

## University of Houston-Downtown

**Course Prefix, Number, and Title:** GEOL 1308: History of the 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.	<p><b>Evidence for Plate Tectonics</b> – 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.)</p> <p><b>Stratigraphic Cross-Sections</b> – Students are given well-log information, including depths, fossil assemblages, rock types, and formation thicknesses. They then construct a</p>	<p>Students will work in pairs on a “Plate Tectonics” worksheet at the beginning of the semester (1<sup>st</sup> or 2<sup>nd</sup> 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.</p> <p>Students’ results will be evaluated on the basis of: 1)</p>

		stratigraphic cross-section on graph paper and make interpretations about the subsurface geology. Students will gain an appreciation for graphic correlations using fossils and rock types.	completeness of the cross-section, and 2) interpretations 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.	<b>Evidence for Plate Tectonics</b> – 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.  <b>Understanding geologic time using numbers</b> – 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 (1 <sup>st</sup> or 2 <sup>nd</sup> 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 be 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.
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**Additional Course Outcomes:** N/A

**Course Topics:**

- Intro; Review of Structural Geology & Plate Tectonics
- Relative Age Dating; Geologic Time Scale
- Absolute Age Dating (Geochronology)
- Formation of Solar System & Protoearth; the Hadean
- The Archean Eon
- The Proterozoic Eon
- The Paleozoic Era – Cambrian & Ordovician Periods
- The Paleozoic Era – Silurian & Devonian Periods
- The Paleozoic Era – Carboniferous & Permian Periods
- The Mesozoic Era – Triassic Period
- The Mesozoic Era – Jurassic Period
- The Mesozoic Era – Cretaceous Period
- The Cenozoic Era – Paleocene & Eocene Epochs
- The Cenozoic Era – Oligocene & Miocene Epochs
- The Cenozoic Era – Pliocene & Pleistocene Epochs

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

<i>Course Grade</i>	<i>A: 90-100</i>	<i>B: 80-89</i>	<i>C: 70-79</i>	<i>D: 60-69</i>	<i>F: 0-59</i>
<b>Summary of Course Exams, Quizzes, Activities, and Final</b>					
Lab Exercises/Mastering Geology Exercises (group projects to interpret data)	15%				
Exams (2@20% each)	40%				
Oral Presentation	5%				
Lab Exam	20%				
Final	20%				
Total	100%				