GEOL A133: GEOLOGIC FIELD STUDIES - COLORADO PLATEAU

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	191400 - Geology
Units	4 Total Units
Hours	180 Total Hours (Lecture Hours 18; Lab Hours 162)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)

Course Description

This course offers students an opportunity to explore fundamental geological concepts in a field-based setting. Pre-trip meetings will orient students to the tectonic, petrologic, historical and geomorphological setting of the Colorado Plateau. This course includes a multi-day field excursion to study the geology of the Colorado Plateau region. Emphasis is on the stratigraphy, tectonic evolution and geologic history of the parks of the Southwest, including the Grand Canyon, Canyonlands, Arches, Capitol Reef, Bryce and Zion National Parks. 18 hours lecture, 18 hours scheduled lab, 144 hours field study lab. ADVISORY: GEOL A105, GEOL A105H, or GEOL A110. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Synthesize field observations into a cohesive geologic and tectonic history of the region.
2. Summarize the geologic time scale and relate it to field observations.
3. Research a regional tectonic, paleogeographic or geologic history topic and present it to the class.

Course Objectives

- 1. Demonstrate a mastery of the Universal Geologic Time Scale and its relationship to the Colorado Plateau
- 2. Construct a composite stratigraphic column incorporating all locations investigated
- 3. Interpret facies characteristics of the Paleozoic to recent sedimentary rock record of the Colorado Plateau
- 4. Interpret regional facies maps and paleogeographic maps
- 5. Apply the model of plate tectonics to the geologic/tectonic evolution of the Colorado Plateau region
- 6. Integrate the geologic history of the are with that of the Sierra Nevada and Death Valley
- 7. Construct a geologic history of the area, using field evidence collected on the trip
- 8. Take accurate and comprehensive field notes on observations made in the region
- 9. Synthesize a component of the regional-tectonic, paleogeographic or geologic history of the region and formally present this material in a seminar format

Lecture Content

Colorado Desert/Basin and Range Flagstaff volcanic area (San Francisco Peaks) Grand Canyon National Park Glen Canyon Dam Navajo National Monument Monument Valley Goosenecks of the San Juan State Park Natural Bridges National Monument Canyonlands National Park Arches National Park LaSal Mountains/Castle Valley Colorado National Monument San Raphael Swell Capitol Reef National Park Bryce National Park Zion National Park Valley of Fire State Park

Lab Content

Mineral identification using classification charts Identification of igneous, sedimentary and metamorphic rocks using classification charts Identification and anlysis of the relative sequence of events from observable rock layers, faults, and other geologic landforms Locate, identify and analyze landforms associated with physical weathering processes (ie. exfoliation domes, river deposits and erosional features, landslides). Locate. identify and analyze landforms (ie. batholithic igneous rocks, faults) in the field, as indicators of modern and past tectonic settings Locate, identify and analyze glacial landforms in the field

Method(s) of Instruction

- Lecture (02)
- Lab (04)
- Field Experience (90)

Instructional Techniques

Instructor evaluation for the field notebook/journal content, which should include: explanaton of the natural history and basic geology of the area document field trip activities and exercises (data collection) written synopsis of geologic principles as they apply to the national park's visited Instructor evaluation fo in-field participation that demonstrates the student's ability to: analyze geologic processes in the field identify basic rocks and minerals analyze and interpret topographic and geologic maps collect field information and data by accurately using field equipment and instrumentation participate in discussion and cooperative group activities

Reading Assignments

Students will spend approximately two hours per week on 1. Readings assigned from textbook(s) and handouts. 2. Readings of textbook, scientific reports and journal articles that emphasize the geology to be studied in the field

Writing Assignments

Students will spend approximately two hours per week on the following: 1. Written assignments that analyze and critically evaluate field geology in different regimes 2. Individual note-taking field notebooks for each field problem 3. Recording of field data and information correctly in field notebooks/journals. 4.Analyze and interpret field data, and provide accurate summaries of the geologic history.

Out-of-class Assignments

Students will spend approximately two hours per week on: 1. Readings assigned from textbook(s) 2. Complete various field exercises and problem solving exercises 3. Sketches of the geologic structures within the rocks. 4. Measurements of glacial striations for example.

Demonstration of Critical Thinking

Regular participation in class discussions and question and answer sessions is required. Examinations and quizzes will be given which are designed to determine the students comprehension of materials presented in class. Question types may include but are not limited to: essay and short answer, fill-in-the-blank, multiple choice, true and false, matching, draw-and-label the diagram questions and the reading and interpretation of geologic maps. Class and individual projects (as outlined above) designed to help the students understand geological concepts will be collected for evaluation. The completeness and correctness of these assignments will provide a measure of the level of understanding each student has achieved and if the students are indeed moving toward the student learning outcomes.

Required Writing, Problem Solving, Skills Demonstration

Produce a written synopsis of geologic principles as they apply to the areas visited Computational or non-computational problem-solving demonstrations, including: homework problem(s) other (specify) : map work based on landscape identification Written reports may be assigned which are designed to allow the students to explore specific geology topics in greater depth. Completion of the reports will expose students to a greater breadth of information and will demonstrate to the instructor whether or not the students are able to utilize the materials covered in class to gain a broader understanding of a topic explored on their own.

Eligible Disciplines

Earth science: Master's degree in geology, geophysics, earth sciences, meteorology, oceanography, or paleontology OR bachelor's degree in geology AND master's degree in geography, physics, or geochemistry OR the equivalent. Master's degree required.

Textbooks Resources

1. Required Filmore, R.. Geological Evolution of the Colorado Plateau of Eastern Utah and Western Colorado, 1st ed. University of Utah Press, 2011 2. Required Baars, D. L.. The Colorado Plateau: A Geologic History, 2nd ed. University of New Mexico Press, 2000 Rationale: .