GEOL A134: GEOLOGIC FIELD STUDIES - CASCADE RANGE

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 Cascade Range of Northern California, Oregon and Washington. The course combines classroom and field studies of Pacific Northwest geology with an emphasis on the volcanic and geothermal features of Mt. Lassen, Mt. Shasta, Crater Lake, Medicine Lake and Lava Beds National Monument. 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, GEOL A105H, or GEOL A110. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Students will learn the nature of geologic field work and of using the scientific method to interpret and analyze physical and human landscapes.
2. Students will be able to apply concepts - from recent research, texts and the classroom - to real world field observations.

Course Objectives

- 1. Describe and apply basic geologic concepts in actual field settings
- 2. Learn to apply scientific methods in field studies
- 3. Observe present geologic processes and their products and apply them to structures found in the rock record (uniformitarianism)
- 4. Gain an appreciation for natural settings and teach the importance of protecting our wilderness resources for future generations

Lecture Content

Introduction to the basic concepts of physical geology Geologic setting of the Pacific Northwest and Cascade Range Earth's internal structure plate tectonics and plate boundary processes dynamics of the Cascadia subduction zone Basin and Range extension Examination of literature defining and explaining processes responsible for shaping various geologic provinces in California, Oregon and Washington Using the concepts of the scientific method and uniformitarianism in field studies to interpret geologic processes and their products both past and present

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 Analyze and interpret topographic amd geologic maps Compilation of field reports and field notebooks

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 Cascade Range Instructor evaluation for 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 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 lava flows or size of pyroclasts 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 Cascade Range 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 Orr, W. N., and Orr, E. L.. Geology of the Pacific Northwest, 2nd ed. Waveland Pr Inc, 2006 Rationale: . 2. Required Hill, R.. Volcanoes of the Cascades: Their Rise And Their Risks, 1st ed. Falcon Guides, 2004 Rationale: . 3. Required Harris, S. L.. Fire Mountains of the West: The Cascade and Mono Lake Volcanoes, 2nd ed. Mountain Press Publishing Company, 2003 Rationale: .