

**STUDENT LEARNING ASSESSMENT PROGRAM  
SUMMARY FORM AY 2004-2005**

**Degree and  
Program Name:**

B.S. in Geology

**Submitted By:**

John Stimac

Please complete a separate worksheet for each academic program (major, minor) at each level (undergraduate, graduate) in your department. Worksheets are due to CASA this year by **June 1**. Worksheets should be sent electronically to [cskjs@eiu.edu](mailto:cskjs@eiu.edu) and should also be submitted to your college dean. For information about assessment or help with your assessment plans, visit the Assessment webpage at <http://www.eiu.edu/~assess/> or contact Karla Sanders in CASA at 581-6056.

**PART ONE**

What are the learning objectives?	How, where, and when are they assessed?	What are the expectations?	What are the results?	Committee/ person responsible? How are results shared?
<p>1. Geology graduates should understand how the scientific method applies to the earth sciences.</p>	<p>Students were assessed at the beginning of the semester and again at the end of the semester using an examination which included in-field and laboratory experiments designed to measure the understanding of the learning objectives. Lower level courses had lesser expectations than did the upper level courses.</p>	<p>Expectations included the ability to correctly identify the various components of proper scientific methodology: 1) observation and description of phenomena, 2) formulation of hypothesis to explain phenomena, 3) use of hypothesis to make predictions, and 4) performance of experiments to test predictions.</p> <p>Lower level courses required students to list parts of the scientific methodology, whereas upper level courses, had students identify correct and incorrect usage of scientific methodology from appropriate level literature sources.</p>	<p>Preliminary analysis indicates marked improvements (greater than 20 percent) in the number of students who can correctly identify and explain the scientific method. Results are significant for the ESC/GEL 1300 course with 108 students, with &gt; 98 percent undecided undergraduates. There may be problems with statistics of small numbers in the other courses since less ten students were in each of those. See Addendum – Table 1, for results.</p> <p>Additional examinations will be given to all students in all required and elective geology courses in order to add to the data. The results thus far indicate that students can be taught the</p>	<p>John Stimac, as chair of the Geology Assessment Committee, was responsible for the Geology Assessment Program in ESC/GEL 1300G, GEL 1430G, GEL 3430, GEL 3440, and GEL 3470. Results will be shared with other Geology Program faculty and the rest of the department.</p>

			scientific method. Owing to the small number of students in the upper division courses, and the fact that many of the students were first being explicitly shown the concepts, as opposed to being questioned about the concepts, the results should be regarded as only preliminary.	
2. Graduates should have a thorough knowledge and understanding of core concepts in the earth sciences, including the following areas:				
2A. Major physical and paleontological events in Earth history, and the methods used to interpret this history	<p>GEL 1430G, Historical Geology, students (8 total; 4 geology majors, 2 geography majors, 1 speech communication major, 1 undeclared) completed a series of laboratory exercises during the semester, which were based on the major physical and paleontological events in Earth history. Assignments and feedback were handed back to the students for review.</p> <p>Students were also required to take an entrance examination, which covered key aspects of the discipline's principles. These principles would be covered in the class – results from which were used as the basis to determine the extent of comprehension of the acquired concepts. Exit examination results have been previously reported under Goal 1.</p>	If students scored under the arbitrary score of 80 percent, they were required to re-submit laboratory exercises until they raised their scores appropriately.	<p>Of seven labs completed, for 56 initial submissions, only five labs required resubmission, and that was from two individuals.</p> <p>Resubmitted labs were brought above the 80 percent level.</p>	<p>John Stimac, as chair of the Geology Assessment Committee, was responsible for the assessment and rubric.</p> <p>Results will be shared with other Geology Program faculty and the rest of the department.</p>
2B. Common mineral, rock, and soil formation processes; the identification of common minerals, rocks, and soils; and the interpretation of the environments in which they	Not measured during this review period. Beginning fall 2005, new rubrics will be developed and implemented.	Not applicable.	Not applicable.	Not applicable.

are found.				
2C. Surface processes and their impact on development of landforms, and the ability to identify and interpret landforms.	Not measured during this review period. Beginning fall 2005, new rubrics will be developed and implemented.	Not applicable.	Not applicable.	Not applicable.
2D. Basic tectonic processes, and the ability to interpret structural relations from geologic data.	<p>GEL 3430, Structural Geology, students (5 students, all geology majors) took the course which included twelve labs, three hour-long examinations and two two-hour examinations. All exercises emphasized the interrelationships between processes and results. During the course, students were required to participate in two, out of three possible, field investigations.</p> <p>Students were also required to take an entrance examination, which covered key aspects of the discipline's principles. These principles would be covered in the class – results from which were used as the basis to determine the extent of comprehension of the acquired concepts. Exit examination results have been previously reported under Goal 1.</p>	Field trips were designed to allow students to apply and demonstrate the fundamental concepts which were discussed in and to get the students thinking outside the box by placing them in a new environment.	<p>By the end of the course, students were able to make basic and advanced measurements and field observations, then critically analyze the deformational process the structures in Earth materials have undergone. The resulting data was gathered and presented in a culminating paper / project. Part of the project was an oral presentation.</p> <p>Average from the course was an <math>84.24 \pm 9.69</math> percent (<math>n = 5, 1\sigma</math>) resulting in two "A," two "B," and one "C" grades.</p>	John Stimac, as chair of the Geology Assessment Committee, was responsible for the assessment and rubric. Results will be shared with other Geology Program faculty and the rest of the department.
2E. Processes occurring at different types of lithospheric plate boundaries.	<p>GEL 3440, Tectonics, students (8 students, 7 geology majors, 1 elementary education major) participated in the course which included 5 labs, four hour long examinations, two take home examinations, two two-hour examinations, a semester length research paper and oral presentation.</p> <p>Students were also required to</p>	Expectations were satisfactory completion of all components of the assessment. Satisfactory completion was arbitrarily set at the 80 percent level. Students who fell below 80 percent may pass the course, but their grade reflected substandard achievement.	<p>Average from the course was an <math>84.54 \pm 7.10</math> percent (<math>n = 8, 1\sigma</math>) resulting in five "A" and four "B" grades.</p> <p>An unusual note was that the elementary education major took the course with <u>no</u> prior geology. Although initial terminology was difficult, the student did earn an A in the course.</p>	John Stimac, as chair of the Geology Assessment Committee, was responsible for the assessment and rubric. Results will be shared with other Geology Program faculty and the rest of the department.

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2F. Major geological cycles and the interactions, both human and physical, with the Earth.	<p>GEL 1430G, Historical Geology, students (8 total; 4 geology majors, 2 geography majors, 1 speech communication major, 1 undeclared) completed a series of laboratory exercises during the semester, which were based on the major physical and paleontological events in Earth history. Assignments and feedback were handed back to the students for review.</p> <p>Students were also required to take an entrance examination, which covered key aspects of the discipline's principles. These principles would be covered in the class – results from which were used as the basis to determine the extent of comprehension of the acquired concepts. Exit examination results have been previously reported under Goal 1.</p>	If students scored under the arbitrary score of 80 percent, they were required to re-submit laboratory exercises until they raised their scores appropriately.	<p>Of seven labs completed, for 56 initial submissions, only five labs required resubmission, and that was from two individuals.</p> <p>Resubmitted labs were brought above the 80 percent level.</p>	John Stimac, as chair of the Geology Assessment Committee, was responsible for the assessment and rubric. Results will be shared with other Geology Program faculty and the rest of the department.
3. Geology graduates should have a set of fundamental skills that they can apply to a variety of situations, including:				
3A. Critical Thinking Skills -- the ability to formulate strategies, collect and synthesize data, and apply mathematical and graphical techniques to arrive at	Students in GEL 3430 (Structural Geology), GEL 3440 (Tectonics), and GEL 3470 (Planetary Geology) were expected to do readings outside the classroom in order to acquire	Students were expected to	<p>Initially the students had a difficult time adjusting to the method so some additional guidance was offered.</p> <p>Each class had three instances in which</p>	John Stimac, as chair of the Geology Assessment Committee, was responsible for the assessment and rubric. Results will be shared

<p>solutions, and interpret results related to geologic processes.</p>	<p>enough background information on particular topics. Once students were comfortable with finding sources, they then had to incorporate the ideas into the material being presented in the class, lab or field.</p>		<p>unexpected, relevant questions were give to the students, which required application of fundamental geological concepts in a new way. Results of those passing at an arbitrarily set <i>80 percent or greater level</i> are shown in the Addendum - Table 2. Also, see comment below Addendum - Table 2.</p>	<p>with other Geology Program faculty and the rest of the department.</p>
<p>3B. Communication Skills -- the ability to clearly express earth science concepts and present results from laboratory and fieldwork orally, graphically, and in writing.</p>	<p>Students in GEL 3430 (Structural Geology), GEL 3440 (Tectonics), and GEL 3470 (Planetary Geology) were required to write and then give as an oral presentation, a semester paper / project.</p>	<p>Presentations were judged using a modified 5-component speaking rubric. A passing level was considered to be at the 80 percent level or greater.</p>	<p>Of 21 “students” (twelve individuals) in the three courses, sixteen presentations were judged satisfactory. The five presentation judged not satisfactory were from four individuals.</p>	<p>John Stimac was responsible for the assessment and rubric. Results will be shared with other Geology Program faculty and the rest of the department.</p>

## PART TWO

Describe what your program’s assessment accomplishments since your last report was submitted. Discuss ways in which you have responded to the CASA Director’s comments on last year’s report or simply describe what assessment work was initiated, continued, or completed.

Additional work needs to be done under the expectation classification using primary trait analysis, i.e., specific standards need to be designed for our expectations.

With respect to how results will be used, we have attempted to put in place a method in which feedback is shared with fellow faculty in the program and the department as a whole. It is recognized that additional work needs to be done in this area in order to bring the level up.

We also need to get more uniform involvement of all program faculty in assessment.

## PART THREE

Summarize changes and improvements in **curriculum, instruction, and learning** that have resulted from the implementation of your assessment program. How have you used the data? What have you learned? In light of what you have learned through your assessment efforts this year and in past years, what are your plans for the future?

Additional data will be collected with the implementation of an alumni survey. After consultation with the Alumni Foundation, the Committee for the Assessment of Student Learning (CASL), and the Center for Academic Support and Achievement (CASA), surveys will be

mailed early fall 2005 and collect early spring 2006. Initial surveys will go out to graduates in three stages: those who have graduated more than 20 years ago; those who graduate less than 20, but more than five years ago; and those who graduated in the last academic year. The most recent graduates are being surveyed in order to gain information about the program itself – which courses they took, why they took them, etc. Graduates between five and twenty years will be surveyed in order to determine how well prepared they were for either graduate school or jobs based on the program. Alumni who graduated more than 20 years ago will be asked how the program helped them in their careers and what changes, as senior level administration in their organizations, they see the discipline moving towards.

## ADDENDUM

Table 1. Entrance versus Exit Examination Results in ESC/GEL 1300G, GEL 1430G, GEL 3430, GEL 3440, and GEL 3470.

Course	Number of students	Initial results, %	Final Results, %	Percentage change
ESC/GEL 1300G	108	51.85	75.93	+24.07
GEL 1430G	9	55.56	77.78	+22.22
GEL 3430	5	60.00	80.00	+20.00
GEL 3440	8	62.50	87.50	+25.00
GEL 3470	8	60.00	80.00	+20.00

Table 2. Results of Unexpected Questions Given to Students in GEL 3430, GEL 3440, and GEL 3470.

Course	Situation #1		Situation #2		Situation #3		Net change
	Number	% passing	Initial	% change	Initial	% change	
GEL 3430 (n=5)	1	20.00	2	40.00	3	60.00	+ 40.00
GEL 3440 (n=8)	2	25.00	4	50.00	6	75.00	+ 50.00
GEL 3470 (n=8)	2	25.00	4	50.00	7	87.50	+ 62.50

Comment: Understanding why students continued to have such a difficult time with the questions in the GEL 3430, Structural Geology, course may have to do with how students visualize three dimensional material, the basis of structural geology, in a two dimensional world. It has been shown, e.g., see <http://www.psych.ucsb.edu/~hegarty/>, that students differ in their ability to “think spatially” which limits their ability to imagine three dimensional objects, manipulate spatial representations, and infer dynamic processes from static structures.