University of Houston-Downtown

Course Prefix, Number, and Title: GEOL 1307: Planet Earth

Credits/Lecture/Lab Hours: 3/2/2

Foundational Component Area: Life and Physical Sciences

Prerequisites: None
Co-requisites: None
Course Description: An integrated lecture-laboratory approach to historical geology for non-science majors that will employ hand specimen and other techniques for the identification of fossils and will include major controversies involving evolution, as well as, discussion of the origin of life and co-evolution of our planet and life on it. Exercises will teach principles of structure geology, sequence of events, fundamental stratigraphic concepts and graphic correlation. These topics will be united in interpretation of geologic maps and their application to human culture.

TCCNS Number: GEOL 1402

Demonstration of Core Objectives within the Course:

Assigned Core Objective	Learning Outcome Students will be able to:	Instructional strategy or content used to achieve the outcome	Method by which students' mastery of this outcome will be evaluated
Critical Thinking Empirical & Quantitative Reasoning	Utilize scientific processes to identify questions pertaining to natural phenomena.	**Evidence for Plate Tectonics** – Students will use simple mathematics to demonstrate that the continents of South America and Africa are moving apart, and to get a sense of the time required for continents to migrate. (Same exercise as in GEOL 1307 but this exercise is relevant to both classes.) **Stratigraphic Cross-Sections** – Students are given well-log information, including depths, fossil assemblages, rock types, and formation thicknesses. They then construct a stratigraphic cross-section on graph paper and make	Students will work in pairs on a "Plate Tectonics" worksheet at the beginning of the semester (1st or 2nd day of class), to correctly calculate the rate at which South America and Africa are currently moving away from each other. This exercise allows students to appreciate geologic time, and the great time spans required for the assembly and disassembly of continents. Students' results will be evaluated on the basis of: 1) completeness of the cross-section, and 2) interpretations

		interpretations about the subsurface geology. Students will gain an appreciation for graphic correlations using fossils and rock types.	of subsurface geology. Owing to the work required, this exercise is worth three lab grades.
Critical Thinking Empirical & Quantitative Reasoning	Utilize scientific processes to develop hypotheses, collect and analyze data using quantitative and qualitative measures.	**Evidence for Plate Tectonics** – Students will use simple mathematics to demonstrate that the continents of South America and Africa are moving apart, and to get a sense of the time required for continents to migrate. **Understanding geologic time using numbers** – Students are asked to contemplate large numbers and to calculate, for example, how many days, months, or years would be represented by one million seconds and by one billion seconds. Students gain an appreciation for the differences between orders of magnitude and the large numbers commonly used in historical geology.	Students will work in pairs on a "Plate Tectonics" worksheet at the beginning of the semester (1st or 2nd day of class), to calculate the rate at which South America and Africa are currently moving away from each other. This exercise allows students to appreciate geologic time, and the great time spans required for the assembly and disassembly of continents. Students work in small groups on the calculations. Their results will be evaluated in class, and will serve as a talking point for a class-wide discussion on the geologic time scale.
Critical Thinking Empirical & Quantitative Reasoning Communication	Utilize scientific processes to effectively communicate the analysis and results using written, oral and visual communication.	Students will work together in groups to analyze and give a presentation on a geologic time period. The presentation will include an oral and visual component.	Students will give oral PowerPoint presentations in laboratory on a related topic assigned by the instructor. It will be graded for both scientific and communication quality using a rubric. There will be written communication in the worksheets turned in after lab exercises and the lab exams will be both one word and short answer.

Teamwork	Collaborate in the evaluation of the quality of scientific evidence from multiple perspectives toward the goal of reaching a shared objective.	Students will work together on lab exercises and on the geologic time presentations.	Students' understanding of geological concepts will evaluated on the basis of the final grade they get on worksheets, assignments, exams. Laboratory worksheets and assignments will require students to work together in groups to get at the most accurate answers.

Additional Course Outcomes:

- to understand the rock cycle and to be able to identify common minerals and rocks using their physical properties,
- to understand the processes by which the common rocks are formed,
- to explain how rocks are weathered and eroded and to understand the importance of these processes,
- to obtain a working knowledge of how to read and interpret topographic and geologic maps,
- to recognize the geomorphologic features produced by gravity transfer, running water, ground water, glaciers, wind, waves, and currents,
- to be able to identify geologic structures, such as anticlines, synclines, faults, and unconformities, and to understand their significance,
- to develop a thorough understanding of the theory of plate tectonics, the kinds of plate boundaries and their significance, and the development and destruction of plates,
- to describe the gross internal structure of the Earth,
- to relate earthquakes, volcanoes, fold belts, ocean floor topography, and magnetic data by means of plate tectonic models,
- to understand the evolution of the Earth in relation to the other planets and objects in our solar system.

Course Outline

Date	**Subject**	**Chapter**
Aug 27, 29	Earth as a Planet; Minerals and Mineral Identification	2
	Mineral Identification	*3*
Sept 3	**LABOR DAY – NO CLASSES**	
Sept 5	*Mineral Identification*	
Sept 10, 12	Igneous Rocks, Volcanic and subvolcanic features	3, 4
	Igneous Rock Identification	*5*
Sept 17, 19	Sedimentary Rocks, Sedimentary processes	6
	Sedimentary Rock Identification	*6*
Sept 24, 26	Metamorphic Rocks, Metamorphic processes	7
	Metamorphic Rock Identification	*7*
Oct 1, 3	**EXAM 1**; Topographic Maps	*9*

	Topographic Maps	*9*
Oct 8, 10	Groundwater	10
	Groundwater processes	*12*
Oct 15, 17	Rivers & Streams	9
	Stream Processes	*11*
Oct 22, 24	Glaciers& Glacial Processes	11
	LAB EXAM	
Oct 29, 31	Deserts and Wind processes	12
	Desert processes	*14*
Nov 5, 7	Shoreline Processes	13
	Shoreline Processes	*15*
Nov 12, 14	Ocean Floor Geology; **EXAM 2**	16
	Geologic Structures	17
Nov 19	Geologic Structures	17
Nov 21-23	**THANKSGIVING – NO CLASSES**	
Nov 26, 28	*Geologic Structures*/Earthquakes and Seismic Activity	*10*, 14
	Seismic Activity	*16*
Dec 3, 5	Plate Tectonics	15, 17
	FINAL EXAM:	

Grading/Course Content which Demonstrates Student Achievement of Core Objectives:

Course Grade ***A: 90-100*** ***B: 80-89*** ***C: 70-79*** ***D: 60-69*** ***F: 0-59***

Summary of Course Exams, Quizzes, Activities, and Final	
Lab Exercises/Mastering Geology Exercises (group projects to interpret data	20%
Exams (2@20% each) (short answer/essay questions 25-40% of exam)	40%
Oral Discussion/Debates	Extra Credit
Lab Exam	20%
Final	20%
Total	100%