Undergraduate Program-Specific Student Learning Outcome and Success Annual Report

I. Program Information

Program/Department: Earth and Geographic Sciences
Department Chair: Elizabeth Gordon
Department Assessment Committee Contact: Elizabeth Gordon

II. Program-Specific Student Learning Outcomes (Educational Objectives) Assessed During This Last Academic Year

List ALL Program-Specific SLOs first, and the assessment timeline (annual or bi-annual) for assessing each program SLO.

	Program SLO	Expected Timing of assessment (annual, semester, bi-annual, etc.)
1	Students will be effective communicators of scientific information in written, oral, graphical, and spatial forms.	annual
2	Understand the nature and ethical principles of scientific inquiry, including experimental design, implementation, and interpretation of scientific data in the context of earth science investigations.	annual
3	Apply principles from complementary disciplines (mathematics, physics, chemistry, and biology) to solve earth science problems	Bi-annual
4	Describe what it means to study Earth as a system, including Earth-sun relations and relationships among Earth's subsystems	annual
5	Be familiar with the overall structure and composition of the Earth system	annual
6	Understand processes that form Earth materials and shape the landscape.	Bi-annual
7	Recognize the enormity of geological time and identify major evolutionary events since Earth's formation.	Bi-annual
8	Develop a scientific understanding of interactions between humans and Earth, including geological hazards, global environmental issues, and use and conservation of Earth's resources.	Bi-annual

III. SLO Assessment

Using the table below, list and briefly describe the direct methods used to collect information assessing whether students are learning the core sets of knowledge (K), skills (S) and attitudes (A) identified as essential.

Dept. SLO #	Assessment description (exam, observation, national standardized exam, oral presentation with rubric, etc.)	When assessment was administered in student program (internship, 4th year, 1st year, etc.)	To which students were assessments administered (all, only a sample, etc.)
1	Manuscript, oral presentation, GIS project	Variable, usually 3 & 4	All
2	No reliable assessment yet identified		
3	No reliable assessment yet identified		
4	Exam questions	Variable, usually 1-2	all
5	Exam questions	Variable	all
6	Exam questions	Usually 3-4	All in Geomorphology
7	Exam questions	Variable	All in historical
8	Exam questions, essays	Variable	all

IV. Summary of Findings: Briefly summarize the results of the assessments and how do these compare to the goals you have set?

Other than GPA, what data/ evidence is used to determine that graduates have achieved the stated outcomes for the degree? (e.g., capstone course, portfolio review, licensure examination)	**Who interprets the evidence? What is the process? (e.g. annually by the curriculum committee)**	**What changes have been made as a result of using the data/evidence?**
Manuscript in upper level course	Ideally: annual by curriculum committee Reality: course instructor	none
Presentation in upper level course or Undergrad Research Conf	Ideally: annual by curriculum committee Reality: course instructor	none
GIS final project	Course instructor	Modified prerequisite for course a couple of years ago
Content objectives evaluated by exam questions, usually on the final; essays	Course instructor	Modified curriculum

V. SSC Data

Indicate a student success performance measure(s) that the department identified as a key measure that it wants to improve. Freshman retention, bottleneck courses, graduation rates, at risk student retention etc.

Student Success Measure (data point from SSC)	Rationale for selection	Planned or Implemented Intervention	Current score/ Target Score

VI. Phase I Data

Indicate department success performance measure(s) that the department identified as a key measure that it wants to improve (from phase 1 data).

Number of graduates, number of majors, credit production, substitutions etc.

Department Performance Measure (data point from Phase 1)	**Rationale for selection**	**Planned or Implemented Intervention**	**Current score/ Target Score**
Number of majors	The number of majors is too low for ensuring upper level courses run	Modify name of major and curriculum requirements	**32/50**

VII. Activities and Adjustments to/Deviation from the Department Assessment Plan

Describe any changes in the assessment plan including new SLOs, new assessments.

We modified the name of the major and curriculum, effective Fall 2017. The new objectives and SLOs based on the new curriculum are as follows:

Students who earn a major in Environmental and Earth Science will demonstrate a scientific understanding of how the Earth operates as a system and how humans interact with their environment, including natural hazards and use of Earth's resources. They will be able to distinguish between science and non-science, back up arguments with quantitative evidence, communicate their ideas effectively, and explain the necessity and characteristics of an interdisciplinary approach to solving environmental issues.

Environmental and earth science students will:

- Be effective communicators of scientific information in written, oral, graphical, and spatial forms.
- Use the scientific process, including experimental design, analysis and critical evaluation of information, and integration of evidence from relevant sources, in the context of environmental investigations.
- Apply an interdisciplinary approach to analyze and propose solutions to environmental science problems.
- Describe the complex interactions between humans and their environment, including geological hazards, air and water pollution, global environmental issues, and use and conservation of Earth's resources.

Students will achieve these objectives through developing essential skills and mastery of relevant content knowledge, as outlined below.

I. Skills

A. Communication - Students will communicate through written and oral expression with clarity, logical organization, and use of scientific evidence to support their ideas.

B. Scientific Inquiry - Students will:

i. Gather, organize, interpret, and report scientific data in the context of environmental science investigations.

ii. Critically and logically analyze competing ideas, and distinguish between scientific and non-scientific approaches to solving problems.

iii. Integrate principles of earth science, physics, chemistry, and biology to answer environmental science questions.

iv. Describe ethical principles related to scientific inquiry and use of resources.

C. Quantitative, analytical, and mapping skills

i. Apply mathematical principles to quantitatively interpret geoscience data.

ii. Use common software (e.g., Excel) to organize and graphically present data.

iii. Conduct spatial analysis in a GIS environment

II. Content knowledge

A. Earth as a system

Students will:

i. describe relationships among lithosphere, atmosphere, hydrosphere, and biosphere

ii. explain Earth-sun relationships, including reasons for seasons

iii. illustrate and discuss energy transfer and element cycling in the Earth system, such as Earth's energy budget, atmospheric composition and circulation, ocean circulation, and the carbon cycle.

B. Earth Materials and Structure: Students will describe the structure and composition of Earth's interior, surface, and atmosphere, processes of mineral and rock formation, and characteristics of different types of minerals and rocks

C. Earth System Processes

Students will discuss constructional forces that have shaped Earth's surface (e.g., plate tectonics), theories and evidence of crustal movements, and the effects of crustal movements on Earth's landscape; erosional-depositional processes that change the earth’s surface (e.g., weathering, erosion); and describe processes by which water moves on, above, and beneath Earth’s surface

D. Societal significance and human stewardship

Students will discuss society's dependence on Earth resources (e.g., mineral, rock resources, soil, and water resources; fossil fuels), explain natural hazards related to earth system processes, and evaluate the effect of human activity on Earth's natural processes (e.g., global warming, ozone depletion, air pollution, water pollution)