

# GEOL R121: EARTH SCIENCE WITH LABORATORY

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**Originator**

toneil

**College**

Oxnard College

**Discipline (CB01A)**

GEOL - Geology

**Course Number (CB01B)**

R121

**Course Title (CB02)**

Earth Science with Laboratory

**Banner/Short Title**

Earth Science with Lab

**Credit Type**

Credit

**Start Term**

Fall 2021

**Catalog Course Description**

This course is a broad introduction to the essentials of Earth Science designed for future educators including teaching techniques to engage students in science. Topics covered in this course 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. The laboratory component includes study of rocks, maps, scientific instruments, earthquakes, and local geologic features. C-ID: GEOL 121.

**Taxonomy of Programs (TOP) Code (CB03)**

1930.00 - Earth Science

**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**

May be required

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

Mountains, beaches, and river bottoms in Ventura County

**Grading method**

Letter Graded

**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 how the Scientific Method is used to solve a question in Earth Science, such as how the solar system formed or how the age of the Earth is determined. |
| 2   | Describe the Plate Tectonic model for movement of the lithospheric plates.   |

### 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 and be able to practically apply concepts, principles, and interactions of Earth's systems including hydrologic cycle, rock cycle, plate tectonics, and weather and climate. |
| 3   | Demonstrate a fundamental understanding of the solar system and the Earth's place in it.  |
| 4   | Demonstrate a fundamental understanding of geologic time.   |
| 5   | Explain basic properties of minerals and rocks and identify representative samples.   |
| 6   | Explain the processes that shape the Earth and how they change over geologic time.  |
| 7   | Communicate complex course concepts effectively in writing and in diagrams.   |

## Course Content

### Lecture/Course Content

1. Introduction to course
  - a. Present an overview of earth science
  - b. Discuss the dynamic Earth
  - c. Describe the Principle of Uniformitarianism
  - d. Describe the Scientific Method
2. Geologic time
  - a. Discuss relative dating, unconformities, fossils, and faunal succession
  - b. Discuss numerical dating and the geologic time scale
3. Plate tectonics

- a. Discuss the theory of plate tectonics
  - b. Identify the major plate tectonic features on Earth
  - c. Answer questions about their nature and origin
4. Earth materials
  - a. Describe the composition of minerals, igneous, metamorphic, and sedimentary rocks
  - b. Describe the formation of minerals, igneous, metamorphic, and sedimentary rocks
5. Earthquakes
  - a. Describe the origin and mechanisms for earthquakes
  - b. Discuss the causes of damage from earthquakes and human interactions with earthquakes
6. Earth's interior
  - a. Discuss the composition and structure of the interior of the earth
  - b. Discuss how we are able to determine the structure and composition of the interior of the earth
7. Volcanoes
  - a. Discuss the nature and origin of volcanoes
  - b. Distinguish two major categories of volcanoes and their occurrences
  - c. Connect volcanic eruptions with their impact on humans
  - d. Connect types of volcanoes to plate tectonic theory
8. Mountains
  - a. Identify and discuss the different types of mountains and their mechanisms of formation
  - b. Identify the components of the mountains in the western United States
9. Rivers
  - a. Discuss how rivers and floods influence the surface of the earth
  - b. Discuss the interactions of humans and rivers
  - c. Examine the nature and origin of ground-water and the importance of groundwater for human needs
10. Mass wasting
  - a. Discuss how mass wasting affects humans and where they live
  - b. Discuss the different types of mass wasting and where and why they occur
11. Deserts and glaciers
  - a. Discuss the nature and origin of deserts and glaciers
  - b. Describe the major features found in desert and glacial areas and how they form
  - c. Discuss how formation and melting of glaciers affects global changes in sea level
12. Atmosphere
  - a. Discuss the atmosphere and how it operates
  - b. Discuss weather and climate, weather systems, atmospheric moisture, storms, wind, Coriolis Effect, and atmospheric circulation
  - c. Describe the heat budget of the earth
  - d. Describe the formation of hurricanes and how they are related to the ocean
13. Coasts
  - a. Discuss features of the coast and how they change through time
  - b. Discuss how beaches change according to the seasons
  - c. Discuss and describe longshore transport of sand
  - d. Describe how human made structures affect processes along the coast
14. Ocean
  - a. Discuss components of ocean circulation such as the connection between Coriolis Effect, winds, gyres, and currents
  - b. Discuss how waves are formed and how they impact the coast
  - c. Discuss the origin and nature of El Niño and La Niña and how they effect weather and climate
  - d. Discuss the major features found on the ocean floor that are due to plate tectonics
  - e. Discuss the nature and origin of sediments in the ocean and how they are important to humans
15. Astronomical Effects
  - a. Discuss the connection between tides and the phases of the moon
  - b. Discuss the nature and origin of the moon and its major components visible from the Earth
  - c. Discuss the Earth's place in the solar system, Milky Way galaxy, and the universe.

#### Laboratory or Activity Content

1. The scientific method
2. Plate tectonics, earthquakes, and volcanoes
3. Geologic structures and faults
4. Mineral properties and identification
5. Rock properties and identification

6. Groundwater and its effects on the land surface: caves, sinkholes, and land subsidence.
7. Astronomy
8. Relative and absolute dating and geologic time
9. Oceans
10. Weather systems and atmospheric moisture
11. Ocean circulation
12. Beaches

## Methods of Evaluation

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

Problem solving exercises  
Written expression

**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):**

Essay exams  
Essays  
Group projects  
Individual projects  
Journals  
Laboratory activities  
Laboratory reports  
Objective exams  
Oral presentations  
Problem-Solving Assignments  
Problem-solving exams  
Quizzes  
Reports/papers  
Research papers

## Instructional Methodology

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

Audio-visual presentations  
Collaborative group work  
Class activities  
Class discussions  
Distance Education  
Demonstrations  
Field trips  
Group discussions  
Guest speakers  
Instructor-guided interpretation and analysis  
Internet research  
Laboratory activities  
Lecture  
Small group activities

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

1. In class viewing of PowerPoint, videos, and Google Earth to analyze the scale of geologic events such as earthquakes, mountain building, and volcanism.
2. Hands on demonstration and illustration of the rock cycle. Student groups are given samples of rocks and asked to identify where they fit in the rock cycle.
3. Lecture on field trip safety.
4. Instructor lead class discussion about mass wasting.
5. Instructor led discussions of significant geologic events that affect Southern California, such as landslides, earthquakes, and beach erosion.

## Representative Course Assignments

### Writing Assignments

1. Reports on field trips to locations such as geologic localities, gem and mineral shows, natural history museums, and astronomical observations.

2. Assigned exercises (e.g., cause of earthquakes, origin of the Cascade Mountain chain) are to be completed by students outside of class and turned in for evaluation and grading.
3. Essay assignment such as describing the meandering in the Santa Clara River.

### **Critical Thinking Assignments**

1. Group discussion about the various reasons for volcanism.
2. Group discussion about how best to prepare for an earthquake.
3. Propose how to reduce the impact of beach erosion at Hueneme.

### **Reading Assignments**

1. Research on earth science topics such as volcanoes, earthquakes, and plate tectonics.
2. Research on curriculum required in elementary education classes and preparing an activity for elementary students that addresses an earth science topic.
3. Each chapter of text studied in class is to be read by students prior to the corresponding lecture. For example, the chapter about earthquakes will be read by students prior to the earthquake lectures.

### **Skills Demonstrations**

Use of topographic maps to determine topography.

### **Other assignments (if applicable)**

1. Visit Hueneme Beach and observe the beach erosion. Recognize the geologic structures.
2. Join a group for a field activity that protects or restores the natural landscape. Recognize the geologic processes or principles impacting the area.

## **Outside Assignments**

### **Representative Outside Assignments**

1. Read the assigned chapters in the textbook and laboratory manual.
2. Write reports on current geologic problems.
3. Write notes in the workbook from provided information or textbook to prepare for exams.
4. Write a summary of instructor-made videos and other video resources.
5. Use on-line learning tools and practice quizzes to prepare for exam.

## **Articulation**

### **C-ID Descriptor Number**

GEOL 121

### **Status**

Approved

## **District General Education**

**A. Natural Sciences**

**B. Social and Behavioral Sciences**

**C. Humanities**

**D. Language and Rationality**

**E. Health and Physical Education/Kinesiology**

**F. Ethnic Studies/Gender Studies**

## **CSU GE-Breadth**

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

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

**Area C: Arts and Humanities**

**Area D: Social Sciences**

**Area E: Lifelong Learning and Self-Development**

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

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

## **Textbooks and Lab Manuals**

### **Resource Type**

Other Instructional Materials

### **Description**

Rock and mineral collections.

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### **Resource Type**

Other Instructional Materials

### **Description**

Bathymetric maps.

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### **Resource Type**

Other Instructional Materials

**Description**

Solar system models.

**Resource Type**

Other Instructional Materials

**Description**

Globes.

**Resource Type**

Textbook

**Classic Textbook**

Yes

**Description**

Tarbuck, Edward J., et al. (2019). *Applications and Investigations in Earth Science Lab (9th)*. Upper Saddle River, N.J. : Prentice Hall

**Resource Type**

Textbook

**Classic Textbook**

Yes

**Description**

Tarbuck, Edward J., Fredrick K, and Dennis G. Tasa. (2018). *Earth Science (15th)*. Upper Saddle River, N.J.: Prentice Hall

**Distance Education Addendum****Definitions****Distance Education Modalities**

Hybrid (51%–99% online)

Hybrid (1%–50% 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)          | Discuss the Theory of Plate Tectonics and other relative topics.   |
| Face to Face (by student request; cannot be required) | Oral proposal such as the activities that children could do at a gem and mineral show or a natural history museum. |



|  |  |
|--|--|
| Other DE (e.g., recorded lectures)     | Recorded lecture about topics such as Plate Tectonics.                     |
| Synchronous Dialog (e.g., online chat) | Discuss about topics such as numerical dating and the geologic time scale. |
| Telephone                              | Discussions such as the origin of Plate Tectonic Theory.                   |
| Video Conferencing                     | Discussions such as faulting and folding in California.                    |

**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 use of asynchronous discussion boards encourages various types of interaction and critical thinking skills among all course participants. Questions and topics posed will allow students to discuss, compare and contrast, identify, and analyze elements of the course outcomes. Other discussion boards may be used for Q&A and general class discussion by students and instructor to facilitate student success and strengthen student learning outcomes.   |
| E-mail  | E-mail, class announcements and various learning management system tools will be used to regularly communicate with all students on matters such as clarification of class content, reminders of upcoming assignments and/or course responsibilities, to provide prompt feedback to students on coursework to facilitate student learning outcomes, or to increase the role of an individual educator in the academic lives of a student. Students will be given multiple ways to email instructor through both the learning management system inbox and faculty provided email accounts.                 |
| Synchronous Dialog (e.g., online chat)                | Instructor may provide a set time each week where s/he will be available for synchronous chat and be available in the discussion board and can answer questions in live time.   |
| Video Conferencing                                    | Video tools such as ConferZoom can be used to provide live synchronous or asynchronous sessions with students. ADA compliance will be upheld with Closed Captioning during the session or of the recorded session. Video Conferences will be used to facilitate SLOs and student-to-student group meetings will also be encouraged.   |
| Face to Face (by student request; cannot be required) | Students will have direct face-to-face contact with instructor during weekly class meetings. This time will provide the opportunity for students to discuss and ask questions about the material to facilitate student learning objectives and course outcomes. The instructor will also hold weekly, scheduled office hours for students to be able to meet and discuss course materials or individual progress. Students can request additional in-person or web conferencing meetings with faculty member as needed. Faculty may encourage online students to form “study groups” in person or online. |

**100% online Modality:**

| Method of Instruction                        | Document typical activities or assignments for each method of instruction   |
|--|---|
| Asynchronous Dialog (e.g., discussion board) | Regular use of asynchronous discussion boards encourages various types of interaction and critical thinking skills among all course participants. Questions and topics posed will allow students to discuss, compare and contrast, identify, and analyze elements of the course outcomes. Other discussion boards may be used for Q&A and general class discussion by students and instructor to facilitate student success and strengthen student learning outcomes.   |
| E-mail                                       | E-mail, class announcements and various learning management system tools will be used to regularly communicate with all students on matters such as clarification of class content, reminders of upcoming assignments and/or course responsibilities, to provide prompt feedback to students on coursework to facilitate student learning outcomes, or to increase the role of an individual educator in the academic lives of a student. Students will be given multiple ways to email instructor through both the learning management system inbox and faculty provided email accounts. |

|   |  |
|---|--|
| Synchronous Dialog (e.g., online chat)                | Instructor will provide a set time each week where s/he will be available for synchronous chat and question and answers with students.   |
| Video Conferencing                                    | Video tools such as ConferZoom can be used to provide live synchronous or asynchronous sessions with students. ADA compliance will be upheld with Closed Captioning during the session or of the recorded session. Video Conferences will be used to facilitate SLOs and student-to-student group meetings will also be encouraged.  |
| Face to Face (by student request; cannot be required) | The instructor will hold weekly, scheduled office hours either in person or via-web conferencing, for students to be able to meet and discuss course materials or individual progress. Students can request additional in-person or web conferencing meetings with faculty member as needed. Faculty may encourage online students to form “study groups” in person or online.<br>Telephone Students can request for instructor to call or vice versa in order to answer one-on-one questions about course material or student progress. |
| Other DE (e.g., recorded lectures)                    | Faculty will use a variety of ADA compliant tools and media integrated within the learning management system to help students reach SLO competency. Tools may include:<br>o Recorded Lectures, Narrated Slides, Screencasts o Instructor created content<br>o OC Online Library Resources<br>o Canvas Peer Review Tool o Canvas Student Groups (Assignments, Discussions)<br>o 3rd Party (Publisher) Tools (MyOpenMath)<br>o Websites and Blogs o Multimedia (YouTube, Films on Demand, 3CMedia, Khan Academy, etc.)                     |

## Examinations

### Hybrid (1%–50% online) Modality

Online  
On campus

### Hybrid (51%–99% online) Modality

Online  
On campus

### Primary Minimum Qualification

EARTH SCIENCE

## Review and Approval Dates

### Department Chair

09/02/2020

### Dean

09/02/2020

### Technical Review

09/23/2020

### Curriculum Committee

09/23/2020

### Curriculum Committee

10/28/2020

### Board

MM/DD/YYYY

### CCCCO

MM/DD/YYYY

**Control Number**

CCC000570364

**DOE/accreditation approval date**

MM/DD/YYYY