

GEOL112 : Environmental Geology Laboratory

General Information

Author:	<ul style="list-style-type: none">Rachel Ridgway
Course Code (CB01) :	GEOL112
Course Title (CB02) :	Environmental Geology Laboratory
Department:	GEOL
Proposal Start:	Winter 2025
TOP Code (CB03) :	(1914.00) Geology
CIP Code:	(40.0601) Geology/Earth Science, General.
SAM Code (CB09) :	Non-Occupational
Distance Education Approved:	No
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000046368
Curriculum Committee Approval Date:	09/11/2024
Board of Trustees Approval Date:	10/15/2024
Last Cyclical Review Date:	09/11/2024
Course Description and Course Note:	GEOL 112 is an introduction to the common laboratory practices and exercises in environmental geology. Laboratory exercises include analyzing topographic and geological maps and aerial and satellite imagery. Students also identify common mineral and rock samples, water and soil analysis and integrate data from a variety of print and electronic sources to complete problem solving exercises.
Justification:	Mandatory Revision
Academic Career:	<ul style="list-style-type: none">Credit
Mode of Delivery:	No value
Author:	<ul style="list-style-type: none">Rachel Ridgway
Course Family:	No value

Academic Senate Discipline

Primary Discipline:	<ul style="list-style-type: none">Earth Science
Alternate Discipline:	No value
Alternate Discipline:	No value

Course Development

Basic Skill Status (CB08)

Course is not a basic skills course.

Allow Students to Gain Credit by Exam/Challenge

Course Special Class Status (CB13)

Course is not a special class.

Pre-Collegiate Level (CB21)

Not applicable.

Grading Basis

- Grade with Pass / No-Pass Option

Course Support Course Status (CB26)

Course is not a support course

General Education and C-ID

General Education Status (CB25)

Not Applicable

Transferability

Transferable to both UC and CSU

Transferability Status

Approved

IGETC Area

5C-Science Laboratory

Area

Science
Laboratory

Status

Approved

Approval Date

02/18/2004

Comparable Course

No Comparable Course defined.

CSU GE-Breadth Area

B3-Laboratory Activity

Area

Laboratory
Activity

Status

Approved

Approval Date

09/01/2004

Comparable Course

No Comparable Course defined.

C-ID

GEOL

Area

Geology

Status

Pending

Approval Date

No value

Comparable Course

GEOL 130 L - Environmental Geology
Laboratory

Units and Hours

Summary

Minimum Credit Units (CB07) 1

Maximum Credit Units (CB06) 1

Total Course In-Class (Contact Hours) 54

Total Course Out-of-Class Hours 0

Total Student Learning Hours 54

Credit / Non-Credit Options

Course Type (CB04)

Credit - Degree Applicable

Noncredit Course Category (CB22)

Credit Course.

Noncredit Special Characteristics

No Value

Course Classification Code (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 Class
Lecture Hours	0	0
Laboratory Hours	3	0
Studio Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54
Course In-Class (Contact) Hours	
Lecture	0
Laboratory	54
Studio	0
Total	54
Course Out-of-Class Hours	
Lecture	0
Laboratory	0
Studio	0
Total	0

Time Commitment Notes for Students

No value

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**

GEOL102 - Environmental Geology

Objectives

- Demonstrate a fundamental understanding of concepts, principles and interactions of Earth's systems, including: the rock cycle, plate tectonics, the hydrologic cycle, geologic hazards, the greenhouse effect, and the interactions between the geosphere, hydrosphere, atmosphere, and biosphere.
- Communicate impacts of energy and resource use on the environment, including climate change, waste disposal, water and air pollution.

- Recognize and describe risk factors for geologic hazards such as earthquakes, volcanism, flooding, and mass wasting; and describe how scientific process provides the information needed to develop viable mitigation strategies to address these hazards.
- Explain how evidence is used to support our understanding of Earth systems through the application of the scientific method.
- Use writing and diagrams to effectively explain complex concepts such as geologic processes, climate system dynamics, and resource management.

OR

Co-Requisite

GEOL102 - Environmental Geology

GEOL 102 may be taken concurrently.

Entry Standards

Entry Standards

Course Limitations

Cross Listed or Equivalent Course

Specifications

Methods of Instruction

Methods of Instruction Collaborative Learning

Methods of Instruction Multimedia

Methods of Instruction Lecture

Methods of Instruction Discussion

Methods of Instruction Field Activites (Trips)

Out of Class Assignments

- Field trip reports (e.g. write a report which analyzes elements of an area's geologic history)
- Laboratory reports

Methods of Evaluation

Exam/Quiz/Test

Exam/Quiz/Test

Exam/Quiz/Test

Project/Portfolio

Rationale

Quizzes

Midterm exam including essay or short answer questions

Final exam including essay or short answer questions

Instructor-directed student projects for evaluation by peers and/or the instructor

Textbook Rationale

There are no environmental geology lab manuals more recent than the one listed below. Faculty have adapted lab exercises from these texts and other OER sources.

Textbooks

Author

Title

Publisher

Date

ISBN

Freeman, Tom

Environmental Geology
Laboratory Manual. 2nd ed.

Wiley

2011

978-0470136324

Pearson Prentice Hall

Hazard City: Assignments in
Applied Geology. 4th ed.

Pearson Prentice
Hall

2011

Other Instructional Materials (i.e. OER, handouts)

Description

Labs written by the instructor

Author

No value

Citation

No value

Online Resource(s)

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

Demonstrate a fundamental understanding of concepts, principles and interactions of Earth's systems including: the Hydrologic Cycle, the Rock Cycle, plate Tectonics, geologic Hazards, impacts of Energy and Resource Usage climate, Climate Change and the Greenhouse Effect connectivity between Geosphere, Atmosphere, Hydrosphere and biosphere.

Articulate how human activities impact the environment.

Recognize and understand how to mitigate geologic hazards.

Communicate complex course concepts effectively in writing and diagrams.

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

Practically apply the principles of the scientific method.

SLOs

Conduct scientific experiments and write lab reports that document the use of the scientific method.

Expected Outcome Performance: 70.0

Use geologic and topographic maps to identify potential geologic hazards and resources.

Expected Outcome Performance: 70.0

Diagram the major components that comprise the hydrologic cycle, the rock cycle, and the carbon cycle, illustrating the connectivity between Geosphere, Atmosphere, Hydrosphere, Cryosphere, and Biosphere.

Expected Outcome Performance: 70.0

Course Content

Lecture Content

No value

Laboratory/Studio Content

Earth Materials (10 hours)

- Mineral properties and identification
- Rock types, properties, and identification
- Soil types and identification

Plate Tectonics and Geologic Structures (4 hours)

- Plate boundaries, stress types, rates of motion
- Identification of geologic structures and their correlation with plate boundaries, stress, and geologic hazards

Biogeochemical Cycles (4 hours)

- Carbon cycle
- Nitrogen cycle
- Water cycle in atmosphere
- Ocean circulation (optional here)

Geologic Hazards (16 hours)

- Earthquake measurements, disasters mitigation strategies, and seismic risk analyses
- Volcanoes, volcanic materials, and volcanic eruptions
- Tsunami
- Landslides and avalanches
- River processes, flood hazards, and mitigation strategies
- Coastal processes and hazards
- Extreme weather events

Climate Change, Environmental Pollution and Waste Disposal (10 hours)

- Atmospheric and ocean circulation
- Climate change
- Surface water pollution (point and non-point sources)
- Soil degradation and groundwater pollution
- Air pollution, acid rain, and the ozone problem Solid waste disposal

Earth's Resources and Sustainable Growth (10 hours)

- Agriculture, aquaculture, and food resources
- Soil, water, and forest resources
- Extraction and use of metallic and nonmetallic mineral resources and its environmental impact
- Energy resources
- Population growth, economic imperatives, and the earth's environment in crisis

Total Hours: 54

Additional Information

Is this course proposed for GCC Major or General Education Graduation requirement? If yes, indicate which requirement in the two areas provided below.

Yes

GCC Major Requirements

No Value

GCC General Education Graduation Requirements

Natural Sciences

Repeatability

Not Repeatable

Justification (if repeatable was chosen above)

No Value

Resources

Did you contact your departmental library liaison?

No

If yes, who is your departmental library liaison?

Caroline Hallam (Mathematics, Physical Science)

Did you contact the DEIA liaison?

No

Were there any DEIA changes made to this outline?

No

If yes, in what areas were these changes made:

No Value

Will any additional resources be needed for this course? (Click all that apply)

- New Equipment
- Hardware or Software (include software license renewal)

If additional resources are needed, add a brief description and cost in the box provided.

Augmented reality sandbox (~\$8,000)