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# **STUDENT ASSESSMENT PLAN**

## **THE GEOLOGY PROGRAM**

at

Indiana State University

November 30, 2001

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This document is an outline for the Student Outcomes Assessment Mandate at Indiana State University for the Geology Program. The document includes:

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**THE GEOLOGY PROGRAM**  
in  
The Department of Geography, Geology and Anthropology  
at  
Indiana State University

**MISSION STATEMENT**

The mission of the Geology Program at Indiana State University (ISU) is to provide students with a broad education in the geology, chemistry, physics, and mathematics that can be applied to interpreting and understanding Earth processes. This comprehensive array of knowledge provides students with a unique mixture of tools suitable for analytical skills, problem solving techniques, and critical thinking necessary for professional careers or graduate school. Upon completion of the Geology Program at ISU, students' lives will be enriched through a greater understanding and appreciation for the physical sciences.

Geology takes an integrated approach to the study of geologic concepts. To understand geology, geologists study several subdisciplines in geology, including physical geology, historical geology, mineralogy, petrology, structural geology, sedimentology/stratigraphy, paleontology, and field method, as well as in other physical sciences, such as chemistry, math, and physics. The scope of geology is very broad, and from the study of geology, geologists are able to explore for minerals and fossil fuels, recommend stable sites for major buildings, help control rivers, and locate underground water supplies for communities. They can also identify potentially dangerous sites that may be affected by dynamic forces within the Earth such as those causing earthquakes and volcanoes. Currently, the discipline of geology plays a key role in the administration of the nation's natural resources (e.g., U.S. Geological Survey) as well as enforcing state environmental legislation (e.g., state agencies such as the Department of Natural Resources, etc.). The discipline also extends into the mainstream and corporate fields of natural resource exploration, natural hazards assessment, and environmental risk assessment and mediation. Geology as an earth science is now required in the Indiana Core 40 and forms an integral part of Core 40 environmental science.

The Geology Program at Indiana State University emphasizes student training in the geological and physical sciences. The Geology faculty offer course work and specialize in the following areas: environmental geology, economic geology, paleontology, paleoceanography, geochemistry, sedimentology, stratigraphy, volcanology, and paleomagnetism (i.e., reconstruction of Earth's history based on preserved magnetism).

The Geology Program at ISU offers a unique experience for undergraduate students that enrich their personal lives and prepare them for life after college. There are many benefits for geology majors at ISU. For example, class sizes are often small (less than 25 students), which enhances the learning experience. Outside of the classroom, students have the opportunity to participate in their professors' research projects and are encouraged to develop their own research projects. Students also have the opportunity to complete a senior thesis tailored to their future goals. To date, several geology students have been successful in presenting and publishing their research projects. In addition, students can participate in fieldwork projects and gain laboratory experience in



geology. Moreover, students can gain experience and job opportunities in geology through summer programs with state government agencies. Finally, students can participate in an active and exciting Earth Science Club, featuring field trips and scientific movie nights. The educational experience of geology students at ISU is enriched through the participation in the Geology Program at ISU.

## **THE INTENDED STUDENT OUTCOMES**

The Student Outcomes Assessments will measure 1) the knowledge students' gained about basic geologic and physical principles that influence Earth processes, 2) how the program enriches the personal and professional lives of the students, and 3) how the program prepares the students to think and respond analytically and critically to geologic issues and concepts. As our Mission Statement declares, our intention is to provide students with a broad education in geology, chemistry, physics, and mathematics to use in evaluating geologic processes, and to prepare them for graduate school or professional careers involving analytical and critical thinking.

## **ASSESSMENT TOOLS AND METHODS**

The tools used to measure students' outcomes assessments are developed by the faculty of the Geology Program according to our Mission Statement presented above and include 1) a quantitative measure of basic knowledge in geology, 2) a qualitative assessment statement of students' expectations of the program, and 3) a qualitative statement of analytical and critical thinking skills. In addition, survey forms will be developed for Alumni and Employer responses regarding post graduation from Indiana State University.

The methods of application used will be to assess the baseline responses of entering students against those of graduating students from the Program of Geology at ISU as well as follow up surveys to Alumni and Employers graduating from the Geology Program. The quantitative, qualitative enrichment, and qualitative analytical and critical assessments will be given to each student entering the Geology Program and given to each student upon graduation from the program. Follow-up surveys will be mailed to Alumni and their employers' two-year post graduation from ISU.

## **TIME FRAME FOR IMPLIMENTATION**

A pilot study could begin with students entering and graduating Spring 2001. Although graduating students completing the graduating outcomes assessments would not have a comparison with their entering scores, the data collected could be used for evaluation of the five-year plan.

Alumni and Employers; surveys could be mailed out in the Spring of 2004 for students graduating in 2002.

## **ANALYSIS OF RESULTS**

A statistical package, such as SPSS, will be used to develop a program for the students' outcomes assessment. The student will be recorded as a code, with entering and graduating assessment scores entered as follows:

### Quantitative Assessment

The students' quantitative assessment is sub-divided into 10 questions from the core areas of geology (i.e., physical geology, historical geology, mineralogy, petrology, structural geology, paleontology, and sedimentology/stratigraphy), resulting in a total of 70 questions. A score of correct answers will be collected, as well as a score of correct answers from each sub-field, and recorded for student X.

For the five-year plan, a summary of all quantitative assessments for entering and graduating students will also include the frequency of each question answered correctly or incorrectly. In addition, a statistical comparison will be made between the entering and graduating student's qualitative assessment performance.

### Qualitative Enrichment Assessment

The students' qualitative enrichment assessment will be read by each faculty member and scored from 1-5 (with five the highest score) as follows: spelling, grammar, content, context, composition, and expression of personal expectation/growth of an understanding of geologic concepts. The entering and graduating enrichment statement for student X will be compared by each faculty member and given an improvement score from 1-5 (with five the highest score).

### Qualitative Analytical & Critical Assessment

The students' qualitative analytical & critical assessment will be read by each faculty member and scored from 1-5 (with five the highest score) as follows: spelling, grammar, opening statement, analyzing the problem, critical thinking in regards to presenting a balanced argument, and closing statement. The entering and graduating analytical & critical statement for student X will be compared by each faculty member and given an improvement score from 1-5 (with five the highest score).

### Alumni & Employers Surveys

The analysis of results for the Alumni and Employers Surveys, post-two year graduation, will be presented upon completion of the survey designs and will be used for the five-year plan review.

## **PROGRAM FOR IMPROVEMENT**

The Student Outcomes Assessment Profiles will be kept in a locked file cabinet in the Department of Geography, Geology and Anthropology records room. At the beginning



of each Fall Semester, the quantitative and qualitative results of the students' response will be summarized and distributed to each faculty member for review. This review process will inform the faculty about the strengths and weaknesses of the program in the following areas:

- 1) The entering students' quantitative measure of knowledge will provide the faculty with a baseline for student awareness of the principles of geology.
- 2) The entering students' qualitative enrichment statement will provide the faculty with a guideline about the students' personal expectations regarding geologic concepts as well as his or her ability to express himself or herself in writing.
- 3) The entering students' qualitative analytical & critical statement will provide the faculty with a baseline for the students' ability to analyze, critique, and present an argument regarding a selected geologic problem.
- 4) The graduating students' quantitative measure of knowledge will provide the faculty with a comparative assessment, relative to the baseline assessment, of the students' fluency regarding the principles of geology. The difference between the entering and graduating student should be statistically significant.
- 5) The graduating students' qualitative enrichment statement will provide the faculty with the students' personal growth and understanding of geologic concepts by completing the Geology Program, as well as his or her ability to express himself or herself in writing. The difference between the entering and graduating student should be statistically significant.
- 6) The graduating students' qualitative analytical & critical statement will provide the faculty with the students' ability to analyze, critique, and present an argument regarding a geologic problem. The difference between the entering and graduating student should be statistically significant.

At the end of five years, all student outcomes assessment data (quantitative, qualitative, and surveys) will be summarized and reviewed by the faculty to find the strengths and weaknesses in the Geology Program. The program and/or the outcomes assessment procedures will be adjusted as needed for the next five years.