ESCI 123: GEOLOGY AND ENVIRONMENTAL JUSTICE

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2026
Credits:	3
Total Contact Hours:	54
Lecture Hours :	54
Lab Hours:	0
Hours Arranged:	0
Outside of Class Hours:	108
Total Student Learning Hours:	162
Strongly Recommended:	ENGL C1000.
District General Education:	B2. Physical Science
Transferable to CSU:	Yes
Transferable to UC:	Yes - Proposed
Grading Method:	Standard Letter

Catalog Course Description

An introduction to environmental geology that examines Earth processes and resources through the lens of equity and social/economic justice. Students will study plate tectonics, geologic hazards, water and energy resources, and climate change, while analyzing how these issues disproportionately affect marginalized communities around the world. Students will gain the tools to evaluate hazards, propose sustainable solutions, and understand the human dimensions of geology. 54 lecture hours.

Course Objectives

- Describe fundamental concepts and interactions of Earth systems, including the hydrologic, rock, and carbon cycles, and the interactions among the geosphere, atmosphere, hydrosphere, and biosphere.
- Explain the principles of plate tectonics, geologic time, and Earth structures.
- Identify and evaluate natural hazards such as earthquakes, floods, volcanoes, mass wasting, extreme weather, and sea-level change.
- Analyze human impacts on Earth systems, including climate change, pollution, and resource extraction.
- Interpret and communicate scientific data using maps, graphs, cross-sections, and case studies.
- Examine case studies that illustrate inequities in environmental hazards and resource access.
- Propose evidence-based strategies for hazard mitigation and sustainable resource management.
- Critically evaluate how environmental challenges disproportionately impact marginalized communities, and apply principles of environmental justice to assess potential solutions that promote equity and sustainability.

Major Course Content

1. **Earth Systems and Cycles**
   a. Rock cycle
   b. Hydrologic (water) cycle
   c. Carbon cycle
   d. Interactions among geosphere, hydrosphere, atmosphere, and biosphere
   e. Weather and climate processes
2. **Plate Tectonics and Earth History**
   a. Geologic time and Earth history
   b. Plate tectonic processes
   c. Geologic structures
3. **Earth Resources**
   a. Rocks and minerals
   b. Soils
   c. Water resources (surface and groundwater)
   d. Energy resources (fossil fuels and renewables)
   e. Human impacts: extraction, exploitation, population growth, waste generation
   f. Case studies of resource conflicts and environmental justice (mining, water rights, fossil fuels)
4. **Geologic Hazards**
   a. Earthquakes and tsunamis
   b. Volcanic activity
   c. Mass wasting and landslides
   d. Flooding, drought, and erosion
   e. Coastal hazards
   f. Groundwater quality, land subsidence, and pollution
   g. Climate change, extreme weather, and sea-level rise
   h. Case studies of disasters and inequitable recovery (such as Hurricane Katrina, wildfire exposure)
5. **Human Impacts and Environmental Justice**
   a. Climate change and greenhouse effect
   b. Pollution and land-use change
   c. Urban geology and vulnerability (heat islands, groundwater access, landslide/flood risk in marginalized communities)
   d. Indigenous land and sovereignty in geoscience (such as Standing Rock, Bears Ears)
6. **Scientific Method and Data Interpretation**
   a. Hypothesis testing and systems thinking in geoscience
   b. Use of maps, graphs, time series, and geospatial data in environmental problem-solving
7. **Communication and Solutions**
   a. Writing, visual, and oral communication of geoscience concepts
   b. Equity-focused strategies for hazard mitigation and sustainable resource management
   c. Capstone integration: environmental justice action memo or policy proposal

Suggested Reading Other Than Required Textbook

Peer-reviewed journal articles on groundwater contamination, disaster recovery, and mining impacts
U.S. Geological Survey (USGS) hazard maps and reports

Intergovernmental Panel on Climate Change (IPCC) Climate Assessment Summaries
News/media coverage of environmental justice case studies (Flint water crisis, Standing Rock)

Examples of Required Writing Assignments

Write a 2-3 page case study analysis on the Flint water crisis, linking hydrogeology to issues of equity and governance.
Develop a 4-5 page “Environmental Justice Action Memo” proposing mitigation strategies for a hazard in a selected community.
Compose a reflective essay comparing scientific reports and media coverage of a recent natural disaster, highlighting differences in framing and equity.
Produce a figure and caption assignment (map, cross-section, or data graph) with a 150-word explanation of the geoscience process and its social implications.

Examples of Outside Assignments

Analyze and interpret USGS ShakeMap data for a recent earthquake and submit a short hazard risk summary.
Create a community hazard map using local city planning or FEMA floodplain data.
Review and critique a documentary or podcast related to environmental justice (example: There’s Something in the Water).
Conduct field observations of a local site (river, hillside, or urban heat island) and prepare a photo log with annotations.

Instruction Type(s)

Lecture, Online Education Lecture