Introduction

Students interested in Physical or Life Science and who enjoy the opportunity to work outdoors as well as the laboratory may find a satisfying and well-paying career in geology. Geology professions provide experiences suited for those who enjoy tackling projects on their own and working in teams. Careers include opportunities in mineral or energy exploration and development, geological engineering, geophysics, environmental geology, water resources, computer application to geology, paleontology, and many other related fields. Careers also exist in education, consulting firms, and with local and federal government agencies. The broad academic background of a geology major would also prepare one for careers in business, law, or many other fields. The entry level for most jobs is a master’s degree but some employment opportunities require only a bachelor’s degree.

Most geologic concepts are best understood by leaving the classroom and spending time studying the rocks and geologic features where they exist. Outings off campus are described as field experiences. The unique location of BYU-Idaho offers an exceptional opportunity to study geology in the midst of some of the finest geologic settings 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 earth-
# GENERAL EDUCATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Semester/Year</th>
<th>Major Course</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading and Writing</td>
<td>Take 1, 3 Credit Course: ENG 111; 111C; 111H</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Take 1, 3 Credit Course: ENG 316; 316C</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>Take 1, 3 Credit Course: Math 110; 110H; 112 (4)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Basic Skills</td>
<td>Take 1, 3 Credit Course: Comm 102; 150; 150H; CS 100(1); HS 131(2); IS 140 OR take ESS 177 and any 100 level ESS course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arts</td>
<td>Take 1, 3 Credit Course: ART 101; 104; 160; 201; 202; Dance 101; HFED 140; HORT 230; HUM 101; 101H; 201; 201H; 202; 202H; MUSIC 100; 101; TA 115; 117 AND take this 0-1 credit course, FA 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letters</td>
<td>Take 1, 3 Credit Course: CHIN 347; ENG 250; 250H; 251; 331; 333; 334; 351; 352; 353; 354; 362; 373; 373H; FR 202; GER 202; HON 201; 220; 222H; 222; LANG 202; PH 314; PHIL 110; 110H; 201; 201H; 202; 202H; 313; 313H; 314; 315; 315H; RUSS 340; SPAN 202; 302</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological Science</td>
<td>Take 4 Credits: AGRON 122; AGRON 270; BIO 100(3); 100H(3); 102(1); 102H(1); 118; 120; 130 150(3);150L(1); 176; 200; 202; 208; 221(3); 222(1); 230; 250; 264;265;268(8)</td>
<td>4</td>
<td>(Credits other than 4)</td>
</tr>
<tr>
<td>Physical Science</td>
<td>Take 4 Credits: CHEM 105; 105H</td>
<td>4</td>
<td>(Credits other than 4)</td>
</tr>
<tr>
<td>American Institutions</td>
<td>Take 1, 3 Credit Course: AMHER 170; 170H; ECON 111; 111H; HIST 120; 121; POLSC 110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Science</td>
<td>Take 1, 3 Credit Course: ANTH101; 101H; CHILD 210; 210H; ECON 111; 111H; ED 270; GEOG 120; HIST 201;202;HON 201; PHIL 203; 3230H; 204; 204H; POLSC 110; 170; 210; PSYCH 111; 111H; 201; 201H; SOC 111; 111H; 112; 112H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td>Take 4 credits - Rel 121; 121H AND Rel 122; 122H OR Rel 221; Take 6 credits - Rel 211; 211H; 212; 212H; 301; 301H; 302; 302H; 324; 324H</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rel 100; 130; 215; 234; 235; 260; 261; 264; 333; 341; 341H; 342; 342H; 351; 352; 370; 431; 471; 475</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# MAJOR REQUIREMENTS

**30 credits - take these courses:**

<table>
<thead>
<tr>
<th>Semester/Year</th>
<th>Course #</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Geol 111</td>
<td>3</td>
<td>Physical Geology For majors in Geology, Engineering, Forestry, Construction and other programs</td>
</tr>
<tr>
<td>1</td>
<td>Geol 111L</td>
<td>1</td>
<td>Physical Geology Lab Mineral and rock identification and interpretation, as well as, map and photo interpretation</td>
</tr>
<tr>
<td>3</td>
<td>Geol 112</td>
<td>3</td>
<td>Historical Geology A study of the geological history of the earth and the evolution of it's life forms</td>
</tr>
<tr>
<td>1</td>
<td>Geol 112L</td>
<td>1</td>
<td>Historical Geology Lab Examination of the principles of historical geology</td>
</tr>
<tr>
<td>1</td>
<td>Geol 210</td>
<td>1</td>
<td>Introduction to Field Geology One week field course covering basic methods of observing, collecting, and recording field data</td>
</tr>
<tr>
<td>4</td>
<td>Geol 311</td>
<td>4</td>
<td>Structural Geology Fundamentals of rock deformation and rock structures. Introduction to tectonics. Field Trips</td>
</tr>
<tr>
<td>4</td>
<td>Geol 350</td>
<td>4</td>
<td>Mineralogy &amp; Petrology The constitution, origin, and identification of minerals</td>
</tr>
<tr>
<td>4</td>
<td>Geol 370</td>
<td>4</td>
<td>Stratigraphy &amp; Sedimentation Covers the origin, classification, distribution and correlation of sedimentary rock bodies</td>
</tr>
<tr>
<td>3</td>
<td>Geol 404</td>
<td>3</td>
<td>Environmental Geology A detailed look at the environmental issues impacting societies today</td>
</tr>
<tr>
<td>6</td>
<td>Geol 410</td>
<td>6</td>
<td>Advanced Field Methods Field experience covering mapping skills, sample data collection, synthesis of field work and literature, etc.</td>
</tr>
</tbody>
</table>

**4 credits - take one grouping**

<table>
<thead>
<tr>
<th>Semester/Year</th>
<th>Course #</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1</td>
<td>Ph 105</td>
<td>3</td>
<td>Introductory Applied Physics I This course is the first semester of the algebra and trigonometry-based Applied Physics sequence</td>
</tr>
<tr>
<td>Semester</td>
<td>Course #</td>
<td>Credits</td>
<td>Course Title &amp; Description</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>---------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Ph 105L</td>
<td>1</td>
<td>Applied Physics Lab I</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduces students to the basic principles and laws that govern motion and waves</td>
<td></td>
</tr>
<tr>
<td>Ph 121</td>
<td>3</td>
<td>Principles of Physics I</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Classical Mechanics with emphasis on combining intuition and past experience with mathematics</td>
<td></td>
</tr>
<tr>
<td>Ph 150</td>
<td>1</td>
<td>Beginning Physics Lab</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduces students to the basics of experimental physics</td>
<td></td>
</tr>
</tbody>
</table>

### 1 credit - take 1 course:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course #</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Geol 498R</td>
<td>1-3</td>
<td>Geology Internship</td>
</tr>
<tr>
<td></td>
<td>Geol 499</td>
<td>1-3</td>
<td>Senior Project</td>
</tr>
</tbody>
</table>

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

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

### Take 1 option:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course #</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 111</td>
<td>2</td>
<td>Trigonometry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Math 112</td>
<td>4</td>
<td>Calculus I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trigonometric functions, triangle relationships, graphs, identities, inverse trigonometric functions, etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limits, continuity, derivatives, integrals, and transcendental functions</td>
<td></td>
</tr>
</tbody>
</table>

**OR**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course #</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 113</td>
<td>3</td>
<td>Calculus II</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Techniques of integration, infinite sequences and series, polar coordinates, and parametric curves</td>
<td></td>
</tr>
</tbody>
</table>

### 12 credits - take 4 courses:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course #</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog 230</td>
<td>3</td>
<td>Introduction to Geographic Information Systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overview of Geographic Information Systems including background, development, etc</td>
<td></td>
</tr>
<tr>
<td>Geol 380</td>
<td>4</td>
<td>Regional Geology</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Travel to different geologic regions to learn the local stratigraphy and geologic history</td>
<td></td>
</tr>
<tr>
<td>Geol 390</td>
<td>1-3</td>
<td>Directed Studies</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Students obtain greater depth of understanding in subject matter not available through normal course work</td>
<td></td>
</tr>
<tr>
<td>Geol 411</td>
<td>3</td>
<td>Geomorphology</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analysis of the origin of earth's major landforms</td>
<td></td>
</tr>
<tr>
<td>Geol 412</td>
<td>3</td>
<td>Geology of North America</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>The study of the geologic history of North America</td>
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</tr>
<tr>
<td>Geol 420</td>
<td>3</td>
<td>Geochemistry</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Applying elementary chemical principles to understand natural water systems</td>
<td></td>
</tr>
<tr>
<td>Geol 435</td>
<td>3</td>
<td>Hydrology</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>In-depth study of hydrologic issues focusing on groundwater</td>
<td></td>
</tr>
<tr>
<td>Geol 440</td>
<td>3</td>
<td>Applied GIS</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Allows students to apply GIS skills to geologic topics and problems with real-world data sets</td>
<td></td>
</tr>
<tr>
<td>Geol 445</td>
<td>3</td>
<td>Applied Geophysics</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Learning and applying geophysical methods to explore and characterize materials in the subsurface</td>
<td></td>
</tr>
<tr>
<td>Geol 480</td>
<td>3</td>
<td>Paleontology</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distribution, morphology, paleoecology, and evolution of organisms in the geologic record</td>
<td></td>
</tr>
</tbody>
</table>

**45 Major Credits**
GENERAL EDUCATION REQUIREMENTS

Reading and Writing:
- Take 1, 3 Credit Course: ENG 111; 111C; 111H
- Take 1, 3 Credit Course: ENG 316; 316C

Mathematics
- Take 1, 3 Credit Course: Math 110; 110H; 112

Basic Skills
- Take this course: CS 100

Arts
- Take 1, 3 Credit Course: ART 101; 104; 160; 201; 202; Dance 101; HFED 140; HORT 230; HUM 101; 101H; 201; 201H; 202; 202H; MUSIC 100; 101; TA 115; 117
- AND take this 0-1 credit course, FA 100

Letters
- Take 1, 3 Credit Course: PH 314

Biological Science
- Take 4 Credits: AGRON 122; AGRON 270; BIO 100(3); 100H(3); 102(1); 102H(1); 118; 120; 130 150(3);150L(1); 176; 200; 202; 208; 221(3); 222(1); 230; 250; 264;265;268(8)

Physical Science
- Take 4 Credits: CHEM 105; 105H

American Institutions
- Take 1, 3 Credit Course: AMHER 170; 170H; ECON 111; 111H; HIST 120; 121; POLSC 110

Social Science
- Take 1, 3 Credit Course: ED 270

Religion
- Take 4 credits - Rel 121; 121H AND Rel 122; 122H OR Rel 221
- Take 6 credits - Rel 211; 211H; 212; 212H; 301; 301H; 302; 302H; 324; 324H

EDUCATION CORE REQUIREMENTS

22 credits - take these courses:

- ED 200 2 Foundations of Education
  Provides future teachers with a knowledge of what helped build American education.
- Ed 492 12 Student Teaching in the Public Schools
  A 16 week practicum completed in the public school classroom
- SecEd 280 3 SecEd Early Field Experience
  Provides pre-service secondary ed students and exposure to the 6-12 grade level classrooms
- SecEd 410 3 Reading in the Content Area
  Emphasis is placed on teacher adaptation needed to teach students who lack functional reading skills
- SpEd 322 2 Exceptional Students
  Assist secondary teachers in meeting the needs of exceptional students

MAJOR REQUIREMENTS

32 credits - take these courses:

- Geol 111 3 Physical Geology
  For majors in Geology, Engineering, Forestry, Construction and other programs
- Geol 111L 1 Physical Geology Lab
  Mineral and rock identification and interpretation, as well as, map and photo interpretation
- Geol 112 3 Historical Geology
  A study of the geological history of the earth and the evolution of its life forms
- Geol 112L 1 Historical Geology Lab
  Examination of the principles of historical geology
- Geol 137 3 Oceanography and Weather
  An introductory study of oceanography and weather including major features of oceans
- Geol 137L 1 Oceanography & Weather Laboratory
  Student experience in observing and analyzing basic oceanographic and weather related phenomena
- Geol 250 4 Rocks and Minerals
  Hand specimen study of common rocks and minerals
- Geol 380 4 Regional Geology
  Travel to different geologic regions to learn the local stratigraphy and geologic history
- Geol 404 3 Environmental Geology
  A detailed look at the environmental issues impacting societies today
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geol 405</td>
<td>3</td>
<td>Methods of Teaching Earth Science</td>
</tr>
<tr>
<td>Math 111</td>
<td>2</td>
<td>Trigonometry</td>
</tr>
<tr>
<td>Ph 127</td>
<td>3</td>
<td>Descriptive Astronomy</td>
</tr>
<tr>
<td>Ph 127L</td>
<td>1</td>
<td>Astronomy Lab</td>
</tr>
</tbody>
</table>

**32 Major Credits**

**Minor in Geology - 154**

No Double Counting of Minor Courses

**MINOR REQUIREMENTS**

**9 credits - take these courses**

<table>
<thead>
<tr>
<th>sem/yr</th>
<th>plan</th>
<th>Course #</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geol 111L</td>
<td>1</td>
<td>Physical Geology Lab</td>
<td>1</td>
<td>Mineral and rock identification and interpretation, as well as, map and photo interpretation</td>
</tr>
<tr>
<td>Geol 112</td>
<td>3</td>
<td>Historical Geology</td>
<td>A study of the geological history of the earth and the evolution of it's life forms</td>
<td></td>
</tr>
<tr>
<td>Geol 112L</td>
<td>1</td>
<td>Historical Geology Lab</td>
<td></td>
<td>Examination of the principles of historical geology</td>
</tr>
<tr>
<td>Geol 380</td>
<td>4</td>
<td>Regional Geology</td>
<td>Travel to different geologic regions to learn the local stratigraphy and geologic history</td>
<td></td>
</tr>
</tbody>
</table>

**3 credits - take 1 course**

| Geol 101 | 3 | Introduction to Geology | General non-technical course for the non-science student who desires a broad introduction to Geology |
| Geol 104 | 3 | Natural Disasters and Resources | Emphasizes physical geology related to geologic hazards, mineral and energy resources, etc. |
| Geol 111 | 3 | Physical Geology | For majors in Geology, Engineering, Forestry, Construction and other programs |

**4 credits - take 1 course**

| Geol 250 | 4 | Rocks and Minerals | Hand specimen study of common rocks and minerals |
| Geol 350 | 4 | Mineralogy & Petrology | The constitution, origin, and identification of minerals |

**Take 3 courses**

| Geol 230 | 3 | Introduction to Geographic Information | A general overview of Geographic Information systems |
| Geol 311 | 4 | Structural Geology | Fundamentals of rock deformation and rock structures. Introduction to tectonics. Field Trips |
| Geol 370 | 4 | Stratigraphy & Sedimentation | Covers the origin, classification, distribution and correlation of sedimentary rock bodies |
| Geol 390 | 1-3 | Directed Studies | Students obtain greater depth of understanding in subject matter not available through normal course work |
| Geol 404 | 3 | Environmental Geology | A detailed look at the environmental issues impacting societies today |
| Geol 411 | 3 | Geomorphology | Analysis of the origin of earth’s major landforms |
| Geol 412 | 3 | Geology of North America | The study of the geologic history of North America |
| Geol 420 | 3 | Geochemistry | Applying elementary chemical principles to understand natural water systems |
| Geol 435 | 3 | Hydrology | In depth study of hydrologic issues focusing on groundwater |
| Geol 440 | 3 | Applied GIS | Allows students to apply GIS skills to geologic topics and problems with real-world data sets |
| Geol 445 | 3 | Applied Geophysics | Learning and applying geophysical methods to explore and characterize materials in the subsurface |
| Geol 480 | 3 | Paleontology | Distribution, morphology, paleoecology, and evolution of organisms in the geologic record |

**23 Minor Credits**
MINOR REQUIREMENTS

**Minor in Natural Science Education - 130**

No Double Counting of Minor Courses

Students wishing to minor in Natural Science must major in AgEd, 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.

### MINOR REQUIREMENTS

**9 credits - take these courses**

<table>
<thead>
<tr>
<th>sem/yr plan</th>
<th>Course #</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
</table>
|             | Bio 204  | 4       | Vertebrate and Invertebrate Strategies  
Comparative organization and evolutionary significance of adaptive morphological, physiological, behavioral, reproductive and ecological differences in vertebrates and invertebrates |
|             | Bio 208  | 4       | General Botany  
An introduction to Botany including cell structure, plant anatomy, physiology, reproduction, heredity, evolution and ecology. Lab is required |
|             | Chem 105 | 4       | General Chemistry  
The first semester of a year-long course designed to meet the general chemistry requirements in engineering, science, and pre-professional majors |
|             | Chem 106 | 4       | General Chemistry  
The second semester of a year-long course designed to meet the general chemistry requirements in engineering, science, and pre-professional majors |
|             | Geol 111 | 3       | Physical Geology  
For majors in Geology, Engineering, Forestry, Construction and other programs |
|             | Geol 111L| 1       | Physical Geology Lab  
Mineral and rock identification and interpretation, as well as, map and photo interpretation |
|             | Geol 112 | 3       | Historical Geology  
A study of the geological history of the earth and the evolution of its life forms |
|             | Geol 112L| 1       | Historical Geology Lab  
Examination of the principles of historical geology |
|             | Ph 105   | 3       | Introductory Applied Physics I  
First semester of the algebra and trigonometry-based Applied Physics sequence |
|             | Ph 105L  | 1       | Applied Physics Lab I  
Introduces students to the basic principles and laws that govern motion and waves |
|             | Ph 106   | 3       | Introductory Applied Physics II  
This course is the second semester of algebra and trigonometry based Applied Physics Sequence |
|             | Ph 106L  | 1       | Applied Physics Lab II  
A three-hour per week physics lab course to accompany Ph 106 |

**32 Minor Credits**

### Minor in Earth Science Education - 181

No Double Counting of Minor Courses

### MINOR REQUIREMENTS

**20 credits - take these courses**

<table>
<thead>
<tr>
<th>sem/yr plan</th>
<th>Course #</th>
<th>Credits</th>
<th>Course Title &amp; Description</th>
</tr>
</thead>
</table>
|             | Geol 111 | 3       | Physical Geology  
For majors in Geology, Engineering, Forestry, Construction and other programs |
|             | Geol 111L| 1       | Physical Geology Lab  
Mineral and rock identification and interpretation, as well as, map and photo interpretation |
|             | Geol 112 | 3       | Historical Geology  
A study of the geological history of the earth and the evolution of its life forms |
|             | Geol 112L| 1       | Historical Geology Lab  
Examination of the principles of historical geology |
|             | Geol 137 | 3       | Oceanography and Weather  
An introductory study of oceanography and weather including major features of oceans |
|             | Geol 137L| 1       | Oceanography & Weather Laboratory  
Student experience in observing and analyzing basic oceanographic and weather related phenomena |
|             | Geol 250 | 4       | Rocks and Minerals  
Hand specimen study of common rocks and minerals |
|             | Ph 127   | 3       | Descriptive Astronomy  
Astronomy is the study of the heavens and the Earth as a planet |
|             | Ph 127L  | 1       | Astronomy Lab  
Gives students experience in observing and analyzing basic astronomical phenomena |

**20 Minor Credits**
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 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 Natural Science Field Expedition program. Contact the director of this programs for fees and other information.
(Winter, Summer, Fall)

**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. This course also fulfills online learning requirement.
(Winter, Summer, Fall)

**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.
(Winter, Fall)

**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.
(Winter, Fall)

**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.
(Winter, Fall)

**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 it’s 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.
(Winter, Fall)

**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.
(Winter, Fall)

**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 it’s 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.
(Winter, Fall)

**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.
(Winter, Fall)

* Credit Description (Credit Hours : Lecture Hours per week : Lab Hours per week)
GEOL 137 Oceanography and Weather (3:3:0)
Fulfills GE Physical Science requirement.
Prerequisite: Must also take Geol 137 Lab
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.
(Winter, Fall)

GEOL 137L Oceanography & Weather Laboratory (1:0:2)
Fulfills GE Physical Science requirement.
Fee: $5.00
Laboratory is designed to give the student experience in observing and analyzing basic oceanographic and weather related phenomena.
(Winter, Fall)

GEOL 210 Introduction to Field Geology (1:0:0)
Fee: $120.00
Prerequisite: Geol 111 Lab, 112 or instructors 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)

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 M inors as well as, any other students interested in rocks and minerals. Not for Geology Majors.
(Fall)

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.
(Winter, Summer, Fall)

GEOL 311 Structural Geology (4:3:3)
Fee: $10.00
Prerequisite: Geol 111 Lab & 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 & 112; Chem 105 or 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 & 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.
(Winter, Fall, Summer)

GEOL 404 Environmental Geology (3:3:2)
Fee: $30.00
Prerequisite: Geol 112 or instructors 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.
(Winter, Fall)
GEOL 405 Methods of Teaching Earth Science (3:2:3)
Prerequisite: Geol 380 or instructor's consent and Ph 127 or 227.
This course should not be taken until the semester immediately proceeding 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.

(Winter, Fall)

GEOL 410 Advanced Field Methods (6:0:46)
Fee: $250.00
Prerequisite: Geol 311, 350, 370, Math 110, 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 101, Math 110/111

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.

(Winter & Fall 2007, 2009)

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 skill in searching and comprehending the geologic literature, presenting geologic concepts, and scientific writing.

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.

GEOL 435 Hydrology (3:3:2)
Fee: $15.00
Prerequisite: Geol 101 & 102 or Geol 111 & 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.

(Winter)

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 instructors consent.

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

(Fall and Winter)

GEOL 445 Applied Geophysics (3:3:2)
Fee: $30.00
Prerequisite: Completion or concurrent registration in Phys 123, Completion of Geol 311 and 370 or Instructor's approval

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

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.

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)