.
(2nd Summer term)
- GEOL 390 Directed Studies (1-3:0:0)**
Prerequisite: Demonstrated abilities to tackle desired subject.
Directed studies in Geology is designed to allow a student to obtain greater depth of understanding in subject matter not readily available through normal course work. Contact the instructor prior to registering for credit.
(Fall, Winter, Summer)

- GEOL 404 Environmental Geology (3:3:2)**
Fee: \$30.00
Prerequisite: Geol 112 or Instructor's consent
A detailed look at the environmental issues impacting societies today. Common geologic hazards associated with floods, landslides, volcanoes, earthquakes will be discussed. The course will also focus on the issues of an increasing demand for natural resources by an ever-growing population. Related impacts of waste management and pollution are also addressed.
(Win '07, Win '08, Sum '09, Win '10, Win '11)
- GEOL 405 Methods of Teaching Earth Science (3:2:3)**
Prerequisite: Prerequisite: Ed 270 and SecEd 280, along with 80% of science courses required for the Earth Science Education major must be completed prior to enrolling in this course. In addition this course should not be taken until the semester immediately preceding student teaching.
Earth Science and general science teaching methods needed for certification in Earth Science secondary education are taught. The course focuses on classroom and laboratory techniques utilized in the earth sciences. Practical experience in teaching laboratories, lectures and demonstrations will be emphasized. Students will build a science unit which demonstrates their understanding and application of inquiry and the use of multiple teaching and assessment strategies.
(Fall, Winter)
- GEOL 410 Advanced Field Methods (6:0:46)**
Fee: \$250.00
Prerequisite: Geol 311, Geol 350, Geol 370, Math 110, Math 111 or Instructors consent.
Field experience covering mapping skills, sample data collection, synthesis of field work and literature, and report writing.
(2nd Summer Term)
- GEOL 411 Geomorphology (3:3:2)**
Fee: \$40.00
Prerequisite: Geol 111 or Geol 101, Math 110/Math 111
Analysis of the origin of earth's major landforms emphasizing the interrelationship between plate tectonics and hydrology in producing the features we see on the earth's surface.
(Win '07, Sum '08, Win '09, Win '10, Sum '11)
- GEOL 412 Geology of North America (3:3:1)**
Prerequisite: Geol 250 or Geol 350.
The study of the geologic history of North America. In addition to the topic studied, students will develop skills in searching and comprehending the geologic literature, presenting geologic concepts, and scientific writing.
(Sum '08, Win '09, Win '10, Sum '11, Win '12,)
- GEOL 420 Geochemistry (3:2:2)**
Fee: \$20
Prerequisite: Geol 111, Chem 105, (Chem 106 recommended)
Applying elementary chemical principles to understand natural water systems.
(Win, '08, Win '09, Sum '10, Win '11, Win '12)
- GEOL 435 Hydrology (3:3:2)**
Fee: \$15.00
Prerequisite: Geol 101 & Geol 102 or Geol 111 & Geol 111L, Math 110.
In depth study of hydrologic issues focusing on groundwater. Movement of water in the aquifer, impacts of pumping and management of water as a natural resource are some of the main topics.
(Win '07, Win '08, Sum '09, Win '10, Win '11)

GEOL 440 Applied GIS

(3:2:2)

Fee: \$15.00

Prerequisite: Geography 230 - Introduction to GIS and one of the following: Geog 101, or Geol 101, Geol 104, Geol 110, Geol 111, or Instructor's consent.

Applied GIS (Geographic Information Systems) allows students to apply GIS skills to geologic topics and problems with real-world data sets.

(Sum '08, Win '09, Win '10, Sum '11, Win '12)

GEOL 445 Applied Geophysics

(3:3:2)

Fee: \$30.00

Prerequisite: Completion or concurrent registration in Phys 123, Completion of Geol 311 & Geol 370 or Instructor's approval

Learning and applying various geophysical methods to explore and characterize materials in the subsurface. Field trips included.

(Win '07, Win '08, Win '10, Win '11, Sum '12)

GEOL 480 Paleontology

(3:3:2)

Fee: \$50.00

Prerequisite: Geol 112 or a general biology class.

Distribution, morphology, paleoecology, and evolution of organisms in the geologic record. Includes vertebrates, invertebrates, and plant life.

(Win '08, Win '09, Sum '10, Win '11)

GEOL 498R Geology Internship

(1-3:0:0)

Prerequisite: To have completed at least through junior level geology courses.

An on-the-job experience related to the area of geological sciences.

GEOL 499 Senior Project

(1-3:0:0)

Prerequisite: Completion of senior level courses in geology. English 316 should have been completed also.

A course which includes original research or field work and results in a publishable paper.

(Fall, Winter, Summer)