Assessment and Improvement Report: 2014

Department: Geology

Assessment Coordinator: Thor Hansen

Departmental Mission: The Geology Department at WWU is committed to excellence in both teaching and research. Our goal is to offer the highest possible quality education in the geological sciences at the undergraduate and graduate levels. The mission of our department is to serve three main populations: graduate students, undergraduate geology majors, and undergraduates from other departments for their general education courses. For all of these students we strive to create excitement about discovery and the process of geologic inquiry. We want to develop in all students an appreciation of how geological processes affect the earth and society so that they will be environmentally responsible, scientifically literate citizens. We strive to produce majors with an interdisciplinary content background in geology and the physical sciences who are competent in the field, who can work collaboratively, conduct original research, and effectively communicate their results.

Department Student Learning Outcomes:

Cognitive outcomes: Our students will have a deep understanding of the following foundational geologic principles:

1. Earth has a history of biological and physical change over billions of years.
2. Earth’s surface is affected by dynamic processes on a range of timescales.
3. Earth’s composition varies and these compositions provide the raw materials for the rock cycle.
4. Earth’s interior is dynamic and drives plate tectonics.
5. Earth scientists use repeatable observations and testable ideas to understand and explain our planet.
6. Geology and society are fundamentally inter-related.

Skills: Our students will have critical skills required by professional geologists. Graduates:

7. Have developed their observational, analytical and quantitative skills.
8. Can create maps and understand what they tell us about the Earth.
9. Will be able to apply physics, chemistry, and mathematics concepts to the study of Earth.
10. Will be able (alone or in teams) to present geological information clearly.

Student Learning Outcomes Assessed This Year:

<table>
<thead>
<tr>
<th>Assessment Measures</th>
<th>SLOs Assessed</th>
<th>Results</th>
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<tbody>
<tr>
<td>Geol 306: Track grades on the science portion of the three parts of the mineral analysis term project.</td>
<td>7</td>
<td>In this assessment of observational, analytical and quantitative skills, we tracked the scores given for the science portion of the mineral analysis term project. This project is conducted in three parts: physical analysis, petrographic analysis, and chemical analysis of the minerals in a student-chosen rock specimen. The project is conducted in small teams of 2-3 students. The course is taught by different faculty, and no attempt was made here to...</td>
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normalize grading variations between them. From Winter 2013 - Winter 2014, the mean score was 85±14% (1SD error). The mean scores for the three portions of the project across the four instances were 88±10%, 80±13%, and 87±14%.

<table>
<thead>
<tr>
<th>Course</th>
<th>Activity Description</th>
<th>Score</th>
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<tbody>
<tr>
<td>Geol 213</td>
<td>Graduates can create maps and understand what they tell us about the Earth.</td>
<td>8</td>
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<td></td>
<td>Track grades on ArcGIS Exercise #5, which requires the processing and map development of Washington State geologic units with an underlying hill-shade relief. The average score on the exercise was 90%. All 36 students but one received a passing grade.</td>
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**Changes based on assessment findings:**

Geol 306: Given the nature of the scoring rubric, we view a value of 85% as a reasonable target, and are generally achieving this. Fall 2013 was lower than is typical, for reasons that are unclear. The scores for the petrographic analysis section are lower than the other two. We suspect that this is due to the combination of students' unfamiliarity with petrographic analysis and the open-ended nature of the analysis (in contrast to the chemical analysis portion, which is also unfamiliar, but has tightly constrained methods of hypothesis-making and -testing). We intend to increase class time spent in cementing petrographic analysis skills in order to ameliorate this difference.

Geol 213: An average score of 90% is a very acceptable outcome. We will continue to monitor student performance in this class and revise it as necessary.

**Other program changes:**

Cancelled Geol 214 and ISTM 201, and several 400-level courses due to lack of faculty resources.

We have streamlined the Geology BS degree by eliminating the three concentrations to improve degree efficiency and to make the BS-Geology a more consistent “brand”

**GUR Assessment:**

GUR academic competencies and perspectives
2. Analyze and interpret information from varied sources, including print and visual media.

**GUR Outcomes Assessed This Year:**

<table>
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<th>Assessment Measures</th>
<th>GUR-ACPs Assessed</th>
<th>Results</th>
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<tbody>
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<td><strong>Geol 303</strong>: Be able to critically assess reconstructions of dinosaur life habits (in both print and video form) based on fossil evidence.</td>
<td>2</td>
<td>Thirteen questions were chosen from the midterm and final exams that require critical assessment of evidence from varied sources (class size 124). The mean score of the responses was 88%.</td>
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</table>
Changes based on assessment findings:

We view an 88% score as a very acceptable outcome. Grade averages in this class have increased by about 6% since the professor introduced an online textbook specifically tailored to the class that includes interactive learning modules and online quizzes. We will continue to monitor student performance in this class and revise the book as needed.