GEOL A142: GEOLOGIC FIELD STUDIES - HAWAII VOLCANOLOGY

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	191400 - Geology
Units	2.5 Total Units
Hours	117 Total Hours (Lecture Hours 9; Lab Hours 108)
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, structural, plutonic and volcanic features of the Hawaiian Islands with special emphasis on Kilauea volcano. Kilauea's long-documented eruptive history and easy accessibility make it a training ground for USGS volcanologists. Focuses on the history and features of the volcano and its interactions with the people that live on it. This course includes a multi-day field excursion to various locales of geological interest and may involve camping in primitive wilderness environments. ADVISORY: GEOL A105 or GEOL A105H or GEOL A110. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Summarize the evolution of the Hawaiian Islands, the island of Hawaii, and Kilauea volcano.
2. Develop field-note taking and mapping skills and create a comprehensive field course notebook.
3. Investigate geologic features and processes in the field and synthesize them into a cohesive structural and geologic history of the region.

Course Objectives

- 1. Relate the evolution of the Hawaiian Islands to the Hawaiian Island Hot Spot.
- 2. Identify, classify, and interpret the various rocks and minerals observed.
- 3. Demonstrate a mastery of the historical events for the ?Big? Island and for the Kilauea volcano, in particular.
- 4. Describe and define the volcanological terms and processes.
- 5. Recognize and interpret the landforms that result from the interaction of volcanic, structural and fluvial processes on the island.
- 6. Analyze the processes that cause the petrologic and chemical trends observed for the various volcanoes on the island.
- 7. Take accurate and comprehensive field notes on observations made in the area.
- 8. Create an accurate geologic map of structural and volcanological features on Kilauea.
- 9. Interpret geologic maps and cross-sections for all locations investigated.
- 10. Analyze the seismic, tsunami, and volcanic risks associated with living on a shield volcano.

Lecture Content

Hot spot processes Volcanic and plutonic rock types Structural processes of shield volcanoes Explosive and effusive volcanic processes Explosive and effusive volcanic textures History of the Kilauea and adjacent calderas Effusive volcanic landforms Rift zone processes and features Lava tube features and processes Processes of pahoehoe and A a flows Human interaction with volcanic hazards (flows, earthquakes, explosive events, and tsunamis)

Lab Content

A. Geologic time/time scale B. Types of faults (and causitive forces) C. Principles of geology D. Types of folds and their significance E. Types of unconformities and their significance F. Volcanic rock types, processess and resulting landforms of the region G. Plate tectonic processes and associated features H. Metamorphic rocks, processes and protoliths I. Field collection and interpretation of fossils

Method(s) of Instruction

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

Instructional Techniques

A. Lecture and application of ideas B. Individual, paired and small group exercises C. Independent study

Reading Assignments

Students will spend approximately two hours per week on readings assigned from the assigned textbook along with journal articles that expose students to current ongoing research in the area.

Writing Assignments

Students will spend approximately 2 hours per week utilizing written field notebook from trips, this will include lecture material and field observations.

Out-of-class Assignments

Students will spend approxiamtely two hours per week on homework including textbook exercises. Field trips will be given. This may include the generation of a field notebook based on field observations and lecture material.

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. Tests, problem solving, final examination, field project/video essays and field trip notebook.

Required Writing, Problem Solving, Skills Demonstration

Produce a written synopsis of geologic principles as they apply to the Hawaiian Islands. 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. Compilation of the field notebook, generation of geologic map and stratigraphic column for the area(s) studied. Construction of a geologic history of the area.

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 Hazlett, R.. Explore the Geology of Kilauea Volcano, 1st ed. Hawaii Pacific Parks Association, 2014 2. Required MacDonald, G., Abbott, A. Peterson, F.. Volcanoes in the Sea: The Geology of Hawaii, 2nd ed. University of Hawaii Press, 1983 Rationale: .