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CURRICULUM AND PROGRAM LEARNING OUTCOMES MAPPING TO ENHANCE ASSESSMENT

ARCHEAN to Anthropocene — the past is the key to the future

Required Core Courses

Disciplinary Courses Required for the Major

Disciplinary Electives in the Major

Course Activities

Grouped Program Learning Outcomes

BACHELOR OF SCIENCE IN GEOLOGY PROGRAM LEARNING OUTCOMES	CORE COURSES Core Area			COURSES REQUIRED FOR THE MAJOR									DISCIPLINARY ELECTIVES IN THE MAJOR								
CORE AND REQUIRED COURSES	D1, BS	D1, BS	D1, BS	BS	BS	BS	BS	BS	BS	BS	BS	BS	BS								
ACTIVITIES	GEOL 1110 Earth Lab	GEOL 1121 Introduction to the Earth	GEOL 1122 General Historical Geology	GEOL 3520 Field Methods	GEOL 3541 Mineralogy	GEOL 3542 Petrology and Petrography	GEOL 4120 Introduction to Research	GEOL 4610 Senior Seminar	GEOL 4820 Senior Thesis Research	GEOL 5142 Stratigraphy and Sedimentation	GEOL 5440 Structural Geology	OFF CAMPUS Field Geology	GEOL 3741 Remote Sensing	GEOL 4530 Tectonics	GEOL 5131 Economic Mineralogy	GEOL 5132 Regional Field Geology	GEOL 5141 Paleontology	GEOL 5431 Coastal Geology	GEOL 5530 Geomorph-ology	GEOL 5541 Hydrogeology	GEOL 5542 Advanced Hydrogeology
Computer Methods													ERDAS								
Writing Assignment				Reports	Type of Assignment		Term Paper	Proposal	Thesis	Term Paper		Reports	Term Paper	Major Software			Term Paper		Term Paper		Term Paper
Poster Presentation					Poster or	Poster									Poster or						
Oral Presentation		Lab Time			Oral		Oral	Oral						Oral	Oral	Oral			Oral	Oral	
Group Projects				Group	Group		Group				Group	Group	Group	Group					Group	Group	Group
Laboratory	2 hrs/week		3 hrs/week	4 hrs/week	4 hrs/week	4 hrs/week	Scale of Trip		Variable	3 hrs/week	4 hrs/week		4 hrs/week		3 hrs/week		3 hrs/week	2 hrs/week	2 hrs/week	3 hrs/week	4 hrs/week
Field Work	Local			Local	Local	Regional				Regional	Regional	National		National	National	National	Regional	Regional	Local	Local	Local
Discipline Specific Knowledge																					
1. Graduates will be able to identify common Earth materials and interpret their composition, origin, and uses.	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Considered	*Strongly Emphasized*	Strongly Emphasized	Emphasized	Emphasized	Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Considered	Emphasized	Strongly Emphasized	Strongly Emphasized	Considered	Emphasized	Considered	Emphasized	Emphasized
2. Graduates will be able to describe the processes operating at and beneath the Earth's surface, how those processes create the Earth's landscape, and how humans affect and are affected by the processes.	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Considered	Considered	Strongly Emphasized	Emphasized	Emphasized	Emphasized	Strongly Emphasized	*Strongly Emphasized*	Strongly Emphasized	Considered	Strongly Emphasized	Considered	Strongly Emphasized	Considered	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized
3. Graduates will be able to outline the broad physical and biological history of the planet and the evidence for that history.	Emphasized	Considered	Strongly Emphasized	Not Considered	Considered	Not Considered	Emphasized	Emphasized	Emphasized	*Strongly Emphasized*	Emphasized	Strongly Emphasized	Not Considered	Strongly Emphasized	Considered	Strongly Emphasized	Strongly Emphasized	Emphasized	Considered	Not Considered	Not Considered
4. Graduates will be able to outline the regional geology of the Southeastern United States and North America.	Considered	Considered	Emphasized	Emphasized	Emphasized	Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	*Strongly Emphasized*	Emphasized	Strongly Emphasized	Considered	Strongly Emphasized	Emphasized	Strongly Emphasized	Emphasized	Strongly Emphasized	Emphasized	Emphasized	Emphasized
Problem-Solving Skills																					
5. Graduates will be able to apply physics, chemistry, biology, and mathematics concepts to the study of the Earth's evolution and Earth Systems.	Emphasized	Emphasized	Strongly Emphasized	Considered	Strongly Emphasized	*Strongly Emphasized*	Considered	Considered	Emphasized	Strongly Emphasized	Strongly Emphasized	Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Considered	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized
6. Graduates will be able to use specific skills (e.g., map reading, field methods and observations, laboratory methods for analysis, image processing) to interpret geological materials, history, and features.	Strongly Emphasized	Emphasized	Considered	*Strongly Emphasized*	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized
7. Graduates will be able to formulate and complete a program of independent research under the direction of the faculty.	Not Considered	Not Considered	Not Considered	Considered	Considered	Considered	Strongly Emphasized	Strongly Emphasized	*Strongly Emphasized*	Considered	Considered	Strongly Emphasized	Considered	Considered	Considered	Considered	Considered	Considered	Considered	Considered	Considered
Communication Skills																					
8. Graduates will be able to evaluate critically fundamental Earth science literature and spatial data (e.g., photographs, maps, remotely sensed images).	Strongly Emphasized	Considered	Not Considered	Strongly Emphasized	Considered	Strongly Emphasized	Strongly Emphasized	*Strongly Emphasized*	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Considered	Strongly Emphasized	Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized
9. Graduates will be able to present geological information clearly in written, graphic, and oral forms.	Considered	Considered	Not Considered	Strongly Emphasized	Emphasized	Strongly Emphasized	*Strongly Emphasized*	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Emphasized	Considered	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized
10. Graduates will be able to articulate the benefits and responsibilities of working as a member of a team.	Strongly Emphasized	Not Considered	Strongly Emphasized	Strongly Emphasized	Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Emphasized	*Strongly Emphasized*	Strongly Emphasized	Emphasized	Emphasized	Strongly Emphasized	Strongly Emphasized	Strongly Emphasized	Emphasized	Emphasized	Emphasized

Outcome Checking

Matching course content with outcomes: If outcomes are frequently "Not Considered" or seldom "Strongly Emphasized" the outcome should either receive greater emphasis or considered for revision or elimination.

ABSTRACT

Matrix mapping of program learning outcomes and course activities provides a rich graphical portrait of program content and can be used as a starting point for program assessment in the geosciences and other disciplines. The form presented here places program learning outcomes (PLOs) in the left-hand column of the matrix and groups them by content areas, e.g., discipline specific knowledge, problem solving skills, and communication skills. Because every PLO will require assessment by one or more techniques, outcomes should be generalized to keep their number, and therefore the assessment effort, reasonable. Many programs have 10-12 PLOs.

The other columns in the matrix are for information about the geoscience courses used in the major. Core courses (typically physical and historical geology) are arrayed first, followed by required courses, and then electives (both in course number sequence). The matrix also includes rows for indicating the types of activities that occur during the courses. Instructors for the courses complete the matrix by indicating: 1) the amount of emphasis placed on each of the PLOs during the course (e.g., strongly emphasized, emphasized, considered, and not considered) and 2) the types of activities that occur during the course such as writing assignments, poster or oral presentations, group projects, fieldwork, and computer methods.

When completed the matrix serves as a map that can be used to determine the courses in which assessment of each of the PLOs will occur. Most often this will be a required course in which the PLO is "strongly emphasized." If a PLO is "not considered" in several required courses, the learning outcome may need to be revised, deleted, or the incorporated into additional courses. Similarly, if important course activities are found to be fewer than desired, new activities can be incorporated into appropriate courses.

The matrix produces a synoptic view of a program's goals and where and how the program's learning objectives are assessed. Furthermore, the matrix has proven an effective means of conveying this information to institutional assessment officers, accrediting agencies, and institutional decision makers.

Outcome Emphasis

The emphasis given to each learning outcome is color coded. The emphasis is determined by the instructors and, ideally, linked to definitions of the terms.

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Outcome Assessment

Assessment occurs in courses that are required and in which the outcome is strongly emphasized.

Assessment

Program Learning Outcome	Assess-ment Course	Assessment-Course Learning Outcomes	Assessment Instrument Description	Rubric	Implementation
Graduates will be able to describe the processes operating at and beneath the Earth's surface, how those processes create the Earth's landscape, and how humans affect and are	GEOL 5440 Structural Geology This course is required of students in the BS program.	1) Distinguish primary structures from secondary structures. 2) Recognize and describe, using standard terminology, the major tectonic structures (faults, fractures, foliations and lineations). 3) Know origins of structures and their implications for the geologic history of their terranes. 4) Use appropriate techniques of descriptive geometry to predict the subsurface geology of an area. 5) Construct and interpret geologic cross sections. 6) Plot, read, and interpret structural data presented in stereo-net format. 7) Recognize geologic structures in the field. 8) Synthesize structural data and write a report involving structural interpretation.	Basics of Geology Pre-instruction and post-instruction tests that evaluate student recognition of major tectonic structures and associated plate tectonic settings. Students also analyze geologic data to construct a cross section given a set of surface data	Basics Pre-Tests Final Evaluations: Excellent: 90% or better on individual scores Good: 80-90% on individual scores Acceptable: 70-80% on individual scores Poor: Less than 70%	Timing: GEOL 5440 is taught in the Fall Semester of even numbered years (2010, 2012, etc.). The assessment will be conducted every time the course is taught. Responsibility for Assessment: The faculty member assigned to teach GEOL 5440 will be responsible for conducting the assessment and compiling the results. Analysis: The assessment data will be analyzed by the Department's Assessment Committee and presented to the faculty for discussion during the following semester.

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