

# GEOL M121: EARTH SCIENCE WITH LAB

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**Originator**

rputnam

**College**

Moorpark College

**Discipline (CB01A)**

GEOL - Geology

**Course Number (CB01B)**

M121

**Course Title (CB02)**

Earth Science with Lab

**Banner/Short Title**

Earth Science with Lab

**Credit Type**

Credit

**Start Term**

Fall 2022

**Catalog Course Description**

Introduces the essentials of Earth science including the geosphere, atmosphere, hydrosphere, and exosphere. Examines the interactions between physical and chemical systems of the earth such as the tectonic cycle, rock cycle, hydrologic cycle, weather and climate.

**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)**

2 - Not Program Applicable

**General Education Status (CB25)**

Y - Not Applicable

**Support Course Status (CB26)**

N - Course is not a support course

**Field trips**

May be required

**Faculty notes on field trips; include possible destinations or other pertinent information**

Field trips will be to local sites to explore topics of Earth science, such as: Arroyo Conejo, Mugu Rock, Long Canyon, Malibu Creek State Park, or Paradise Falls.

**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**

**Minimum Contact/In-Class Lecture Hours**

52.5

**Maximum Contact/In-Class Lecture Hours**

52.5

**Activity**

**Laboratory**

**Minimum Contact/In-Class Laboratory Hours**

52.5

**Maximum Contact/In-Class Laboratory Hours**

52.5

**Total in-Class**

**Total in-Class**

**Total Minimum Contact/In-Class Hours**

105

**Total Maximum Contact/In-Class Hours**

105

**Outside-of-Class**

**Internship/Cooperative Work Experience**

**Paid**

**Unpaid**

**Total Outside-of-Class**

**Total Outside-of-Class**

**Minimum Outside-of-Class Hours**

105

**Maximum Outside-of-Class Hours**

105

**Total Student Learning**

**Total Student Learning**

**Total Minimum Student Learning Hours**

210

**Total Maximum Student Learning Hours**

210

**Minimum Units (CB07)**

4

**Maximum Units (CB06)**

4

**Student Learning Outcomes (CSLOs)**

**Upon satisfactory completion of the course, students will be able to:**

- |   |   |
|---|---|
| 1 | demonstrate understanding of and apply the "9 Big Ideas" of Earth Science as outlined by the National Science Foundation. |
|---|---|

**Course Objectives**

**Upon satisfactory completion of the course, students will be able to:**

- |   |  |
|---|--|
| 1 | explain and practically apply the principles of the scientific method.                                   |
| 2 | demonstrate a fundamental understanding of the solar system and Earth's place within it.                 |
| 3 | demonstrate a fundamental understanding of geologic time.  |
| 4 | explain basic properties of minerals and rocks and identify representative samples.                      |
| 5 | explain basic plate tectonic theory and apply this understanding to explain Earth's landforms.           |
| 6 | diagram the water cycle and relate it to local and regional sources of municipal water.                  |
| 7 | interpret weather maps to give short-term forecasts of local and regional weather.                       |
| 8 | communicate an understanding of natural hazards and the risks they pose to communities around the world. |

## Course Content

### Lecture/Course Content

- (7%) - Earth science and the scientific method
- (7%) - The Exosphere
  - Formation of the universe
  - Stars and stellar evolution
  - Solar system
- (7%) - Plate tectonics
  - Evidence for continental drift
  - Evidence for plate tectonics
  - Plate boundaries and associated landforms
  - Driving forces
- (7%) - Volcanoes
  - Melting
  - Eruption behavior
  - Volcanic landforms
  - Volcanic hazards
- (7%) - Earthquakes
  - Elastic rebound theory
  - Faults
  - Seismic waves
  - Magnitude and intensity
  - Earthquake hazard
- (14%) - Earth's materials
  - Minerals
  - Igneous rocks
  - Metamorphic rocks
  - Weathering processes and sedimentary rocks
  - Mineral resources
- (7%) - Geologic time
  - Relative dating
  - Absolute dating
  - Geologic timescale
- (14%) - Surface water and groundwater
  - Stream shape and characteristics
  - Stream geology
  - Flooding
  - Aquifers and aquitards
  - Threats to ground and surface water
- (12%) - Oceanography
  - Global bathymetry
  - Ocean currents
  - Tides and coastal processes
- (18%) - Atmosphere
  - Composition and evolution
  - Weather patterns and severe weather
  - Climate and climate change

### Laboratory or Activity Content

- (7%) - The scientific method
- (7%) - Astronomy
- (7%) - Plate tectonics

- (7%) - Volcanology
- (7%) - Seismology
- (7%) - Mineral identification
- (14%) - Rock identification
- (7%) - Mineral Resources
- (7%) - Relative and absolute dating and geologic time
- (14%) - Streams and surface water processes
- (7%) - Oceanography
- (9%) - Weather and climate

## 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):**

Computational homework  
 Essay exams  
 Laboratory activities  
 Laboratory reports  
 Objective exams  
 Problem-solving exams  
 Problem-solving homework  
 Skills demonstrations  
 Other (specify)  
 Classroom Discussion  
 Projects  
 Participation  
 Reports/Papers/Journals

### Other

Map analysis assignments  
 Google Earth exercises

## Instructional Methodology

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

Case studies  
 Class activities  
 Class discussions  
 Collaborative group work  
 Demonstrations  
 Distance Education  
 Field trips  
 Group discussions  
 Guest speakers  
 Instructor-guided interpretation and analysis  
 Laboratory activities  
 Lecture  
 Readings  
 Small group activities

**Describe specific examples of the methods the instructor will use:**

- Think-pair-share exercises evaluating landform types, geologic histories, or other other questions related to Earth science.
- Use guided exercises to track individual and collective resource use.
- Physical demonstration using rocks, minerals, fossils, and models.

## Representative Course Assignments

### Writing Assignments

- Write reports on field trips, gem and mineral shows, geology of a specific place such as a national park.
- Compose essays on assigned topics in earth science, for example to describe the relationship between the tectonic cycle, hydrologic cycle and rock cycle.
- Write reactions to exercises that track personal water, energy, and mineral resource use.

### Critical Thinking Assignments

- Propose activities that elementary-age children could do at a natural history museum.
- Evaluate a hypothesis that explains how a landscape feature formed based on observation of features in a rock outcrop or photograph.
- Compare the characteristics of a group of rock samples and determine which type of rock each is and the processes responsible for their formation.

### Reading Assignments

- Peer-review lesson plans for elementary-age students on topics of Earth science.
- Read journal articles about best practices of Earth science pedagogy.
- Read and journal about current events in the Earth and environmental sciences.

### Skills Demonstrations

- Choose a topic relevant to Earth science and present a demonstration about it to the class, as if it was an elementary school classroom.
- Write lesson plans to teach topics in Earth science in an elementary education setting.
- Conduct Google Earth exercises connecting plate tectonics to the evolution of Earth's major landforms.

## Outside Assignments

### Representative Outside Assignments

- Research curriculum required in elementary education classes and preparing an activity for elementary students that addresses an earth science topic.
- Write or present reports on field trips to geologic localities, gem and mineral shows, natural history museums and astronomical observatories.
- Summarize each week's lecture topic and write a brief lesson plan about how to teach it to an elementary-age audience.

## Articulation

### C-ID Descriptor Number

GEOL 121

### Status

Approved

### Equivalent Courses at 4 year institutions

University	Course ID	Course Title	Units
Cal Poly Pomona	GSC 2120	Earth Science for Elementary Educators	2, 1
CSU Fullerton	GEOL 102	Earth Science Investigations for Future Teachers	3
CSU Long Beach	GEOL 106	Earth Science for Teachers	4

### Comparable Courses within the VCCCD

GEOL R121 - Earth Science with Laboratory  
 GEOL V09 - Earth Science with Lab

## District General Education

### A. Natural Sciences

#### A2. Physical Science

Approved

**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:**

F2015

**CSU GE-Breadth**

**Area A: English Language Communication and Critical Thinking**

**Area B: Scientific Inquiry and Quantitative Reasoning**

**B1 Physical Science**

Approved

**B3 Laboratory Activity**

Approved

**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 5A: Physical Science**

Approved

**Area 5C: Laboratory Science**

Approved

**Area 6: Languages Other than English (LOTE)**

**Textbooks and Lab Manuals**

**Resource Type**

Textbook

**Description**

McConnell, David, and David Steer. *The Good Earth: Introduction to Earth Science*. 5th ed., McGraw Hill, 2021.

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**Resource Type**

Textbook

**Description**

Merali, Zeeya, and Brian J. Skinner. *Visualizing Earth Science*. Wiley, 2009.

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**Resource Type**

Textbook

**Description**

Tarback, Edward J., Frederick K. Lutgens, and Dennis G. Tasa. *Earth Science*. 15th ed., Prentice Hall, 2017.

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**Resource Type**

Textbook

**Description**

Tarback, Edward J., Frederick K. Lutgens, and Dennis G. Tasa. *Applications and Investigations in Earth Science Lab*. 9th ed., Prentice Hall, 2019.

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**Library Resources**

**Assignments requiring library resources**

Using the Library print and online resources, research for writing assignments.

**Sufficient Library Resources exist**

Yes

**Example of Assignments Requiring Library Resources**

Write reports on case studies of natural hazards and position papers on anthropogenic climate change.

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**Distance Education Addendum**

**Definitions**

**Distance Education Modalities**

- Hybrid (1%–50% online)
- Hybrid (51%–99% online)
- 100% online

**Faculty Certifications**

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes



Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

### Regular Effective/Substantive Contact

#### Hybrid (1%–50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Regular Asynchronous discussion boards will be used to encourage discussion among students where they can compare and contrast/ discuss /identify and analyze elements of course outcomes. Other Discussion boards will also be used for Q&A and general class discussion by students and instructor to facilitate student learning outcomes. E.g. - Students will use the discussion board in Canvas to discuss how the geosphere and hydrosphere influence each other.
E-mail	Email, class announcements and tools such as “Message Students Who” and “Assignment Comments” in Canvas will be used to regularly communicate with all students to clarify class content, remind of upcoming assignments, and provide immediate feedback to students on coursework to facilitate student learning outcomes. Students will be given multiple ways to email instructor through Canvas inbox and faculty provided email account through their own canvas email and school email.
Other DE (e.g., recorded lectures)	Faculty will use a variety of tools and media integrated within the LMS to help students reach SLO such as: <ul style="list-style-type: none"> <li>o Recorded Lectures, Narrated Slides, Screencasts</li> <li>o Instructor created content</li> <li>o MC Online Library Resources</li> <li>o Canvas Peer Review Tool</li> <li>o Canvas Student Groups (Assignments, Discussions)</li> <li>o 3rd Party (Publisher) Tools (Mastering Geography)</li> <li>o Websites and Blogs</li> <li>o Multimedia (YouTube, Films on Demand, 3CMedia, Google Earth, Earth.nullschool, etc.)</li> </ul>
Synchronous Dialog (e.g., online chat)	Scheduled synchronous sessions may be organized at the instructor’s discretion to demonstrate skills, address problems, and review asynchronous lectures. Synchronous sessions may also be used for students to work on problem sets together. The platform for such sessions may include ConferZoom or any other approved medium for synchronous dialog.

#### Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Regular Asynchronous discussion boards will be used to encourage discussion among students where they can compare and contrast/ discuss /identify and analyze elements of course outcomes. Other Discussion boards will also be used for Q&A and general class discussion by students and instructor to facilitate student learning outcomes. E.g. - Students will use the discussion board in Canvas to discuss how the geosphere and hydrosphere influence each other.

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<b>100% online Modality:</b>	
<b>Method of Instruction</b>	<b>Document typical activities or assignments for each method of instruction</b>
Asynchronous Dialog (e.g., discussion board)	Regular Asynchronous discussion boards will be used to encourage discussion among students where they can compare and contrast/discuss /identify and analyze elements of course outcomes. Other Discussion boards will also be used for Q&A and general class discussion by students and instructor to facilitate student learning outcomes. E.g. - Students will use the discussion board in Canvas to discuss how the geosphere and hydrosphere influence each other.
E-mail	Email, class announcements and tools such as “Message Students Who” and “Assignment Comments” in Canvas will be used to regularly communicate with all students to clarify class content, remind of upcoming assignments, and provide immediate feedback to students on coursework to facilitate student learning outcomes. Students will be given multiple ways to email instructor through Canvas inbox and faculty provided email account through their own canvas email and school email.
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**Examinations**

**Hybrid (1%–50% online) Modality**

On campus  
Online

**Hybrid (51%–99% online) Modality**

On campus  
Online

**Primary Minimum Qualification**

EARTH SCIENCE

**Review and Approval Dates**

**Department Chair**

11/04/2021

**Dean**

11/04/2021

**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**

CCC000564435

**DOE/accreditation approval date**

MM/DD/YYYY