

# G 001: PHYSICAL GEOLOGY

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**Originator**

erjassalazar

**Justification / Rationale**

Adding the online modality.

**Effective Term**

Fall 2022

**Credit Status**

Credit - Degree Applicable

**Subject**

G - Geology

**Course Number**

001

**Full Course Title**

Physical Geology

**Short Title**

PHYSICAL GEOLOGY

**Discipline****Disciplines List**

Earth Science

**Modality**

Face-to-Face

Hybrid

**Catalog Description**

This course serves as an introduction to the study of the origin and composition of Earth. Subject matter for this course includes Earth materials and processes such as minerals, rocks, plate tectonics, earthquakes, and volcanoes. Physical Geology provides a broad understanding and appreciation of Earth and its evolution over time. The laboratory component studies aspects of geology on a practical and applied basis with possible field trips that emphasize the study of local geological systems.

**Schedule Description**

Physical Geology serves as an introduction to the field for majors and those looking to fulfill their general education requirement. Subject matter for this course includes Earth materials and processes such as minerals, rocks, plate tectonics, earthquakes, and volcanoes. Advisory: ENG 001A & MATH 054 IGETC: 5A, 5C

**Lecture Units**

3

**Lecture Semester Hours**

54

**Lab Units**

1

**Lab Semester Hours**

54

**In-class Hours**

108

**Out-of-class Hours**

108

**Total Course Units**

4

**Total Semester Hours**

216

**Prerequisite Course(s)**

Advisory: ENG 001A &amp; MATH 054

**Required Text and Other Instructional Materials****Resource Type**

Book

**Author**

Marshak, Stephen

**Title**

Earth: Portrait of a Planet

**Edition**

6th

**City**

New York

**Publisher**

W. W. Norton Company

**Year**

2019

**College Level**

Yes

**Flesch-Kincaid Level**

13.5

**ISBN #**

9780393617511

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**Resource Type**

Book

**Author**

Marshak, Stephen, Ludman, Allan

**Title**

Laboratory Manual for Introductory Geology

**Edition**

4th

**City**

New York

**Publisher**

W. W. Norton Company

**Year**

2019

**College Level**

Yes

**Flesch-Kincaid Level**

13.5

**ISBN #**

9780393617528

**Class Size Maximum**

28

**Entrance Skills**

Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.

**Requisite Course Objectives**

ENG 001A-Read, analyze, and interpret varied texts (e.g., literary, digital, visual).

**Entrance Skills**

Fully utilize a dictionary, thesaurus and other reference materials

**Requisite Course Objectives**

ENG 001A-Recognize and integrate creative elements of style (e.g., metaphor, analogy, voice, tone).

**Entrance Skills**

Develop, organize and express complex ideas in both expository and research papers

**Requisite Course Objectives**

ENG 001A-Write thesis statements, topic sentences, and ideas in an organized way in essays.

**Entrance Skills**

Demonstrate critical thinking skills when reading, composing and participating in class discussion

**Requisite Course Objectives**

ENG 001A-Read, analyze, and interpret varied texts (e.g., literary, digital, visual).

**Entrance Skills**

Demonstrate independent study skills and learning habits.

**Requisite Course Objectives**

ENG 001A-Participate in the process of developing texts in collaborative and individual settings.

**Entrance Skills**

Compute stream gradients

**Requisite Course Objectives**

MATH 054-Solve equations and inequalities that model application problems and interpret these solutions.

MATH 054-Convert between the geometric (Cartesian) and algebraic representations of a linear relation in two variables. Make use of point-slope and slope intercept forms.

**Entrance Skills**

Convert one type of map scale to another

**Requisite Course Objectives**

MATH 054-Use properties of equality to solve linear equations in one variable and describe the solution using set notation.

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**Entrance Skills**

Convert from metric to English and vice versa

**Requisite Course Objectives**

MATH 054-Convert between the geometric (Cartesian) and algebraic representations of a linear relation in two variables. Make use of point-slope and slope intercept forms.

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**Entrance Skills**

Advisory Skill:  
Construct focused theses

**Requisite Course Objectives**

ENG 001A-Write thesis statements, topic sentences, and ideas in an organized way in essays.

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**Entrance Skills**

Advisory skill:  
Select, develop and organize ideas in a structured format

**Requisite Course Objectives**

ENG 001A-Compose texts with complex sentence structure and appropriate diction.

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**Entrance Skills**

Advisory skill:  
Adequately negotiate a library to find a variety of source material for research including: 1) periodicals; 2) books; 3) electronic data bases; and 4) on-line sources

**Requisite Course Objectives**

ENG 001A-Identify and evaluate appropriate research sources, and incorporate them into essays through quotations, summaries, and paraphrases.

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**Entrance Skills**

Advisory skill:  
Understand and use basic formulas from geometry including perimeter, area and volume

**Requisite Course Objectives**

MATH 054-Add, subtract, multiply, divide and simplify rational expressions.  
MATH 054-Solve rational equations that simplify to linear or quadratic equations.  
MATH 054-Interpret the meaning of the slope of a line as a constant rate of change.  
MATH 054-Use dimensional analysis appropriately in applications.

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**Entrance Skills**

Advisory skill:  
Understand the meaning of the slope of a line and find an equation for a line using general forms including point slope and slope-intercept

**Requisite Course Objectives**

MATH 054-Demonstrate use of the method of completing the square to solve quadratic equations of the form where p and q are integers.  
MATH 054-Add, subtract, multiply, divide and simplify rational expressions.  
MATH 054-Deduce right triangle side lengths using the Pythagorean Theorem and square roots.  
MATH 054-Use basic formulas from geometry to find perimeter, area and volume of basic figures.  
MATH 054-Use proportionality to discover side lengths of similar triangles.

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**Course Content**

1. Introductory overview.
2. Atoms, elements, and minerals.
3. Igneous rocks, intrusive activity, and the origin of igneous rocks.
4. Volcanism and extrusive rocks.
5. Weathering and soil.
6. Sediments and sedimentary rocks.
7. Metamorphism, metamorphic rocks, and hydrothermal rocks.
8. Time and geology.
9. Mass wasting.
10. Streams and floods.
11. Ground water.
12. Glaciers and glaciation.
13. Deserts and wind action.
14. Waves, beaches, and coasts.
15. Geologic structures.
16. Earthquakes.
17. The Earth's interior.
18. The sea floor.
19. Plate tectonics.
20. Mountain belts and the continental crust.
21. Geologic resources.

**Lab Content**

- a. Minerals.
- b. Rocks.
- c. The geologic column and relative geologic time.
- d. Map coordinates and land divisions.
- e. Topographic maps.
- f. Geologic interpretation of topographic maps, aerial photographs, and Earth satellite images.
  - i. Geologic work of running water.
  - ii. Groundwater movement, groundwater pollution, and groundwater as a geologic agent.
  - iii. Glaciers and glacial geology.
  - iv. Landforms produced by wind action.
  - v. Modern and ancient shorelines.
  - vi. Landforms produced by volcanic activity.
- g. Structural features of sedimentary rocks.
- h. Faults and earthquakes.
- i. The use of seismic waves to locate the epicenter of an earthquake.
- j. Sea floor spreading in the Atlantic and Pacific Oceans.
- k. Local geologic features including the San Andreas fault zone, Indio Hills, Mecca Hills, and surrounding mountains.

**Course Objectives**

	<b>Objectives</b>
Objective 1	Identify rocks and minerals, understand how they are formed, and relate their formation to major Earth environments.
Objective 2	Explain diverse weathering and erosional processes and how they relate to particular climates, rock types, and tectonic settings.
Objective 3	Integrate various Earth processes such as mountain building, volcanic activity, and earthquakes into plate tectonic theory.
Objective 4	Define major mineral, water, and energy resource issues and their relationships to environmental concerns.
Objective 5	Understand major geologic hazards and how to avoid or mitigate their effects.
Objective 6	Recognize and analyze geologic features on topographic maps, such as streams and stream valleys, sand dunes, glacial and shoreline features, volcanoes, and fault topography.
Objective 7	Interpret structure and stratigraphy from geologic cross-sections.
Objective 8	Summarize local geology and describe how it relates to lecture and lab topics.

**Student Learning Outcomes**

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

Outcome 1	Describe the current scientific understanding of the origin of the universe and solar system.
Outcome 2	Describe the processes that operate in and on the Earth, the products produced by these processes and their relation to the theory of plate tectonics.
Outcome 3	Recognize and describe the materials that make up Earth.
Outcome 4	Evaluate and explain applications of the scientific method in geology.

**Methods of Instruction**

Method	Please provide a description or examples of how each instructional method will be used in this course.
Laboratory	Mineral and Rock identification, hands on activities, critical thinking activities, interpreting geologic phenomenon
Lecture	PowerPoint presentations, hand-written notes, accompanied images, case studies, classroom samples, local samples

**Methods of Evaluation**

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
College level or pre-collegiate essays	Required on homework, laboratory write-ups and tests	In and Out of Class
Tests/Quizzes/Examinations	Tests on both lecture and lab material will be in class. Quizzes on canvas will be completed out of class	In and Out of Class
Laboratory projects	Complete lab activities in groups or as individuals to complement lecture topics and improve quality of learning of geologic processes	In Class Only
Written homework	Weekly assignments from the textbook and online resources	Out of Class Only

**Assignments**
**Other In-class Assignments**

Discussion of lecture and laboratory topics

**Other Out-of-class Assignments**

- Analysis of textbook materials to summarize data for study-guide questions and in-class discussion and testing.
- Gather information on in-depth aspects of physical geology to organize and interpret in research papers/class oral reports.
- Preparation of in-lab work on exercises by review of lab materials.
- Completion of assigned laboratory exercises.
- Student research projects/oral reports on selected aspects of geology to promote a deeper understanding of these aspects and to become familiar with the methodology of library/internet research and writing and speaking on geology topics.
- Completion of online modules provided by book publisher.

**Grade Methods**

Letter Grade Only

**Distance Education Checklist**

**Include the percentage of online and on-campus instruction you anticipate.**

**Online %**

50

**On-campus %**

50

## Lab Courses

**How will the lab component of your course be differentiated from the lecture component of the course?**

All of the labs are face-to-face and require hands-on learning activities.

**From the COR list, what activities are specified as lab, and how will those be monitored by the instructor?**

Lab assignments will require some group work, studying rock and mineral samples, reading maps, completing case studies and calculations. Lab assignments all require hands on activities that will be completed after short instructions and class discussion,

**How will you assess the online delivery of lab activities?**

Lab activities will be face-to-face.

## Instructional Materials and Resources

**If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?**

N/A

**If used, explain how specific materials and resources outside the LMS will be used to enhance student learning.**

N/A

## Effective Student/Faculty Contact

**Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?**

**Within Course Management System:**

Discussion forums with substantive instructor participation  
Online quizzes and examinations  
Private messages  
Regular virtual office hours  
Timely feedback and return of student work as specified in the syllabus  
Video or audio feedback  
Weekly announcements

**External to Course Management System:**

Direct e-mail  
E-portfolios/blogs/wikis  
Posted audio/video (including YouTube, 3cm mediasolutions, etc.)

**For hybrid courses:**

Field trips  
Orientation, study, and/or review sessions  
Scheduled Face-to-Face group or individual meetings

**Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.**

The strategies listed above will enable communication, prompt feedback on assignments and questions sent to instructor via canvas messenger or email. Field-trips will be helpful in assessing learning and consolidating knowledge.

**If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.**

N/A

## Other Information

**Provide any other relevant information that will help the Curriculum Committee assess the viability of offering this course in an online or hybrid modality.**

Research has shown that STEM classes on a hybrid modality are effective and keep students engaged. It also helps students feel more secure on their learning abilities since they are given the opportunity to go back to explanations and demonstrations as often as they like since they are pre-recorded.

## Comparable Transfer Course Information

### University System

CSU

### Campus

CSU San Bernardino

### Course Number

Geol 101

### Course Title

Introductory Geology

### Catalog Year

2011

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### COD GE

C1 - Natural Sciences

### CSU GE

B1 - Physical Science

B3 - Laboratory Activity

### IGETC GE

5A - Physical Science

5C - Science Laboratory

## MIS Course Data

### CIP Code

40.0601 - Geology/Earth Science, General.

### TOP Code

191400 - Geology

### SAM Code

E - Non-Occupational

### Basic Skills Status

Not Basic Skills

### Prior College Level

Not applicable

### Cooperative Work Experience

Not a Coop Course

### Course Classification Status

Credit Course

### Approved Special Class

Not special class

### Noncredit Category

Not Applicable, Credit Course

### Funding Agency Category

Not Applicable

### Program Status

Program Applicable

**Transfer Status**

Transferable to both UC and CSU

**General Education Status**

Y = Not applicable

**Support Course Status**

N = Course is not a support course

**C-ID**

GEOL 101

**Allow Audit**

No

**Repeatability**

No

**Materials Fee**

No

**Additional Fees?**

No

**Approvals****Curriculum Committee Approval Date**

3/03/2020

**Academic Senate Approval Date**

3/12/2020

**Board of Trustees Approval Date**

5/15/2020

**Course Control Number**

CCC000446027

**Programs referencing this course**

Anthropology AA-T Degree (<http://catalog.collegeofthedesert.eduundefined/?key=14>)

Geography AA-T Degree (<http://catalog.collegeofthedesert.eduundefined/?key=15>)

Environmental Science AS-T (<http://catalog.collegeofthedesert.eduundefined/?key=216>)

Liberal Arts: Math and Science AA Degree (<http://catalog.collegeofthedesert.eduundefined/?key=29>)

Geology AS-T Degree (<http://catalog.collegeofthedesert.eduundefined/?key=42>)

Natural Resources AS Degree (transfer preparation) (<http://catalog.collegeofthedesert.eduundefined/?key=71>)