Core Curriculum Assessment Report 2012-2013

Department: Geology and Geography
Representative: Ronald D. Lewis, Associate Professor
Academic Year: 2012_13

Course Name / number: GEOL1100,1110

2. **SLO(s) being assessed:** Student will...

   SLO 10: Students will understand and appreciate methods and issues of science and technology.

3. **AGSC Content Area of Alignment:**

   Area III: Science and Math

4. **Assessment Method(s):**

   [Explain how assessment for the measures associated with this SLO - not grading for the course as a whole - was conducted. You may cut/paste rubrics for inclusion here, identify faculty reviewing committees, or identify specific kinds of test questions important to your method. Is this the method you initially planned to use? Provide a separate paragraph for each method].

   A set of 10 questions (below) was included in the midterm examination in each lecture section. The questions were carefully selected by the three professors who regularly teach the course to assess all five measures outlined for SLO10. As shown below, the questions include a mix of multiple-choice, fill-in-the-blank, and short-answer formats, with some questions keyed to illustrations. Each of the 10 questions was weighted equally and scored as one point each. This is the method originally proposed. PART A. See figure below. Examine the geologic cross section and address the following questions and problems. 1. Which rock is older? Rock unit B or rock unit D? _____ 2. What stratigraphic principle(s) did you employ to establish the age relationship between rock units B and D? 3. Which rock unit formed first? Rock unit D or rock unit E? ____ 4. What stratigraphic principle did you employ to establish the age relationship between rock units D and E? 5. Which early geologist introduced the principle referred to in question 4? a. James Hutton b. Charles Lyell c. Charles Darwin. Nicholas Steno d. James Hall 6. What kind of invertebrate fossil is illustrated in the inset for rock unit D? a. brachiopod b. tabulate coral c. ammonite d. trilobite e. ostracoderm 7. Based on your answer to question 7, you can conclude that the age of unit D is ____ a. Triassic to Recent b. Paleozoic c. Cretaceous d. younger than Permian e. Cenozoic 8. Suppose that a paleontologist tells you that the fossil indicates a Cambrian age (543-490 MY). Considering the stratigraphic context of unit D, what scientific approach(es) could be taken to test the age of fossil-bearing unit D? Be as specific as possible. Part B. Examine the cross section below and address the following questions and problems. 1. Based on your observations of the distribution of sediments at the surface and in the subsurface, what can you conclude about sea-level change in the area? 2. Assuming that Earth is progressively becoming warmer due to greenhouse gas emissions (e.g., CO2, etc.), what concerns might you have for the fate of coastal areas, particularly those that are heavily developed or urbanized? Explain your answer thoroughly.

5. **Findings: What assessment data did each assessment method produce?**

   Findings are discussed along with the data in the attached file.

   Attachment name: Findings.doc

6. **Based on the comprehensive rubric for the appropriate SLO(s), indicate the extent of competency of the average student who has completed this core course in each learning outcome assigned to it:**

<table>
<thead>
<tr>
<th>SLO</th>
<th>Level of Ability</th>
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<tbody>
<tr>
<td>SLO 10</td>
<td>intermediate</td>
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7. How did you (or will you) use the findings for improvement?

[What questions / issues / concerns did your data raise for the faculty teaching the course? What discussion did the faculty have about the findings? What future actions to improve student attainment of this outcome will the department / program take as a result of this analysis?]

Taking the numbers at face value, it appears that more attention should be given to the history, philosophy, and basic principles, including the scientific method. As it is, a considerable amount of course time (approximately 20%) is devoted to Earth materials and to the history of their interpretation, going back to the 17th century. This includes textbook as well as lecture treatment. Notably, the period of time covered encompasses the transition from the Renaissance to the foundation of modern science. Thus, the opportunity exists to discuss the scientific method more expressly. Throughout the course, the latest hypotheses in geologic science should be explained along with the evidence supporting them. To make sure that students understand the methods of science and can apply them to geology, more use will be made of in-class exercises and quizzes during lecture periods as well as in the weekly laboratory sessions. With regard to experiments, historical geology is not primarily an experimental science, but it does make use of experiments done in closely related sub-disciplines. Thus, students have to understand these experiments and know how to interpret their results. A case in point is the experimental work of Frank Bowen, who established the sequence of mineral formation as a molten rock cools -- or the converse: the sequence of mineral melting as solid rock is heated. With this background students can appreciate how partial melting of Earth’s upper mantle resulted in relatively light rocks that rose to help create the Earth’s crust. Effort will be made to more fully integrate the key experiments that have been done in this discipline with the activity of interpreting the Earth’s history.

8. Additional Comments:

[What else would you like the Committee to know about your assessment of this course or plans for the future?]

None

9. Committee Comments: