Cerro Coso College

Course Outline of Record Report

10/11/2021

GEOLC111 : Physical Geology

General Information

Author:	-
Course Code (CB01) :	GEOLC111
Course Title (CB02) :	Physical Geology
Department:	Science
Proposal Start:	Fall 2013
TOP Code (CB03) :	(1914.00) Geology
SAM Code (CB09) :	Non-occupational
Distance Education Approved:	Yes
Course Control Number (CB00) :	CCC000293116
Curriculum Committee Approval Date:	02/07/2014
Board of Trustees Approval Date:	03/06/2014
External Review Approval Date:	07/08/2014
Course Description:	This course covers the study of the earth as an integrated system of hydrologic, tectonic, atmospheric, and human processes, including the origin and evolution of continents, mountains, earth materials, oceans, and life forms. It also covers geologic hazards, such as earthquakes, floods, groundwater contamination, and global climate change. Laboratories are designed to complement and reinforce topics covered in the lecture and will apply geologic principles to local geologic and land use issues such as earthquake hazards, flash floods, and the evolution of landforms in eastern California.
Submission Type:	New Course
Author:	No value

Faculty Minimum Qualifications

Master Discipline Preferred:	• Physical Sciences
Alternate Master Discipline Preferred:	• Physical Sciences
Bachelors or Associates Discipline Preferred:	No value
Additional Bachelors or Associates Discipline Preferred:	No value

Course Development Options

Basic Skills Status (CB08)

Course is not a basic skills course.

Course Special Class Status (CB13)

Course is not a special class.

Grade Options

- Letter Grade Methods
- Pass/No Pass

Allow Students to Gain Credit by

Allowed Number of Retakes

Course Prior To College Level (CB21)

Allow Students to Gain Credit by Exam/Challenge

0

Not applicable.

Rationale For Credit By Exam/Challenge

No value

Retake Policy Description

Type:|Non-Repeatable Credit

Allow Students To Audit Course

Course Support Course Status (CB26)

No value

Associated Programs

Course is part of a program (CB24)

Associated Program	Award Type	Active
No value	No value	

Transferability & Gen. Ed. Options

Course General Education Status (CB25)

No value

Transferability

Transferable to both UC and CSU

Transferability Status

Approved

Cerro Coso General Education Requirements	Categories	Status	Approval Date	Comparable Course
Area 1.2	Natural Science Physical Sciences	Approved	No value	No Comparable Course defined.

CSU General Education Certification	Categories	Status	Approval Date	Comparable Course
Area B.1	Scientific Inquiry & Quantitative Reasoning Physical Sciences	Approved	No value	No Comparable Course defined.
Area B.3	Scientific Inquiry & Quantitative Reasoning Laboratory	Approved	No value	

Intersegmental General Education Transfer Curriculum	Categories	Status	Approval Date	Comparable Course
Area 5.A	Physical & Biological Sciences Physical Science	Approved	No value	No Comparable Course defined.

Units and Hours:

Summary

Minimum Credit Units (CB07)	4
Maximum Credit Units (CB06)	4
Total Course In-Class (Contact) Hours	108
Total Course Out-of-Class Hours	108
Total Student Learning Hours	216
Faculty Load	0

Credit / Non-Credit Options

Course Credit Status (CB04)

Credit - Degree Applicable

Course Non Credit Category (CB22)

Credit Course.

Non-Credit Characteristic

No Value

Course Classification Status (CB11)

Credit Course.

☐ Variable Credit Course

Funding Agency Category (CB23)

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

Weekly Student Hours

	In Class	Out of Classs
Lecture Hours	3	6
Laboratory Hours	3	0
Activity Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	0
Course In-Class (Contact) Hours	
Lecture	0
Laboratory	0
Activity	0
Total	108
Course Out-of-Class Hours	
Lecture	0
Laboratory	0
Activity	0
Total	108

Time Commitment Notes for Students

No value

Faculty Load

Extra Duties: 0

Faculty Load: 0

Units and Hours: - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Prerequisite

ENGLC070 - Introductory Composition

Students taking GEOL C111 are expected to be able to read the text book, understand written laboratory instructions and draw conclusions from multiple written data sources, as well as write coherent laboratory reports and answer short essay questions.

Entrance Skills

Entrance Skills	Description
No value	No value

Limitations on Enrollment

Limitations on Enrollment	Description
No value	No value

Specifications

Methods of Instruction

Methods of Instruction	Other
Rationale	Other Methods: Classroom lecture and discussion of all course content. Presentations utilizing transparencies, computer presentation, chalkboard, whiteboard and internet. Homework and in-class exercises relating to lecture topics.
Methods of Instruction	Problem Solving

Rationale	No value
Methods of Instruction	Written work
Rationale	No value
Methods of Instruction	Lecture
Rationale	No value
Methods of Instruction	Outside reading
Rationale	No value
Methods of Instruction	Laboratory
Rationale	No value
Methods of Instruction	In-class writing
Rationale	No value
Methods of Instruction	Instruction through examination or quizzing
Rationale	No value
Methods of Instruction	Field Trip
Rationale	Field trip
Methods of Instruction	Group Work
Rationale	No value
Methods of Instruction	Discussion
Rationale	No value
Methods of Instruction	Case Study
Rationale	No value

Methods of Instruction	Demonstration
Rationale	No value

Methods of Instruction	Audiovisual
Rationale	No value

Assignments

- A. Readings from the assigned texts and news media B. Internet assignments, students locate and utilize scientific databases and articles. C. Laboratory Assignments D. Laboratory Reports E. Field Trips

Methods of Evaluation	Rationale
Tests	A. Quizzes covering material from the assigned readings and laboratory C. Exams, multiple choice and essay, covering lecture and assigned reading material. assessment
Participation	B. Reports and presentations F. Laboratory exercises. G. Laboratory reports, activities and presentations H. Field Trip Reports
Research Paper	D. Written Assignments E. Research Assignments

Equipment

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
	Richard Busch. (2014) Laboratory Manual in Physical Geology, 10th, Prentice Hall			
	Lutgens, Tarbuck, Tasa. (2014) Essentials of Geology, 12th, Prentice Hall			

Other Instructional Materials

No Value

Materials Fee

No

Learning Outcomes and Objectives

Course Objectives

No value

CSLOs

Explain and practically apply the principles of the scientific method Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.
Social Science PLOs for CSU GE COA	Communicate scientific results by applying the appropriate scientific method, including experimental and empirical methodologies characteristic of science and modern methods and tools used in scientific inquiry through the use of graphs, oral communications, and writings.
Social Science IGETC PLOs	Communicate scientific results by applying the appropriate scientific method, including experimental and empirical methodologies characteristic of science and modern methods and tools used in scientific inquiry through the use of graphs, oral communications, and writings.
Science Liberal Arts: Mathematics & Science AA Degree	Describe the nature of science, the methods applied in scientific investigations, and the value of those methods in developing a rigorous understanding of the physical world.

Demonstrate a conceptual understanding of fundamental concepts, principles, and interactions of Earth's systems applicable to the geological sciences Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.

Demonstrate an understanding of plate tectonics and the Earth's resources Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.

Apply understanding of the internal and external processes that shape and form the Earth Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.

Demonstrate an understanding of the rock cycle and identify and describe the basic properties of rocks and minerals Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.

Demonstrate an understanding of the Earth through the identification and evaluation of minerals Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.

Demonstrate an understanding of the Earth through the identification and evaluation of igneous, sedimentary and metamorphic rocks

Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.

Demonstrate an understanding of how geological environments are formed, changed and eroded through time

Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.

Demonstrate an ability to communicate complex course concepts effectively in writing and diagrams and apply critical thinking and problem solving skills to make informed decisions in life

Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.
Science Liberal Arts: Mathematics & Science AA Degree	Apply algebraic, graphical, numerical, and other methods to solve applied problems in the areas of mathematics, natural sciences, computer graphics, and computer animation.

Demonstrate the ability to read and interpret topographic and geologic maps and answer questions pertaining to geologic processes.

Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.

Safely perform hands-on supervised experiments in the appropriate geological setting

Expected SLO Performance: 70.0

Social Science Anthropology AA Degree for Transfer	Use the scientific method to analyze aspects of the human condition.
	Use the scientific method to analyze aspects of the human condition.

Outline

Course Outline

A. The Earth System
1. The Scientific Method
2. Earth's Shape and Surface (topography)
3. The Geologic Record-principle of uniformitarianism
4. Earth's concentric layers
5. Plate tectonics system
6. Geologic Time

B. Plate Tectonics-The Unifying Theory
1. Continental Drift
2. Plate Tectonics
3. Active Plate Margins
4. Mechanism for Plate Tectonics

C. Earth Materials-Minerals and Rocks
1. Minerals-building blocks of rocks
2. Matter
3. Mineral Formation

4. Silicates
5. Chemical Classes of Other Common Minerals
6. Properties of Minerals

D. Igneous Processes: Rocks Formed from Cooling Melts
1. Igneous Rock Classification
2. Igneous rocks
3.Igneous textures
4. Igneous rock compositions
5. Origins of magma - Bowen's Reaction Series tells you minerals and temperature of crystallization
6. How igneous rocks form - melt; then crystallize
7. Plate tectonic settings of igneous rocks

E. Sedimentation: Rocks Formed by Surface Processes
1. Sedimentary rocks and the rock cycle
2.Classification (based on composition and texture)
3. Plate Tectonics and sedimentary basins
4. Sedimentary Structures
5. Burial and Diagenesis
6. Sedimentary rocks and the rock cycle
7. Types of sedimentary rocks

F. Metamorphism: Modification of Rocks by Temperature and Pressure
1.Causes of Metamorphism
2. Kinds of Metamorphism
3. Textures and Types
4. Metamorphic Grade&mdash:Regional Metamorphism
5. Plate Tectonics and Metamorphism

G. Deformation: Modification of Rocks by Folding and Faulting
1. Measuring strike and dip
2. Forces-types of stress
3. Behavior (plastic; elastic; brittle) of rocks depends on
4. Deformation-response to force
5. Joints
6. Faults-normal; reverse; thrust; strike-slip; rift valley (horst and graben)
7. Folds-Symmetrical and Asymmetrical

H. Clocks in Rocks: Timing the Geologic Record
1. Relative vs. radiometric ages
2. The Stratigraphic Record
3. The Geological Time Scale
4. Calibration of the Geological Time Scale with "absolute time" methods
5. Radiometric Time: adding dates to the time scale
6. Time scales of geologic processes

I. Early History of the Terrestrial Planets
1. Origin of our solar system-Nebular hypothesis
2. Diversity of the Planets
3. Earth's Differentiated Layers
4. Origin of our solar system-Nebular hypothesis
5. Formation of Earth's atmosphere/oceans-
6. Planetary Surfaces-Isotopic dating of Moon rocks has yielded a crater counting time-scale that is useful in dating other planetary surfaces

J. Evolution of the Continents

K. Volcanoes
1.What Comes Out of a Volcano?
2. Factors Influencing Eruptive Style
3. Kinds of Eruptions/Types of Volcanoes
4. Volcanism and Climate
5. Convergent and divergent plate boundaries
6. Hot spots
7. Hydrothermal deposits
8. Volcanic Hazards

L. Earthquakes

1. What is an Earthquake?
2. Causes
3. Detecting and Measuring Earthquakes
4. Seismic Waves
5. Location
6. Measuring the Size of an Earthquake
7. Earthquakes and Patterns of Faulting
8. Destructiveness of Earthquakes
9. What Should You Do Before and During an Earthquake?

M. Weathering; Erosion; and Mass Wasting
1. Major Factors Controlling Rates of Weathering
2. Products of Chemical Weathering
3. Silica and quartz sand
4. Physical Weathering
5. Soils are residues of weathering processes
6. Mass wasting&mdash:Processes that move rock and soil downhill via gravity
7. Factors that influence mass movements
8. Types of mass movement
9. Rock mass movements
10. Origins of Mass Wasting

N. The Hydrologic Cycle and Ground water
1. Hydrologic Cycle
2. Flows/Fluxes
3. Groundwater
4. Movement of Groundwater
5. Aquifer vs. Aquiclude
6. Rate of Groundwater Flow
7. Erosion by Groundwater&mdash:Dissolution
8. Water Quality

O. Stream Transport
1. Stream Valleys; Channels; and Floodplains
2. How Running Water Erodes Solid Rock
3. Sediment Load and Transport
4. Lake
5. Alluvial fans
6. Terraces
7. Dam and reservoir
8. Effects of waves; tides; and tectonics
9. Deltas
10. Active channel-cross-section and roughness
11. Floodplain
12. Meanders and entrenched meanders
13. Levees
14. Channel patterns
15. Discharge (amount of water)
16. Gradient (slope)
17. Floods

P. Deserts and Wind
1. Deserts are where evaporation exceeds precipitation
2. Wind
3. Wind Transport
4. Wind transported materials
5. Wind erosion
6. Wind deposits
7. Factors Contributing to Desert Conditions
8. Desert weathering
9. Sediments
10. Desert landscape features

Q. Coastlines and Oceans
1. Oceans vs. Continents
2. Origin of the Ocean Crust
3. Coastal Processes

4. Wave motion
5. Surf zone
6. Shoreline Features
7. Continental Margins
8. Major Features of the Ocean Basins
9. Continental margins
10. Deep Sea

R. Glaciers
1. Glacial Ice (metamorphic rock)
2. Types of Glaciers
3. How Do Glaciers Form?
4. Movement of Ice
5. Isotasy; Ice Shelves; and Sea Level Change
6. Erosional and Abrasional Features
7. Ice and Melt Water Deposited Sediments/Drift
8. Depositional Features
9. Ice Ages: the Pleistocene Glaciation

S. Earth Resources
1. Renewable and Non-Renewable Resources
2. Metallogenic Provinces

Lab Outline

This laboratory course provides practical experience in field methods and enhancement of topics covered in the detailed topical outline. Activities covered but not limited to:

Topographic maps
Mineral identification
Relative and absolute dating
Geologic time
Plate Tectonics
Earthquakes
Volcanoes
Rock identification
Geological structures
Geological maps and cross sections
Surface water processes
Ground water processes
Coastal processes
Desert processes
Glacial processes
Field Trips

Delivery Methods and Distance Education

Delivery Method: Please list all that apply -Face to face -Online (purely online no face-to-face contact) -Online with some required face-to-face meetings ("Hybrid") -Online course with on ground testing -iTV – Interactive video = Face to face course with significant required activities in a distance modality -Other

Face 2 Face
Hybrid

Rigor Statement: Assignments and evaluations should be of the same rigor as those used in the on-ground course. If they are not the same as those noted in the COR on the Methods of Evaluation and out-of-class assignments pages, indicate what the differences are and why they are being used. For instance, if labs, field trips, or site visits are required in the face to face section of this course, how will these requirements be met with the same rigor in the Distance Education section?

rigor Laboratory Experiments must be hands on and face to face.

Effective Student-Instructor Contact: Good practice requires both asynchronous and synchronous contact for effective contact. List the methods expected of all instructors teaching the course. -Learning Management System -Discussion Forums -Moodle Message -Other Contact -Chat/Instant Messaging -E-mail -Face-to-face meeting(s) -Newsgroup/Discussion Board -Proctored Exam -Telephone -iTV -Interactive Video -Other (specify)

forums
message
chat
email
face2face
proctored

Software and Equipment: What additional software or hardware, if any, is required for this course purely because of its delivery mode? How is technical support to be provided?

No Value

Accessibility: Section 508 of the Rehabilitation Act requires access to the Federal government's electronic and information technology. The law covers all types of electronic and information technology in the Federal sector and is not limited to assistive technologies used by people with disabilities. It applies to all Federal agencies when they develop, procure, maintain, or use such technology. Federal agencies must ensure that this technology is accessible to employees and the public to the extent it does not pose an "undue burden". I am using -iTV—Interactive Video only -Learning management system -Publisher course with learning management system interface.

itv
LMS
publisher

Class Size: Good practice is that section size should be no greater in distance ed modes than in regular face-to-face versions of the course. Will the recommended section size be lower than in on-ground sections? If so, explain why.

No Value