Program
Bachelor of Science and Bachelor of Arts in Geology

Department
Geology

College
Arts & Sciences

Year
2014-2015

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Program Overview

Geology is a vibrant and multi-faceted discipline that focuses on the richness of the physical and life histories of our planet and involves many issues critical to society’s most pressing concerns including natural resources, energy and environmental change. Geology examines the evolving relationships of Earth systems—lithosphere, hydrosphere, atmosphere, cryosphere, and biosphere—through the full spectrum of geologic time, including the present day. The Bachelor of Science degree in geology is designed for undergraduates who wish to pursue careers in geology and the Earth sciences in general, such as environmental geology, paleontology, glaciology, petroleum geology, geochemistry, petrology, and hydrogeology, as well as secondary school, university and museum education and research. Our graduates leave the University of Cincinnati prepared to enter the workforce or progress to graduate studies.

The Department of Geology offers a Bachelor of Science degree and a Bachelor of Arts degree. Both programs provide students with a broad spectrum of knowledge in the many facets of geology. The Bachelor of Arts degree enables students to acquire a solid grounding in geological sciences without the full requirements of auxiliary sciences required by the Bachelor of Science degree. At the introductory level, the purpose of coursework is to familiarize students with Earth processes and the history of life. The mid-level “core” courses provide a solid knowledge base of the basic subject areas of geology and Earth Sciences, while upper-level courses provide the opportunity to explore specific topics in geology. While progressing through the degree students acquire field- and laboratory-based skills and knowledge necessary for future endeavors in geology after graduation. In the field, students learn how to map geologic structures and collect samples. Field locations are local as well as far-reaching and include destinations such as the Himalaya, Bahamas, Alaska, the Appalachian Mountains, the Rocky Mountains, and here in the Cincinnati area, home to world famous, fossil-rich outcrops. In the laboratory, students prepare and examine various types of samples on a variety of laboratory instruments and equipment and utilize computer programs to analyze field data.

Beyond course-related experiences, students have the opportunity to interact with faculty, graduate students, and fellow undergraduates while participating in field- and laboratory-based research projects. Faculty and graduate students serve as mentors for undergraduates interested in expanding their knowledge in a particular area of geology. Students work closely with their mentor to participate in an existing research project or create one of their own. Undergraduate research projects have led to senior theses, papers published in major geological journals, and presentations at regional, national, and international geology meetings.

Degree requirements may be altered to suit particular needs and abilities of a student upon petition to the Undergraduate Director and in consultation with the Academic Director. Special consideration is given to students with strong backgrounds in supporting sciences and students with superior records who decide to major in geology late in their programs. The Department of Geology also sponsors a minor in Geology.
## Program Outcomes

<table>
<thead>
<tr>
<th>Program Outcomes as stated in the P-1</th>
<th>Proposed Program Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Students will be able to identify past and present processes that have formed the Earth's surface and interior.</td>
<td>1) Identify and explain the processes that have shaped the Earth's surface and interior through geologic time.</td>
</tr>
<tr>
<td>2) Students can explain and interpret sedimentary, igneous, and metamorphic structures.</td>
<td>2) Interpret sedimentary, igneous, and metamorphic rocks and features and explain related processes.</td>
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<tr>
<td>3) Students can detail how the organisms of Earth originated and changed over time, and explain how anthropogenic factors have and will continue to affect Earth's environments and processes.</td>
<td>3) Detail how the Earth’s organisms originated and have transformed throughout geologic time.</td>
</tr>
<tr>
<td>4) BS students will be well prepared for further graduate study in Geological Sciences, Paleontology, and Environmental Sciences.</td>
<td>4) Describe how anthropogenic factors have and will continue to affect the Earth's environments and processes.</td>
</tr>
<tr>
<td>5) Students will demonstrate the ability to apply geological knowledge and techniques in real, field and laboratory situations such as would arise in geological research and industry.</td>
<td>5) Conduct research on a geologic topic by gathering, analyzing, and synthesizing information and communicating results to peers.</td>
</tr>
<tr>
<td>6) Students will exhibit knowledge and field and laboratory experiences on a broad spectrum of geological topics through the required core geology courses.</td>
<td>6) Apply geological knowledge and techniques in field and laboratory situations such as would arise in academia or industry.</td>
</tr>
</tbody>
</table>
## Curriculum Mapping Matrix: Linking Program Outcomes to Curriculum

<table>
<thead>
<tr>
<th>Key</th>
<th>Required Courses, Experiences &amp; Artifacts*</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/E: Introduced/Emerging</td>
<td>1001C: Geology &amp; Paleontology</td>
</tr>
<tr>
<td>D: Developing</td>
<td>1002C: Surface Processes &amp; Env. Issues</td>
</tr>
<tr>
<td>A: Achieved</td>
<td>2003C: Sedimentary Geology &amp; Earth History</td>
</tr>
<tr>
<td></td>
<td>2004C: Geomorphology &amp; Surface Hazards</td>
</tr>
<tr>
<td></td>
<td>2005C: Structural Geology &amp; Tectonics</td>
</tr>
<tr>
<td></td>
<td>2008C: Mineralogy</td>
</tr>
<tr>
<td></td>
<td>Add. 2000-level</td>
</tr>
<tr>
<td></td>
<td>6000-level courses</td>
</tr>
<tr>
<td></td>
<td>Capstone</td>
</tr>
</tbody>
</table>

### Outcomes

1. Identify and explain the processes that have shaped the Earth's surface and interior through geologic time.
   - I/E
   - I/E
   - D
   - D,A
   - A
   - D
   - I/E,D
   - D
   - D
   - D, A

2. Interpret sedimentary, igneous, and metamorphic rocks and features and explain related processes.
   - I/E
   - D
   - I/E
   - D
   - D
   - D
   - D
   - D
   - D, A

3. Detail how Earth's organisms originated and have changed throughout geologic time.
   - I/E
   - D
   - D
   - D
   - D
   - D
   - D
   - D, A

4. Describe how anthropogenic factors have and will continue to affect the Earth's environments and processes.
   - I/E
   - I/E
   - I/E
   - I/E
   - I/E
   - D
   - D
   - D
   - D, A

5. Conduct research on a geologic topic by gathering, analyzing, and synthesizing information and communicating results to peers.
   - I/E
   - D
   - A
   - D
   - D
   - D
   - D, A

6. Apply geological knowledge and techniques in field and laboratory situations such as would arise in academia or industry.
   - I/E
   - E
   - D
   - D
   - D
   - I/E
   - D
   - D
   - D, A
<table>
<thead>
<tr>
<th>Program Outcome</th>
<th>Assessment Tools</th>
<th>Course/Experience</th>
<th>Time Line</th>
<th>Responsible Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Identify and explain the processes that have shaped the Earth’s surface and</td>
<td>a. In-class presentations, exam</td>
<td>a. 1002C (I/E)</td>
<td>a. Annually: SS</td>
<td>a. Lewis Owen</td>
</tr>
<tr>
<td>have shaped the Earth’s surface and interior through geologic time.</td>
<td>b. Final exam, field trip report</td>
<td>b. 2009C (D)</td>
<td>b. Annually: SS</td>
<td>b. Eva Enkelmann</td>
</tr>
<tr>
<td></td>
<td>c. Lab exercises, final exam</td>
<td>c. 2005C (A)</td>
<td>c. Annually: FS</td>
<td>c. David Nash</td>
</tr>
<tr>
<td>explain related processes.</td>
<td>b. Lab exercises</td>
<td>b. 2008C (D)</td>
<td>b. Annually: FS</td>
<td>b. Craig Dietsch</td>
</tr>
<tr>
<td></td>
<td>c. Field notebooks</td>
<td>c. Capstone (A)</td>
<td>c. Annually: FS</td>
<td>c. Carl Brett/Krista Smilek</td>
</tr>
<tr>
<td>3) Detail how organisms of the Earth origin and have changed throughout</td>
<td>a. Mid-term and final exams</td>
<td>a. 1001C (I/E)</td>
<td>a. Annually: FS</td>
<td>a. Carl Brett</td>
</tr>
<tr>
<td></td>
<td>c. Field notebooks</td>
<td>c. Capstone (A)</td>
<td>c. Annually: FS</td>
<td>c. Carl Brett/Krista Smilek</td>
</tr>
<tr>
<td>4) Describe how anthropogenic factors have and will continue to affect the Earth’s</td>
<td>a. In-class presentations, report</td>
<td>a. 1002C (I/E)</td>
<td>a. Annually: SS</td>
<td>a. Lewis Owen</td>
</tr>
<tr>
<td>environments and processes.</td>
<td>b. Lab exercises, final exam</td>
<td>b. Capstone (D)</td>
<td>b. Annually: FS</td>
<td>b. Carl Brett/Krista Smilek</td>
</tr>
<tr>
<td></td>
<td>c. Field notebooks</td>
<td>c. Capstone (A)</td>
<td>c. Annually: FS</td>
<td>c. Carl Brett/Krista Smilek</td>
</tr>
<tr>
<td>5) Conduct research on a geologic topic, issue, or problem by constructing a</td>
<td>a. In-class presentations, report</td>
<td>a. 1002C (I/E)</td>
<td>a. Annually: SS</td>
<td>a. Lewis Owen</td>
</tr>
<tr>
<td>research paper or preparing a class presentation.</td>
<td>b. Oral presentations, research paper</td>
<td>b. Capstone (D)</td>
<td>b. Annually: FS</td>
<td>b. Craig Dietsch</td>
</tr>
<tr>
<td></td>
<td>c. Lab exercises, final exam</td>
<td>c. Capstone (A)</td>
<td>c. Annually: FS</td>
<td>c. David Nash</td>
</tr>
<tr>
<td>such as would arise in academia or industry.</td>
<td>b. Field notebooks, thin-section reports</td>
<td>b. 2008C (D)</td>
<td>b. Annually: FS</td>
<td>b. Craig Dietsch</td>
</tr>
<tr>
<td></td>
<td>c. Field notebooks</td>
<td>c. Capstone (A)</td>
<td>c. Annually: FS</td>
<td>c. Carl Brett/Krista Smilek</td>
</tr>
</tbody>
</table>
Assessment Infrastructure

Assessment Personnel

Individual instructors assigned to the courses listed in the Methods and Measures section, Part IV will serve a primary role in the assessment of exams, research papers, in-class presentations, and field notebooks. Members of the departmental Curriculum Committee (CC) will review the assessment information annually. The CC will consist of at least three faculty members. The Director of Undergraduate Studies will assume the position of Curriculum Committee Chair. The Academic Director will assist with data collection (e.g. obtaining and organizing assessment data from faculty members for presentation to the Curriculum Committee). The Academic Director will establish a Blackboard site where faculty can upload assessment data for their courses. The CC will analyze and interpret data to produce an annual report. This report will be distributed to members of the geology faculty. It should be noted that given the anticipated large volume of work associated with annual assessment, faculty on the Curriculum Committee should be acknowledged as having a substantial department service load according to departmental workload policies and merit criteria.

Assessment Schedule

At the beginning of each semester, the Academic Director will remind responsible faculty that assessment data will need to be collected for their respective course(s). At the conclusion of the semester, faculty will upload assessment data to the established Blackboard site. The Academic Director will organize these data according to the appropriate Program Learning Outcomes (PLOs). The data will then be given to the CC for review. The CC will meet at the end of spring semester to review assessment data for each required course and determine if actual level of achievement for each PLO matches the expected levels. A report will be compiled and shared with the faculty at the beginning of the following fall semester for review and comments. If issues are identified, the Undergraduate Program Director and Department Head will discuss with the CC potential strategies to address the issues and make recommendations for the implementation of these adjustments, such as refining assessments, refining Student Learning Outcomes, etc. Annual reports from the CC, the associated data, and proposed recommendations will be archived by the Academic Director.

The annual reviews for the first two to three years will generate baseline data. After this initial period, the CC will use the baseline data to define expected levels of achievement for each PLO. These annual reports and meetings allow for adjustments to be made to the curriculum that will enhance the quality of education for undergraduate geology students.
Findings

Here you will describe and explain in this section any multi-year patterns and trends that your assessment efforts have identified, including a description of any relevant relationships to national standards.

I. Use of Findings

In this final section, you will describe how your program intends to make use of the program-level assessment data it has gathered.

- How will this information be presented to and discussed among the faculty?
- How might this data or these discussions result in review and possible revision of course or program learning outcomes and pedagogical strategies?