Number: GEOL G110  
TITLE: Physical Geology

ORIGINATOR: Bud Benneman  
EFF TERM: Fall 2011

FORMERLY KNOWN AS:  
DATE OF OUTLINE/REVIEW: 05-01-2018

CROSS LISTED COURSE:  
TOP NO: 1914.00  
CID: GEOL 101

SEMESTER UNITS: 4.0
HRS LEC: 54.0  
HRS LAB: 54.0  
HRS OTHER: 0.0
CONTACT HRS TOTAL: 108.0
STUDY NON-CONTACT HRS RECOMMENDED: 108.0

CATALOG DESCRIPTION:
An introductory survey of physical geology and the scientific method. This course includes the internal and surface processes responsible for shaping the Earth and formation of natural resources and geologic landscapes. Past and present geologic processes such as mountain building, climate change, and the evolution of life in the fossil record will be covered. Resource extraction, identification of minerals and rocks with the natural processes are covered in lecture and laboratory work. Recognition of geologic hazards both natural and human caused. Utilizing Geographical Information Systems (GIS), maps, digital satellite images are included in laboratory work.

JUSTIFICATION FOR COURSE:

PREREQUISITES:
COREQUISITES:
ADVISORIES:
ASSIGNED DISCIPLINES:  
Earth science

MATERIAL FEE: Yes [ ] No [X] Amount: $0.00
CREDIT STATUS: Noncredit [ ] Credit - Degree Applicable [X] Credit - Not Degree Applicable [ ]
GRADING POLICY: Pass/No Pass [ ] Standard Letter [X] Not Graded [ ] Satisfactory Progress [ ]
OPEN ENTRY/OPEN EXIT: Yes [ ] No [X]
TRANSFER STATUS: CSU Transferable[ ] UC/CSU Transferable[X] Not Transferable[ ]
BASIC SKILLS STATUS: Yes [ ] No [X]  
LEVELS BELOW TRANSFER: Not Applicable

CALIFORNIA CLASSIFICATION CODES: Y - Not Applicable

NON CREDIT COURSE CATEGORY: Y - Not applicable, Credit Course

OCCUPATIONAL (SAM) CODE: E

REPEATABLE ACCORDING TO STATE GUIDELINES: No [X] Yes [ ] NUMBER REPEATS:

REQUIRED FOR DEGREE OR CERTIFICATE: No [ ] Yes [X]
Anthropology(Associate in Arts for Transfer)
Elementary Teacher Education(Associate in Arts for Transfer)
Elementary Teacher Education(Associate in Arts for Transfer)
Geography(Associate in Arts for Transfer)
Geography(Associate in Arts for Transfer)
Geology(Associate in Science for Transfer)
Liberal Arts: Emphasis in Science(Associate in Arts)
Liberal Studies for Elementary Education(Associate in Arts)
GE AND TRANSFER REQUIREMENTS MET:
IGETC Area 5: Physical and Biological Sciences
   5A: Physical Science
   5C: Laboratory Activity
CSU GE Area B: Scientific Inquiry and Quantitative Reasoning
   B1 - Physical Science
   B3 - Laboratory Sciences

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. Use the scientific method to understand natural processes on Earth. Identify surface processes operating on the Earth and their products; those internal processes operating on Earth; the correlated process with phenomenon such as earthquakes, faults, volcanism, and plate tectonics; and the manner in which inorganic matter occurs in nature from atoms through minerals and into rocks.

2. Describe the ways in which geology is used in society; the origin and occurrence of the Earth's valuable mineral, rock, and fossil fuels resources; and how the Earth's processes and materials affect human life as geological hazards.

3. Identify and name unknown minerals and rocks through employing physical properties such as color, hardness, cleavage, streak, and special properties. Understand the differences between igneous, sedimentary, and metamorphic rocks. Distinguish between rocks based on mineral composition and texture.

4. Use Geographical Information Systems (GIS). Examine topographic and geologic maps. Identify locations, distances, and elevations on standard U.S.G.S. quadrangle maps. Be able to draw a topographic profile and understand slope and gradient of terrain. Identify geologic structures on geologic maps and understand dip and strike of geological units.

5. Identify landforms resulting from glaciers and glaciation periods. Understand the continuous aspects of climate change throughout the earth's history; climate with and without glaciers and ice caps. Recognize how warm and cold climates result in formation of unique landscapes, fossil fuel deposits, and fossil fauna on Earth.

COURSE OBJECTIVES:

1. Explain how the Earth's processes and materials affect our lives.
2. Explore those surface processes operating on the Earth and their products.
3. Identify the internal processes operating on Earth and correlate these processes with phenomenon such as earthquakes, volcanism and plate tectonics.
4. Outline the manner in which inorganic matter occurs in nature, from the atom through the formation of minerals and then how minerals form rocks.
5. Understand the ways in which geology is used in society and identify geologic hazards.
6. Describe the origin and occurrence of the Earth's valuable mineral and fossil fuel resources.
7. Determine the names of minerals by measuring various physical properties (i.e. hardness, cleavage, luster and crystal form). Identify the three rock types by an examination of their textures, structures, colors, and mineralogies.
8. Interpret topographic maps, draw topographic profiles and 'read' standard U.S.G.S. quadrangle maps. Determine Strike and dip of topographic features, from geologic maps, identify structures (faults, folds) present, construct geologic cross sections and establish the sequence of geologic events that produced the current geologic and topographic setting.

COURSE CONTENT:
LECTURE CONTENT:

A. Introduction to Earth Science, the scientific method, and the study of minerals, rocks, and geologic processes
B. Understand Geologic time and the evolution of the Earth’s History
   1. Geologic Time Scale
   2. The fossil record and the evolution of life
C. Plate tectonics the unifying theory
   1. Plate Tectonic Model and the driving forces responsible for plate movement
   2. Types of plate boundaries
D. Atoms and elements the building blocks for minerals
E. Mineral properties and mineral identification
   1. Specific and special properties of minerals
   2. Specific and special properties of inorganic compounds
F. Rocks
   1. Igneous rocks and processes, including volcanism
   2. Sedimentary rocks and processes of weathering
   3. Metamorphic rocks and processes heat and pressure
G. Economically important materials
   1. Ore deposits
   2. Fossil fuels
H. Surface Processes and Products of natural Earth forces
   1. Streams and groundwater
   2. Glaciers and climate change, warmer and colder and paleoclimatic studies
   3. Wind and water with both erosion and deposition
   4. Landslides and mass wasting
I. Internal Processes
   1. Earthquakes and Earth's interior relating to plate tectonics
   2. Mechanics
   3. Evidence- new and old rocks and formations
   4. Structural Geology
   5. Faulting types and folding forming anticlines and synclines
J. Isostasy and mountain building
   1. Geologic forces: tension and compression
   2. Major mountain building events
   3. Orogenic mountain belts and the history of mountain belts
K. Ocean basins and the modern coast line
   1. Waves, currents, tides erosion and deposition of sediments

LABORATORY CONTENT:

Lab will include the actual employement of the scientific method with the identification of minerals, igneous, sedimentary, and metamorphic rocks. Lab time will be used to study topographic maps and other Geographical Information Systems (GIS) such as satellite photographs and geological maps. Lab portions will be used to conduct experiments using water flow hydrogeology, structural models, and earthquake epicenter location. The lab portion of this course will expand on concepts that are discussed in lecture as theory. Lecture topics are both reinforced and applied in a hands on laboratory setting.

METHODS OF INSTRUCTION:

A. Lecture:
B. Lab:
C. Independent Study:

INSTRUCTIONAL TECHNIQUES:
COURSE ASSIGNMENTS:

Reading Assignments

Textbook
Websites
Lab manual

Out-of-class Assignments

none listed

Writing Assignments

1. Write brief answers to questions in the lab manual and study guide, or complete a pre-lab set of questions.
2. Write answers to questions at the end of chapters covered each week.
3. Use deductive reasoning along with measured properties to identify minerals and rocks.
4. Use map reading skills to interpret geologic and topographic maps.

METHODS OF STUDENT EVALUATION:

Midterm Exam
Final Exam
Short Quizzes
Written Assignments
Objective Examinations
Report
Problem Solving Exercises

Demonstration of Critical Thinking:

Students will carry out critical thinking in the form of: 1. Measuring physical properties of minerals and using these properties to identify minerals. 2. Examination of rock textures and mineralogies with hand lenses/microscopes and identifying or classifying unknown rocks. 3. Analyzing topographic maps from principles learned in map exercises. 4. Analyzing geologic structures present from the map patterns formed on the surface and principles learned in class. 5. Outlining the geologic history, or sequence of events, by means of using absolute and relative geologic dating principles with given geologic maps and cross sections.

Required Writing, Problem Solving, Skills Demonstration:

Each week, the student shall do one or more of the following: 1. Write brief answers to questions in the lab manual and study guide. 2. Write answers to questions at the end of chapters covered each week. 3. Use deductive reasoning along with measured properties to identify minerals and rocks. 4. Use map reading skills to interpret geologic and topographic maps.

TEXTS, READINGS, AND RESOURCES:

Texts:

Manuals:

LIBRARY:
Adequate library resources include:

Comments:

Attachments:

Attached Files