Historical Geology
GEOL 1050

Major competencies: Students will demonstrate proficiency on a broad range of topics relative to historical geology. These general proficiencies include the following:

(1.) Recognition of individual scholars and ideas that have helped form the field of historical geology; (2.) Integration of the methodologies and techniques of historical geology to explain the geological history of the earth; (3.) Application of principles of the geologic time scale in establishing the order of past events; (4.) Demonstration of the central importance of rocks, particularly sedimentary rocks, in reconstructing past geologic events, processes, and environments; (5.) utilization of an often inseparable relationship between geologic events and life in order to explain the development of life on the planet; (6.) Application of concepts in plate tectonics to past geologic events, such as mountain building, and to the distribution and development of life on the planet; (7.) Application of the "tools" of historical geology, including geologic maps, compasses, and the geologic time scale, to interpretation of past geologic occurrences; (8.) Ordering of fossils by accepted standards of palentology.

Teaching methods used: The teaching strategies used in any given semester may vary from instructor to instructor. The strategies will include, but not be limited to, lecture, audio visual/computer supplements, Power Point discussions, small-group problem solving, and field trips. Specific emphasis will be given to computer enhanced technologies, "hands-on" analysis of rocks, fossils, geologic maps, stratigraphic maps, and paleogeographic maps, and practice with compasses and other equipment in recording accurate field notes.

Administrative instructions: Attendance policies will vary by instructor. However, in all cases laboratory experience will be viewed as an integral part of the course. As such, lab attendance is mandatory and unapproved absences of more than 25% of lab meetings will result in a failing grade for the complete course. Regular class (lecture) attendance policy is left to the individual instructor.

Evaluation plan: The "target" grading percentages are shown below. However, these may vary according to the individual instructor.

Instrument	% of Final Grade
(1) Three written exams	65%
(2) Lab work with attendance	25%
(3) Lab exam or 2-4 quizzes	10%
(4) Extra credit projects at discretion of instructor	0-25%
(5) Subjective evaluation of participation in class activities/discussions	0-25%

Major Course Competencies:

I. Demonstrate plate tectonics as a unifying theme in physical geology.

Related Skills	Evaluation Method(s)	Teaching Strategy
1. Describe the dynamics of plate processes, origins, and activities.	Exam, class discussion	Lecture, CD-ROM, transparencies, video, Power Point
2. Describe resultant geologic features orogenesis.	Exam, class discussion	Lecture, Power Point
3. Relate plate movements to historical events and to major developments of life on earth.	Exam, class discussion	Lecture, film, Power Point

II. Demonstrate an ability to apply the general methodologies and techniques of historical geology in problem analysis.

Related Skills	Evaluation Method(s)	Teaching Strategy
1. Identify ideas, developments, and people of significance to the field of historical geology.	Exam, class discussion	Lecture, assigned reading, Power Point
2. Demonstrate the historical significance of rocks, especially sedimentary rocks, in reconstructing past geologic events and environments.	Exam, class discussion, lab exercises	Lecture, films, assigned reading, Power Point
3. Use the physical properties of sedimentary rock as indicators of past geologic events and environments.	Exam, class discussion, lab exercises	Lecture, field trip, assigned reading, Power Point

III. Apply the principles of physical stratigraphy to analysis of problems and historical reconstruction.

Related Skills	Evaluation Method(s)	Teaching Strategy
1. Demonstrate a knowledge of rock stratigraphic units and terminology.	Exam, lab exercises, class discussion	Lecture, lab manual, assigned reading, Power Point
2. Demonstrate a knowledge of various sedimentary environments.	Exam, lab exercises, class discussion	Lecture, videos, transparencies, Power Point
3. Construct lithofacies and paleogeo-. graphic maps for lithostratigraphic analysis	Lab exercises, class discussion	Lab exercises, assigned reading Power Point
4. Demonstrate an ability to use the geologic concepts of transgression, regression, and facies.	Exams, lab exercises	Lab exercises, assigned reading Power Point
5. Demonstrate an ability to correlate and interpret stratigraphic sequences.	Exams, lab exercises, field problems	Lab exercises, lecture, transparencies, Power Point

IV. Apply the principles of paleontology to an analysis and reconstruction of the history of life on earth.

	Related Skills	Evaluation Method(s)	Teaching Strategy
1.	Demonstrate an ability to identify different fossil groups and individual fossils.	Exam, lab exercises	Class discussion, lab exercises, assigned reading
2.	Describe strengths and weaknesses of the fossil record as an accurate portrayal of life on the earth.	Exam	Class discussion, lecture, assigned reading, Power Point
3.	Describe the different types of fossils and means of preservation.	Exam, lab exercises	Lecture, class discussion, lab Exercises, Power Point
4.	Demonstrate how fossils may be used as indicators of the environment.	Exam, lab exercises	Lecture, class discussion, lab Exercises, Power Point
5.	Apply major concepts, ecology and paleoecology to paleontology.	Exam, lab exercises	Lecture, class discussion,video lab exercises, Power Point
6.	Demonstrate the establishment and application of "index fossils."	Exam, lab exercises	Lecture, class discussion, lab exercises
7.	Demonstrate the use of fossil assemblages in age determination.	Exam, lab exercises	Class discussion, assigned reading, lecture, Power Point
8.	Demonstrate an ability to classify fossils according to the internationally accepted Linnean classification system.	Lab exercises	Lecture, lab exercises
9.	Relate the development of life on earth to macro-scale geologic events.	Exam	Lecture. assigned reading, videos, Power Point
10.	Apply modern concepts of evolution to an interpretation of the record of life on earth.	Class discussion, exam, lab exercise	Lecture, assigned reading, class discussion, Power Point

V. Demonstrate an understanding of geologic time and the ordering of geologic events.

	Related Skills	Evaluation Method(s)	Teaching Strategy
1.	Apply the time-related principles of uniformitarianism, original horizontality, superposition, lateral continuity, cross-cutting relations, components, and fossil succession to problems of ordering past geologic events.	Lab exercises, class discussion, exam	Lab exercises, assigned reading videos, Power Point
2.	Demonstrate a knowledge of unconformities as applied to reconstructing past geologic events.	Lab exercises, exam	Lab exercises, assigned reading lecture, Power Point
3.	Apply concepts of radiometric dating to analysis of sequences of geologic events.	Lab exercises, exam	Lecture, assigned reading, lab exercises, Power Point
4.	Demonstrate an understanding of the principles, terminology, and applications of the geologic time scale.	Exam, lab exercises, class problem-solving	Lecture, assigned reading, lab exercises, video, Power Point

VI. Apply the "tools" of historical geology to analyses of geologic problems.

	Related Skills	Evaluation Method(s)	Teaching Strategy
1.	Demonstrate the use of geologic maps.	Lab exercises	Lab exercises, class discussion, assigned reading, Power Point
2.	Demonstrate the use of a compass and Abney level.	Field exercise	Field demonstration/exercise
3.	Demonstrate the safe and proper use of a geologic pick / hammer in rock and fossil collecting.	Field exercise	Field exercise

VII. Demonstrate a knowledge of the earth as related to our solar system and the universe.

	Related Skills	Evaluation Method(s)	Teaching Strategy
1.	Describe various theories regarding formation and function of the universe, such as "red shift" and "big bang."	Exam, class discussion	Lecture, assigned reading, Power Point
2.	Describe current theories regarding the origin of the solar system, such as the Nebular and Protoplanet Hypotheses.	Exam, class discussion	Lecture, assigned reading
3.	Demonstrate an understanding regarding modern methods of data collection in space.	Exam, class discussion	Lecture, assigned reading
4.	Demonstrate a knowledge of lunar processes and characteristics of the earth's moon.	Exam, class discussion	Lecture, assigned reading

VIII. Demonstrate an understanding of the history of the earth as understood through the pooling of information from various subfields in historical geology, such as paleontology, stratigraphy, and paleoecology.

	Related Skills	Evaluation Method(s)	Teaching Strategy
1.	Describe the general geologic record as we know it from the beginning of the earth to the present, utilizing eras, periods, and epochs as portrayed by the geologic time scale.	Exam, class discussion	Lecture, assigned reading., video, Power Point
2.	Specify major events of continental movement, collision, and separation by geologic period.	Exam, class discussion	Lecture, assigned reading Power Point
3.	Specify major episodes of orogenesis by geologic period.	Exam, class discussion	Lecture, assigned reading Power Point
4.	Specify major episodes of transgression and regression, particularly in North America, by geologic time period.	Exam, class discussion	Lecture, assigned reading, video, Power Point
5.	Trace the origin and development of life on earth from earliest life forms to the present.	Exam, class discussion	Lecture, assigned reading, video, Power Point