GEOL C106: EARTH SCIENCES FOR TEACHERS

Item	Value
Curriculum Committee Approval Date	10/06/2023
Top Code	191400 - Geology
Units	4 Total Units
Hours	108 Total Hours (Lecture Hours 54; Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)
Local General Education (GE)	• Area 5A Physical Sciences (CB1)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 5A Physical Science (5A)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 5A Physical Science (5A)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B1 Physical Science (B1) • CSU B3 Laboratory Activity (B3)

Course Description

An introduction to the essentials of Earth Science with a laboratory. Topics include the geosphere, atmosphere, hydrosphere, and solar system. This course focuses on the interactions between physical and chemical systems of the Earth such as the tectonic cycle, rock cycle, hydrologic cycle, weather and climate. Topics are aligned with the California State Science Standards for K-12 and will prepare future teachers to teach these subjects within the California Science Framework. Transfer Credit: CSU; UC: Credit Limitation: GEOL C105, C105L and GEOL C106 combined: maximum credit, 4 units. C-ID: GEOL 121.**C-ID:** GEOL 121.

Course Level Student Learning Outcome(s)

1. Use the scientific method to create and test hypotheses related to Earth-science problems.
2. Explain the basic principles and interactions of Earth's five spheres as they relate to the hydrologic cycle, rock cycle, plate tectonics, geologic time, weather, and climate, and how Earth changes over time as a result of these processes.
3. Explain the basic properties of minerals and rocks, and use them to identify representative physical samples.
4. Describe the evolution/formation of Earth and our solar system; explain the relationship of Earth to other planets, the Moon, and the Sun.

Course Objectives

- 1. Explain and apply the principles of the scientific method.
- 2. Demonstrate a fundamental understanding of and be able to apply concepts, principles and interactions of Earth?s systems including the Hydrologic Cycle, Rock Cycle, Plate Tectonics Cycle, Solar System, Geologic Time, and Weather and Climate.
- 3. Be able to explain basic properties of minerals and rocks and to identify representative physical samples.
- 4. Explain the processes that shape the Earth and how they change over geologic time.
- 5. Communicate complex course concepts effectively in writing and diagrams.

Lecture Content

Introduction What is Earth Science Introduction to the Scientific Method Earth's Five Spheres Earth Materials Minerals Igneous Rocks Sedimentary Rocks Metamorphic Rocks Internal Processes Earth's Interior Plate Tectonics Earthquakes Mountain Building and Structural Geology including Folds and Faults Surface Processes Streams Earth s History Geologic Time and Dating The Fossil Record and Evolution Geologic and Climate History Oceanography Ocean Floor Ocean and Coastal Processes - Currents, Tides, and Shorelines Meteorology and Climate Atmosphere and Weather Weather Patterns and Severe Weather Planetary Science and Astronomy The Solar System Formation of the Solar System

Lab Content

Introduction Using the Scientific Method Earth Materials Mineral Identification Igneous Rock Identification Sedimentary Rock Identification Metamorphic Rock Identification Internal Processes Plate Motion Identification and Calculation Earthquake Epicenter Location Geologic Feature Identification Surface Processes Stream Type Identification Stream Erosion and Deposition Earth s History Distinguishing Between Relative and Absolute Time Dating of Rock Units Using Principles of Relative Age Dating, Isotopic Age Dating, and the Fossil Record Oceanography Ocean Floor Feature Identification Coastal Feature Identification Investigation of Tides and Currents Meteorology and Climate Weather Prediction Climate Cateogory Investigation Planetary Science and Astronomy Planetary Feature Identification

Method(s) of Instruction

- Lecture (02)
- DE Online Lecture (02X)
- Lab (04)
- DE Online Lab (04X)

Instructional Techniques

Lecture, laboratory, potential field trips, computer-based assignments, written assignments, and reading.

Reading Assignments

The students shall, each week, read the following: Selections from the textbook or similar materials The introduction to each laboratory exercise Handouts given in class or provided electronically

Writing Assignments

The student, during the course of the semester, shall Write brief answers to questions in the lab exercises Write answers to questions provided

at the end of lessons Write answers to prompts provided and exchange findings with other classmates through in-class discussion or online discussion boards Use map reading skills and deductive reasoning to interpret topographic, geologic, and weather maps

Out-of-class Assignments

The student, during the course of the semester, shall Follow earthquake and weather activity at appropriate web sites Search for news articles that discuss earth science research and current discoveries and/or explorations Search for geologically relevant materials or experiences to report back on in class

Demonstration of Critical Thinking

The students shall, during the semester, undertake the following: From measurements taken and observations made from weather stations, perform weather predictions. Use the measuring of physical properties of minerals to identify known minerals. Identify unknown rocks by using the texture and observed mineralogy. Use data (earthquake, tidal, etc.) to draw conclusions about earth processes. Analyze satellite images, block diagrams, and geologic maps and draw proper conclusions.

Required Writing, Problem Solving, Skills Demonstration

Each week the student shall do one or more of the following: Write brief answers to questions in the lab exercises. Write answers to questions provided at the end of the lesson. Use skills learned to determine the characteristics exhibited by mineral and/or rock samples. Demonstrate understanding of a concept or skill learned using a written or oral (in-class or video-based) response.

Eligible Disciplines

Earth science: Master's degree in geology, geophysics, earth sciences, meteorology, oceanography, or paleontology OR bachelor's degree in geology AND master's degree in geography, physics, or geochemistry OR the equivalent. Master's degree required.

Textbooks Resources

1. Required Tarbuck, E.S.; Lutgens, F.; Tasa, D. Earth Science, 15th ed. New York: Pearson, 2017 Rationale: Legacy Text Legacy Textbook Transfer Data: Legacy Text 2. Required Marshak, S. Rauber, R.. Earth Science, 2 ed. W. W. Norton Company, 2020

Manuals Resources

1. Tarbuck, E.S.; Lutgens, F.; Tasa,D.; Pinzke, K.G. Lab Manual: Applications and Investigations in Earth Science, Pearson , 02-05-2018

Other Resources

1. Coastline Library