Department: Chemistry/Geography/Geology

Program (Degree): Sequence Assessment in Geology (GLG 141, 142)

Type of Degree: AAS ____ X AA ____ AS ____ ATS ____ AIS ____

Chairperson: Mike Canestaro Date: 3/19/03

Person(s) Interviewed: Anne Henry

I. Program Curriculum: A description of the basis for the program curriculum (i.e., how it is derived and validated). Include accreditation organizations, advisory committees or external groups that influence curriculum. Describe curriculum review activities including the review of course master syllabi*.

The curriculum for the Geology sequence (GLG 141-143/144) is aligned with that of four-year institutions to make it transferable to a bachelor's degree program. The geology sequence primarily satisfies the General Science requirement for both degree-seeking and transfer students.

An external review of the department was conducted spring of 2003. An external review is conducted every four years.

The master syllabi for Geology were reviewed and revised fall of 1999.

* Note: Every department is required to review Master Syllabi and Program Learning Outcomes a minimum of every two years.

II. **<u>Program Learning Outcomes</u>:** A description of what you intend for students to know (cognitive), think/feel (affective), or do (psychomotor), when they have completed your degree program. A suggested manageable number of outcomes should be in the range of five to ten. Describe Learning Outcomes review activities*.

a. Program Learning Outcomes**:**

The program learning outcomes for Liberal Arts and Sciences that are applicable to the Geology sequence (GLG 141-142) are:

- Communicate the significance of facts, concepts, and ideas in spoken and written English, which is clear, precise and logical.
- Demonstrate a problem-solving capability through analysis/synthesis**.**
- Recognize the ways in which a scientific approach can be used to formulate an understanding of the observable world.
- Demonstrate an academic proficiency comparable to students completing the second year of a baccalaureate degree program.

b. End-of-sequence learning outcomes:

The end-of-sequence learning outcomes for GLG 141-143/144 currently are:

- End of sequence learning outcomes were reviewed and changed when Mater Syllabi were reviewed in 1999-2000. As they were, the learning outcomes were severely lacking in content and only reflected the main course objectives of only one faculty member within the department. The changes provided below are a more thorough list of what we expect from our geology students and currently reflect the collaboration of the entire Geology department.

GLG 141/147:

1. Describe basic structure of solar system, the Earth's relationship to this system, and the internal structure of the Earth itself.
2. Identify minerals by their physical properties.
3. Identify and classify rocks based on their composition, texture, and formation.
4. Describe the weathering process in relationship to the conversion of Earth material from one rock type to another.
5. Demonstrate an understanding of the Theory of Plate Tectonics by relating it to Earth processes such as volcanism, earthquakes, and mountain building.
6. Explain the mechanisms responsible for the formation of igneous, sedimentary, and metamorphic rocks.

7. Explain the concept of the hydrologic cycle and the long-term effect of running water on the landscape.
8. Explain the role of ground water in relationship to geologic and biologic systems.
9. Describe how a glacier forms, moves, and reshapes the landscape and how to recognize its former presence in an area.
10. Describe the processes and features of deserts.

GLG142/148:
11. Apply principles of relative and radiometric dating to determine, from the rock record, the timing and sequence of geologic events.
12. Understand the premises behind the Theory of Evolution and be familiar with the supporting evidence.
13. Reproduce and use the modern, Geologic Time Scale.
14. Enumerate, in their proper order, the sequence of events that have resulted in the formation of the North American continent as it is today.
15. Briefly summarize what occurred during the events that resulted in the formation of the North American continent.
16. Be able to summarize the characteristics of each major geologic time division.
17. Be aware of the vast diversity of life on Earth and its evolutionary history as recorded in the fossil record.

GLG143/149:
18. Adopt an appreciation of our natural environment by developing an understanding of the basic operations of major Earth cycles.
19. Realize the importance of resource management and conservation in light of an ever increasing world populations and demand.
20. Understand the nature, degree and extent of water, air and soil pollution; its causes, consequences, and the problems and processes of clean up and prevention.
21. Explain the relationship between the hydrologic cycle, the groundwater system and humankind.
22. Explain the causes and consequences of acid deposition, ozone depletion, global warming and El Nino.
23. Examine the hazards posed by earthquakes, volcanoes, landslides, floods, and coastal storms and the measures people have taken to protect themselves from these hazards.
24. Recognize the role humans have played in the utilization and modification of the land and explain the consequences of these actions.
25. Analyze the geologic processes that have produced the energy resources we use today and brainstorm the possibilities for alternative energy resources in the future.
26. Be more familiar with the major policies of environmental law; their development, intent and application.

GLG144: (may be taken as an alternate to GLG143/149)
27. Use direct observations from the field to interpret Earth history as it relates to the geologic development of Ohio.

28. Identify the basic types and features of sedimentary rocks such as stratification, cross-bedding, fossil content, facies changes and other textural characteristics.
29. Be able to interpret ancient processes, conditions, and the sequence of events from the type, textural characteristics, and fossil content of the sedimentary rocks of Ohio.
30. Recognize the evidence of past glacial activity by direct observation and discussion of various distinctive features.
31. Discuss the origin, importance and use of economic resources in Ohio; especially limestone, shale, sand and gravel.

III. Assessment Method(s): A measurable indicator of success in attaining the stated learning outcome(s). The methodology should be both reliable and valid. Please describe in detail.

a. Formative Assessment Method(s) and Description: a measurable indicator of student in-progress success in attaining the stated learning outcome(s).

The pre/post comprehensive test was revised to account for the various teaching strategies of all the Geology Department faculty; instead of having been 'catered' to one faculty's course sections.

Since students have an option for their third course in the sequence (GLG143 or GLG144), and because the courses can be taken out of sequence (GLG141 is only prereq for both 142, and 143), the current test administration schedule includes a pre-test that is administered early in GLG141 and a post-test later, near the end of GLG142. An assessment test over the sequence; GLG141, 142, 143 or GLG141, 142, 144; is currently very problematic. The scores from pre and post-tests over the 'short sequence' of GLG 141-142 have been compared and seem to indicate that students are retaining information.

b. Summative Assessment Method(s) and Description: a measurable indicator of end-of-program success in attaining the stated program learning outcome(s).

Not applicable to end-of-sequence assessment.
Refer to section on summative assessment of the program learning outcomes for Liberal Arts and Sciences.

IV. Results: A description of the actual results of overall student performance gathered from the summative assessment(s). (see IlI.b.)

Results:
The twenty-possible-point pre and post tests for the past academic year are shown below. Please note that the number of students who take the post-test is always much lower; sometimes significantly so; than is the number of students who took the pre-test the previous quarter. This is mainly because many students; for various reasons; do not take GLG142 the quarter following GLG141, but opt to take GLG143 first, and pick up the GLG142 later. Approximately 10-15 % of students who take the post-test at the end of GLG142, are students who have not had GLG 141 for two or more quarters previous.

SEQ CHAPTER \h \r 1
Fall-01 to Winter-02
Winter-02 to Spring-02
Summer 2002

141 Fall-01
Pre-test
Median Score
142 Winter-02
Post-test
Median Score
141 Winter-02
Pre-test
Median Score
142 Spring-02
Post-test
Median Score
141 Summer A
Pre-test
Median Score
142 Summer B
Post-test
Median Score

11.82
14.61
11.53
13.86
11.10
14.00

V. <u>Analysis/Actions</u>: From analysis of your summative assessment results, do you plan to or have you made any adjustments to your program learning outcomes, methodologies, curriculum, etc.? If yes, describe. If no, explain.

Program Learning Outcomes were revised during revision of course Master Syllabi in 1999-2000. Changes to methodologies, curriculum, etc. are always ongoing as our department continuously strives to make learning an enjoyable and challenging experience. Since assessment of our assessment test tool has not been done since 1999, it is likely that it will undergo review and revision over the summer of 2003.

VI. <u>General Education</u>: A description of where and how the three primary general education outcomes* (communication, thinking, values/citizenship) are assessed.

A. Where do you assess written communication ?

General Education skills are course-embedded through student learning activities. Communication skills are practiced through written lab reports, class discussions, in-class and out of class group projects, Internet research activities, essays and field work.

B. Where do you assess oral communication ?

General Education skills are course-embedded through student learning activities.
Oral communication is utilized during team lab activities, class discussions, inclass and out of class group projects, and in-class presentations.

C. Where do you assess thinking ?

General Education skills are course-embedded through student learning activities.
The geology sequence emphasizes problem solving, pattern recognition, realization of interdisciplinary connections, and deriving creative solutions. Analytical thinking is developed method.

D. Where do you assess values/citizenship/community ?

General Education skills are course-embedded through student learning activities.
All lab sections require or, at least, encourage partnership or team collaboration. Most lecture sections require group activity on in-class discussions and presentations, as well as out-of class group-work. Environmental
Geology (GLG143) emphasizes the global community and the relationships between natural and 'man-made' events and local cultural mores, political ideals, and economic/technological potential. The Field Trip Course
(GLG144) exposes students to various locations throughout Ohio. Students conduct research in the field and learn how to interpret the geologic history of the state. Since most of the field trip sites are public areas, students often return with relatives and friends and share the information they learned.