GROSSMONT COLLEGE

COURSE OUTLINE OF RECORD

Curriculum Committee Approval: 04/26/2022

GCCCD Governing Board Approval: 06/14/2022

GEOLOGY 121 – EARTH HISTORY

1. Course Number Course Title Semester Units

GEOL 121 Earth History 4

Semester Hours

3 hours lecture: 48-54 hours96-108 outside-of-class hours144-162 total hours

1. Course Prerequisites

None

Corequisite

None

# Recommended Preparation

A “C” grade or higher or “Pass” in Geology 104 or 110 or equivalent

3. Catalog Description

This is a required course for geology majors and minors. The lecture portion will cover the geologic and tectonic development of earth and its importance to the evolution of life on this planet as evidenced in the fossil record. Laboratory work will include, but is not limited to, the detailed study of sedimentary petrology, stratigraphy, identification of fossil phyla, and local field investigations. Emphasis will be placed on the application of rock and fossil interpretations to the reconstruction of ancient environments and their evolution through geologic time.

4. Course Objectives

The student will:

1. List major plate tectonic events and the role of the supercontinent cycle in the development of planet earth geology, biology, and climate cycles, and in the advancement of ideas (such as catastrophism and uniformitarianism) in the science of geology.
2. Identify, and explain the formation of, a broad spectrum of samples in the sedimentary rock family and the fossil record.
3. Analyze and assemble the characteristics of sedimentary rocks and fossils to reconstruct plausible depositional and ecological environments.
4. Utilize stratigraphic principles, geologic dating methods, geologic maps, and the interpretation of the fossil record to decipher both global and local geologic history.
5. Assess the extent to which the geological evolution of earth has influenced its biological evolution, including extinctions.
6. Communicate complex course concepts effectively in both writing and diagrams.

5. Instructional Facilities

1. Standard lecture and laboratory classrooms.
2. Lecture and lab rooms should have audiovisual equipment for use with slides, videos, and internet access.
3. Appropriate geologic and tectonic maps should be available in the lecture room along with a geological time chart.
4. Laboratory facilities should accommodate performance of simple dry and wet chemical tests, and the storage of a representative study collection of rock and fossil samples.

6. Special Materials Required of Student

1. Access to the internet outside the classroom.
2. Electronic storage media
3. Appropriate attire for the field.

7. Course Content

The topics will include:

1. Historical development of important geological ideas and concepts from the 14th century until the present, including catastrophism, uniformitarianism, and actualism.
2. Plate tectonics with special emphasis on the supercontinent cycle, and the tectonic and geologic evolution of North America and of San Diego County.
3. The rock cycle and the role of earth materials, including igneous and sedimentary rocks in reconstructing paleogeographic environments.
4. Fossils, modes of fossilization, their classification, and the use of the fossil record to decipher the history of life on earth from its inception in the Precambrian to the present time, including theories on the origin, evolution, and extinction of life.
5. Geologic time and the various techniques for determining the sequence of geologic events, including relative and absolute dating.
6. The interpretation of sedimentary rock sequences and the application of stratigraphic principles.
7. Paleogeographic evolution of planet earth through the various units of geologic time, including the Hadean, Archean, Proterozoic, Paleozoic, Mesozoic, and Cenozoic.
8. Laboratory activities will include:

1) Identification and description of rock samples.

2) Identification of a selection of fossils according to the Linnaean Classification System and examination of modes of fossil preservation.

3) Interpretation of geologic maps, cross sections and stratigraphic columns.

4) Application of dating principles (relative and absolute) in the sequencing of geologic events.

5) Analysis of rocks, fossils, and geologic features and their application in the reconstruction of paleogeography.

6) Field observation and interpretation of local rock units and fossils.

8. Method of Instruction

1. Lecture and demonstrations.
2. Collaborative learning and group discussion.
3. Field study and observation.
4. Individualized instruction.
5. Online research and computer exercises.
6. Multimedia presentations.

9. Methods of Evaluating Student Performance

Final grade will be determined by student performance on two or more of the following:

1. Essay questions and objective exams or quizzes, including final exam.
2. Laboratory work and field exercises.
3. Final project/presentation based on observations and data obtained in the field and/or lab.
4. In-class activities and/or research projects and/or computer-based assignments may also be used (e.g., computer simulation showing the movement of Earth’s cratons over time relative to illustrating the Wilson Cycle)

10. Outside Class Assignments

1. Required reading in texts
2. Take-home exercises
3. Weekend field trip(s) and written field trip reports
4. Research for projects (e.g., visiting the San Diego Natural History Museum to compare and contrast the fossils being pulled out of the Pliocene-age San Diego Formation vs. the Eocene-age Friars Formation as an indicator of past environment-of-deposition).

11. Representative Texts

a. Representative Text(s):

Levin, H., and King, D.T. *The Earth Through Time*. Hoboken, N.J: John Wiley and Sons, Inc., 2016.

b. Supplementary texts and workbooks:

Handouts and lab exercises as assigned by the instructor.

Addendum: Student Learning Outcomes

Upon completion of this course, our students will be able to do the following:

1. Objectively analyze, evaluate, and practice scientific methods used to investigate the origin of earth and its evolution (both physically and biologically) through geologic time.
2. Use basic geologic and stratigraphic principles to explain the formation and evolution of geologic features.
3. Interpret past earth processes and rates of change in the context of plate tectonics and the Wilson Cycle, and assess how the same processes and/or rates of change may affect the future.