GEOL M18: FIELD GEOLOGY

Originator
rputnam

College
Moorpark College

Discipline (CB01A)
GEOL - Geology

Course Number (CB01B)
M18

Course Title (CB02)
Field Geology

Banner/Short Title
Field Geology

Credit Type
Credit

Start Term
Fall 2022

Catalog Course Description
Explores the rich geology of California through field investigation. Focuses on the following topics: faults, earthquakes, volcanoes, mountain building, and tectonics.

Taxonomy of Programs (TOP) Code (CB03)
1914.00 - Geology

Course Credit Status (CB04)
D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)
A (Transferable to both UC and CSU)

Course Basic Skills Status (CB08)
N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)
E - Non-Occupational

Course Cooperative Work Experience Education Status (CB10)
N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)
Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)
N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)
Y - Not Applicable

Course Noncredit Category (CB22)
Y - Credit Course

Funding Agency Category (CB23)
Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)
1 - Program Applicable

General Education Status (CB25)
Y - Not Applicable

Support Course Status (CB26)
N - Course is not a support course

Field trips
Will be required

Faculty notes on field trips; include possible destinations or other pertinent information
The class will be held entirely in the field, at locations in the Mojave Desert, the Eastern Sierra, and coastal California

Grading method
(L) Letter Graded

Alternate grading methods
(O) Student Option- Letter/Pass
(P) Pass/No Pass Grading

Does this course require an instructional materials fee?
No

Repeatable for Credit
No

Is this course part of a family?
No

Units and Hours

Carnegie Unit Override
No

In-Class

Lecture

Activity

Laboratory
Minimum Contact/In-Class Laboratory Hours
52.5
Maximum Contact/In-Class Laboratory Hours
52.5

Total in-Class

Total in-Class

Outside-of-Class

Internship/Cooperative Work Experience

Paid

Unpaid

Total Outside-of-Class

Total Outside-of-Class

Total Student Learning

Total Student Learning
Total Minimum Student Learning Hours
52.5
Total Maximum Student Learning Hours
52.5

Minimum Units (CB07)
1
Maximum Units (CB06)
1

Prerequisites
GEOL M02, GEOL M02H, GEOL M03, OR GEOL M121

Entrance Skills

Entrance Skills
GEOL M02, GEOL M02H, GEOL M03, OR GEOL M121

Prerequisite Course Objectives
GEOL M02- describe and give examples of the interactions between the four basic components of the Earth as a global ecosystem - the atmosphere, hydrosphere, lithosphere, and biosphere.
GEOL M02- distinguish the Big Bang hypothesis from the solar nebula theory and explain current theories on stellar processes and how solar systems and planets form.
GEOL M02- apply the scientific method to solve geologic problems such as determining the age of the Earth; distinguishing data, observations, and evidence from interpretation.
GEOL M02- describe the Earth's internal layered structure, its composition and properties, and the methods used to study it; identify the internal processes that affect the lithosphere and plate tectonics.
GEOL M02- explain the theory of plate tectonics by describing the three types of plate boundaries, and the landforms and processes that occur at each type with reference to appropriate examples.
GEOL M02- locate the major lithospheric plates on a world map and correlate each type of plate boundary with the major landform that occurs there.
GEOL M02- relate plate tectonic processes to phenomena such as earthquakes and the formation and evolution of Earth's major features: oceans, continents, mountain ranges, and volcanoes.
GEOL M02- distinguish between elements, minerals, and rocks; define the properties of a mineral and recognize the importance of minerals as natural resources and in identifying rocks.
GEOL M02- classify and distinguish between igneous, sedimentary, and metamorphic rocks and describe how they are formed by internal and surface processes on the Earth and on other planets.
GEOL M02-determine the relative ages of rocks from an outcrop or a diagram by analyzing their relationships and combine their ages and processes of formation to construct the geologic history of an area.
GEOL M02- identify geologic structures and determine the forces that caused them.
GEOL M02- describe the processes and effects of physical and chemical weathering and mass movements.
GEOL M02- illustrate the hydrologic cycle and identify the variety of environments where erosion, sediment transport, and deposition occur.
GEOL M02- identify river, glacial, desert, and coastal landforms in photographs and describe the surface processes responsible for their formation and evolution.
GEOL M02- recognize and describe the interaction between human activities and the geologic environment; identify the major geologic hazards in the world and possible actions humans could take to avoid or mitigate property damage or loss of life.
GEOL M02H-describe and give examples of the interactions between the four basic components of the Earth as a global ecosystem - the atmosphere, hydrosphere, lithosphere, and biosphere.
GEOL M02H-distinguish the Big Bang hypothesis from the solar nebula theory and explain current theories on stellar processes and how solar systems and planets form.
GEOL M02H-apply the scientific method to solve geologic problems such as determining the age of the Earth; distinguishing data, observations, and evidence from interpretation.

GEOL M02H-describe the Earth's internal layered structure, its composition and properties, and the methods used to study it; identify the internal processes that affect the lithosphere and plate tectonics.
GEOL M02H-explain the theory of plate tectonics by describing the three types of plate boundaries, and the landforms and processes that occur at each type with reference to appropriate examples.
GEOL M02H-locate the major lithospheric plates on a world map and correlate each type of plate boundary with the major landform that occurs there.
GEOL M02H-relate plate tectonic processes to phenomena such as earthquakes and the formation and evolution of Earth's major features: oceans, continents, mountain ranges, and volcanoes.
GEOL M02H-distinguish between elements, minerals, and rocks; define the properties of a mineral and recognize the importance of minerals as natural resources and in identifying rocks.
GEOL M02H-classify and distinguish between igneous, sedimentary, and metamorphic rocks and describe how they are formed by internal and surface processes on the Earth and on other planets.
GEOL M02H-determine the relative ages of rocks from an outcrop or a diagram by analyzing their relationships and combine their ages and processes of formation to construct the geologic history of an area.
GEOL M02H-identify geologic structures and determine the forces that caused them.
GEOL M02H-describe the processes and effects of physical and chemical weathering and mass movements.
GEOL M02H-illustrate the hydrologic cycle and identify the variety of environments where erosion, sediment transport, and deposition occur.
GEOL M02H-identify river, glacial, desert, and coastal landforms in photographs and describe the surface processes responsible for their formation and evolution.
GEOL M02H-recognize and describe the interaction between human activities and the geologic environment; identify the major geologic hazards in the world and possible actions humans could take to avoid or mitigate property damage or loss of life.
GEOL M02H-HONORS: read, analyze and summarize original scientific data, research and primary sources.
GEOL M02H-HONORS: identify, discuss, and explain the Earth science principles and processes that currently affect society.
GEOL M02H-HONORS: apply various field and laboratory techniques to various fields such as, but not limited to, geochemistry, surveying, environmental engineering, hydrology, ecological restoration, bedrock geologic mapping, and coastal geomorphology.
GEOL M03-describe and give examples of the interactions between the four basic components of the Earth as a global ecosystem - the atmosphere, hydrosphere, lithosphere, and biosphere.
GEOL M03-apply the scientific method to solve geologic problems such as determining the age of the Earth; distinguishing data, observations, and evidence from interpretation.
GEOL M03-explain the immensity of geologic time, define the geologic eras, and place some well-known events in the context of the geologic time scale.
GEOL M03-determine the relative ages of rocks from an outcrop or a diagram by analyzing their relationships, and combine their ages and processes of formation to construct the geologic history of an area; explain how absolute ages of rocks and fossils are determined.
GEOL M03-explain the theory of plate tectonics by describing the three types of plate boundaries, the landforms, and processes that occur at each type with reference to appropriate examples.
GEOL M03-apply plate tectonic theory to explain phenomena such as the supercontinent cycle and paleoclimate change, and the formation and evolution of Earth's major features such as oceans, continents, mountain ranges, and volcanoes.
GEOL M03-classify and distinguish between igneous, sedimentary, and metamorphic rocks and analyze rock distributions to reconstruct the paleogeography, paleoclimate, and geologic history of an area.
GEOL M03-identify types of fossils and fossilization processes, and demonstrate how fossils are used to determine paleoenvironments, ecology, and relative ages of rocks; explain the importance of the fossil record as evidence of evolution and extinction events.
GEOL M03-compare mass extinctions in the history of life and critique proposed theories for their causes by assessing the evidence.
GEOL M03-describe the major tectonic events, rock-forming processes, and major events in the evolution of life recorded by fossils for each major geologic time period.
GEOL M03-explain the relationships between the supercontinent cycle, paleogeography, and paleoclimate and how these changes affect evolution of life.
GEOL M121-explain and practically apply the principles of the scientific method.
GEOL M121-demonstrate a fundamental understanding of the solar system and Earth's place within it.
GEOL M121-demonstrate a fundamental understanding of geologic time.
GEOL M121-explain basic properties of minerals and rocks and identify representative samples.
GEOL M121-explain basic plate tectonic theory and apply this understanding to explain Earth's landforms.
GEOL M121-diagram the water cycle and relate it to local and regional sources of municipal water.
GEOL M121-interpret weather maps to give short-term forecasts of local and regional weather.
GEOL M121-communicate an understanding of natural hazards and the risks they pose to communities around the world.

Requisite Justification

Requisite Type

Prerequisite

Requisite

GEOL M02, GEOL M02H, GEOL M03, GEOL M121

Requisite Description
Course in a sequence

Level of Scrutiny/Justification
Content review

Student Learning Outcomes (CSLOs)

	Upon satisfactory completion of the course, students will be able to:
1	collect and analyze geologic data and summarize the results in a scientific journal-style paper.

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1	explain how tectonics, volcanism, erosion, deposition, and mountain building processes have shaped California.
2	summarize the geologic evolution of the state of California, focusing upon the southern part of the state.
3	collect accurate and precise field notes.
4	formulate a research question that is able to be investigated using the scientific method in the field.
5	employ the tools of field geology to collect data to interpret a landscape or understand a process.
6	evaluate geologic data sets to interpret the evolution of a landscape or understand a process.
7	compose a report on geologic field work using a technical writing style.

Course Content

Lecture/Course Content
n/a

Laboratory or Activity Content

- (8%) - Earth surface processes
  - Fluvial
  - Glacial
  - Tectonic geomorphology
- (5%) - Igneous and metamorphic rocks
- (7%) - Sedimentary rocks
  - Identification
  - Sedimentary structures
  - Depositional environments
- (9%) - Stratigraphy
  - Lithostratigraphy and biostratigraphy
  - Physical correlation
- (9%) - Structural geology
- Folds
- Faults
- Strike and Dip
- (12%) - Plate tectonics
  - Earth's internal structure
  - Plate boundary types
  - California tectonics
- (50%) Field methods
  - Use of geologic surveying equipment
  - Field study design and execution
  - Field note-taking and data collection
  - Topographic and geologic map interpretation

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Written expression
Problem solving exercises
Skills demonstrations

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Individual projects
Journals
Laboratory activities
Objective exams
Problem-solving exams
Reports/papers
Research papers
Skills demonstrations
Other (specify)
Classroom Discussion
Projects
Participation
Reports/Papers/Journals

Other

Homework
Field trip attendance

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Case studies
Class discussions
Field trips
Guest speakers
Laboratory activities
Lecture

Describe specific examples of the methods the instructor will use:

- Field examination of landscapes and outcrops by applying standardized field notetaking practices
- Collection of data at localities of interest using the tools of field geoscience

Representative Course Assignments

Writing Assignments

- A capstone report, written in scientific journal format, on the results of a field study.
- Summaries of phenomenon observed in the field.
- Daily field notebook entries documenting geologic data in the form of data tables, sketches, and observations.

Critical Thinking Assignments

- Paleo-stress analyses derived from measurements of the orientations of joints and faults.
- Reports on the geologic history of a field site as evaluated by on-site analysis.

Reading Assignments

- Conduct a literature review on the regions in which field study will be practiced.
- Read the supporting information to geologic maps of the field site.

Skills Demonstrations

- Compile field maps by making observations of lithology and orientation of rocks in a field area.
- Measure and draw a scale stratigraphic section.
- Assess rock type and mineral modes of rocks observed in the field.

Outside Assignments

Representative Outside Assignments

- Prepare a scientific journal-style report on the results of a field study.
- Post-process data collected in the field using spreadsheet software.

Articulation

Equivalent Courses at 4 year institutions

University	Course ID	Course Title	Units
CSU LA	GEOL 1600	Geology Field Experience	1
UCSB	EARTH 18	Field Studies in Geological Sciences	1

District General Education

A. Natural Sciences

A2. Physical Science

Proposed
Approved

Date Proposed:

10/24/2019

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

Course is CSU transferable

Yes

CSU Baccalaureate List effective term:

Fall 2020

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

B3 Laboratory Activity

Proposed
Approved

Date Proposed:

10/24/2019

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

UC TCA

UC TCA
Approved

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 5C: Laboratory Science
Proposed
Approved

Date Proposed:
12/15/2019

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type
Textbook

Description
Sylvester, Arthur Gibbs, and Elizabeth O'Black Gans. *Roadside Geology of Southern California*. Mountain Press Geology, 2016.

Resource Type
Textbook

Description
Meldahl, Keith Heyer. *Surf, Sand, and Stone: How Waves, Earthquakes, and Other Forces Shape the Southern California Coast*. University of California Press, 2019.

Resource Type
Textbook

Description
Prothero, Donald. *California's Amazing Geology*. Routledge, 2017.

Library Resources

Assignments requiring library resources
Students will use the Moorpark College Library resources, both online and print, in support of their capstone project (scientific journal-style paper on the research they did in the field).

Sufficient Library Resources exist
Yes

Example of Assignments Requiring Library Resources
Conduct a literature review about the geologic history of the region in which the field studies were conducted.

Primary Minimum Qualification
EARTH SCIENCE

Review and Approval Dates

Department Chair
11/10/2021

Dean
11/10/2021

Technical Review
11/18/2021

Curriculum Committee
12/07/2021

DTRW-I
MM/DD/YYYY

Curriculum Committee
MM/DD/YYYY

Board
MM/DD/YYYY

CCCCO
MM/DD/YYYY

Control Number
CCC000598767

DOE/accreditation approval date
MM/DD/YYYY