

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

GEOLOGY 122 – REGIONAL FIELD STUDIES IN PHYSICAL GEOGRAPHY AND GEOLOGY OF DESERT ENVIRONMENTS

1 hour lecture, 1 hour laboratory, 1 unit

Catalog Description

Are you interested in science and enjoy spending time outdoors? Explore the desert and learn about regional geology and geography with this field studies course! Regional Field Studies in Physical Geography and Geology of Desert Environments provides focused experience in geological and geographical field studies of desert environments in California and western North America. This course emphasizes use of the scientific process, observation, and interpretation of geologic and geographic phenomena in desert environments through direct experience in a field setting. This course centers around multi-day weekend field trips to desert environments in addition to on-campus meetings prior to and immediately following the field trips. Students must supply their own camping gear (sleeping bag, tent, etc.) and attend all class meetings and field trips. *Also listed as GEOG 122. Not open to students with credit in GEOG 122.*

Prerequisite

None

Recommended Preparation

“C” grade or higher or “Pass” in GEOG 120, GEOL 104, or GEOL 110 or concurrent enrollment

Entrance Skills

Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:

- 1) Recognize Earth’s spheres (lithosphere, hydrosphere, atmosphere, biosphere) and the interconnections between each sphere.
- 2) Employ the scientific process to make observations, develop hypotheses, test hypotheses and draw conclusions.
- 3) Understand and apply basic geographic and geologic principles.
- 4) Interpret basic topographic and geologic map data.

Course Content

Topics investigated in a field setting include:

- 1) Field investigations and applications of geologic and physical geography phenomena in desert environments of western North America.
- 2) Application of the scientific process in the field.
- 3) Interactions within and between the atmosphere, hydrosphere, lithosphere and biosphere in desert environments.
- 4) Mapping geologic and geographic features and structures in the desert environments.
- 5) Regional plate tectonics and interpretation of geologic history of western North America as it pertains to the development of desert environments.
- 6) The formation of minerals and relationship between minerals and igneous, sedimentary and metamorphic rocks.
- 7) Regional surface and geomorphic processes and landforms found in desert environments.
- 8) Weathering and erosion in desert environments and the connection between weathering and climate.

- 9) Formation and evolution of deserts over geologic time.
- 10) Intersection between local geology, climate, and vegetation in desert regions.
- 11) Human impact on the local, regional, and global desert environments.
- 12) California and western North America geology in context of global plate tectonics and geologic events.
- 13) Communication of scientific knowledge to peers.

Course Objectives

Students will be able to:

- 1) Identify interactions within each of Earth's spheres and the connections between the spheres.
- 2) Identify igneous, sedimentary, and metamorphic rocks in desert environments.
- 3) Identify minerals that compose an unknown rock in the field environment.
- 4) Use geologic and topographic maps to understand a field site.
- 5) Recognize geomorphic and geographic features in the desert field environment.
- 6) Assess different stages of desert development based on observable features in the field.
- 7) Differentiate between physical and chemical weathering and recognize weathering and erosional features in the field.
- 8) Relate weathering and erosional rates to the climate of the region.
- 9) Describe the theory of plate tectonics and the different ways in which tectonic plates can interact.
- 10) Evaluate how plate tectonics have led to the development of the desert field sites.
- 11) Analyze how the regional plate tectonics relate to global tectonics.
- 12) Assess human interactions and modification of desert environments at a local, regional, and global scales.
- 13) Constructively collaborate with classmates to successfully complete a project in the field environment.
- 14) Develop science communication skills.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation.

- 1) Field-trip guides for each field trip will measure the student's ability to investigate geologic and geographic principles, processes, and phenomena in the field.
- 2) Field-trip follow-up written essay assignments will measure the student's ability to analyze, interpret and evaluate geologic and geographic processes and features in a field setting.
- 3) A geologic mapping project will measure the student ability to explore and evaluate geologic and geographic relationships such as rock type, deformation features, and geomorphic features.

Special Materials Required of Student

- 1) Camping gear including sleeping bag, tent, eating utensils, etc.
- 2) Field gear including sturdy hiking boots, warm/cold weather clothing and rain gear
- 3) Field notebook and hand lens.

Minimum Instructional Facilities

- 1) Campus meetings: Smart classroom
- 2) Field trip:
 - a. Rock hammers, geologic compasses, and appropriate field equipment
 - b. Field guides, topographic maps, transportable white board, and clipboards

Method of Instruction

- 1) Integrated lecture, discussion and demonstration in a field setting
- 2) Small and large group discussion in a field setting
- 3) Hands-on field activities
- 4) Instructional slides, audio/video presentations during on-campus meetings

- 5) Auxiliary use of study groups, peer tutoring and/or instructional office hours

Out-of-Class Assignments

- 1) Reading assignments
- 2) Written reports and projects
- 3) Online discussions

Texts and References

- 1) Required (representative examples): Reading materials will be different for each class depending on the area visited and may include any of the following:
 - a. Selected readings from appropriate geology or physical geography texts including, but not limited to:
 1. Understanding Earth (8th Edition) by Grotzinger and Jordan 2019
 2. Applied Physical Geography: Geosystems in the Laboratory (10th Edition) by Christopherson 2017.
 - b. Selected articles from scientific journals
 - c. Regional books, maps and charts as relevant to the area visited
- 2) Supplemental: As assigned by instructor

Exit Skills

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Recognize interactions between Earth's spheres (lithosphere, hydrosphere, atmosphere, biosphere) and their impact of geologic and geographic processes in desert environments.
- 2) Employ the scientific process to make observations, develop hypotheses, test hypotheses and draw conclusions about desert environments in geological and geographical context.
- 3) Collect data in the field and develop basic geologic maps of a desert regions.
- 4) Identify different minerals and rock types in desert environments and use this information to interpret the geologic history of a field site.
- 5) Recognize deformation features and interpret the type of stress involved to create the features.
- 6) Identify geologic and geographic landforms in desert environments and interpret how they formed due to interactions between the lithosphere and climate and assess the stage of desert development.
- 7) Relate regional western North American geology to global geologic and geographic processes, including the distribution of continents and global events.
- 8) Effectively communicate geologic and geographic information to others.

Student Learning Outcomes

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

- 1) Identify, interpret, and evaluate the geographic and geologic processes involved in shaping desert landscapes and assess the stage of desert development.
- 2) Evaluate human impact on the desert environment in the context of global climate change.
- 3) Constructively work as a member of a team and effectively communicate geologic and geographic information.