BIOL 0016G - WEEKEND FIELD PALEONTOLOGY AND ANCIENT ENVIRONMENTS

Catalog Description

Also known as ESCI 16G
Hours: 30 (12 lecture, 18 laboratory) per unit
Description: Investigations into the ecology of environments in the geologic past through field work at fossil sites. Comparisons and contrasts made between ancient (fossil) communities and the current (living) communities of selected study sites. Differences and similarities between the plants and animals used as evidence to reconstruct ancient ecological communities. This class requires the ability to hike moderate distances on uneven ground. This class will involve camping in either developed campsites or in undeveloped wilderness areas. (CSU)

Course Student Learning Outcomes

- CSLO #1: Interpret the stratigraphy to explain the paleoenvironmental setting of fossils.
- CSLO #2: Apply principles of geology, biology and ecology in order to reconstruct the paleoenvironment.
- CSLO #3: Collect, classify, and catalog paleontological specimens.
- CSLO #4: Accurately document and interpret paleoecological observations made during a field trip.

Effective Term

Fall 2021

Course Type

Credit - Degree-applicable

Contact Hours

30-60

Outside of Class Hours

24-48

Total Student Learning Hours

54-108

Course Objectives

Course objectives are linked to items in the course content outline (parentheses)
Lecture Objectives:
1. Evaluate the basic principles of geology and ecology as they apply to field paleontology. (Lecture outline #1, #2)
2. Hypothesize how the fossilization process and the processes of erosion leads to the formation and discovery of fossils. (Lecture outline #1, #2)
3. Outline the taxonomical characteristics that enable proper identification of organisms collected from the field. (Lecture outline #3)
4. Explain preparedness principles for field experience including personal safety, navigation techniques, field research, and legal considerations. (Lecture outline #4)
5. Outline and evaluate the primary techniques for the proper field collection of fossils. (Lecture outline #5)
Laboratory/Field Objectives:
1. Apply preparedness principles during the field experience including personal safety, navigation techniques, field research, and legal considerations. (Lab outline #1, #2)
2. Demonstrate proper techniques for finding, cataloging and preserving fossil materials. (Lab outline #1, #2)
3. Assess principles of ecology, biology and geology in order to reconstruct an ecosystem description of the ancient environment being studied. (Lab outline #3, #4, #5, #6)
4. Demonstrate the basic principles of geology and ecology as they apply to field paleontology. (Lab outline #1, #2)
5. Deduce valid conclusions as to the biological composition of ancient environments from evidence found at selected fossil sites. (Lab outline #6, #7)
6. Demonstrate the use of taxonomical characteristics for proper identification of organisms collected from the field. (Lab outline #7)
7. Create a detailed field journal or summary report documenting the field experience. (Lab outline #8)

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Projects
  - Example: To address Course Lecture Objective #1, "Evaluate the basic principles of geology and ecology as they apply to field paleontology", students might be asked, either individually or in groups, to prepare a short oral presentation or written report or participate in a class discussion about such principles and how they apply to the field sites visited. Students could be evaluated on participation, accuracy of information, attention to detail, and completeness.
- Reports
  - Example: To address Course Lab Objective #7, "Create a detailed field journal or summary report documenting the field experience", students might be asked to write a report summarizing the sites visited, geological and ecological features observed, and fossils encountered. Students could be evaluated based on accuracy of information, attention to detail, and completeness of summary.
- Skill Demonstrations
  - Example: To address Course Lab Objective #6, "Demonstrate the use of taxonomical characteristics for proper identification of organisms collected from the field", students might be asked to use a taxonomic key or guide to correctly identify an organism. Students could be evaluated on the correctness of the answer, technique, and understanding of terminology in the key.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion

Lab:

1. To address Course Lab Objective #2, "Demonstrate proper techniques for finding, cataloging and preserving fossil materials", the instructor might demonstrate how to determine locations best suited for location of fossils and how to initiate a dig. Students will then use these techniques to evaluate possible dig locations in the field and justify their choices.
2. To address Course Lab Objective #4, "Demonstrate the basic principles of geology and ecology as they apply to field paleontology", the instructor might point out key geological features in the field, making comparisons to other such features observed in the field or described in the classroom. Students will then make and record their own observations.

Lecture:

1. To satisfy Course Lecture Objective #5, "Outline and evaluate the primary techniques for the proper field collection of fossils", the instructor might prepare a lecture (supplemented by images and/or video) on the proper way to excavate and preserve a fossil in the field. Students will then use correct procedure to excavate and preserve specimens they locate in the field.
2. To satisfy Course Lecture Objective #2, "Hypothesize how the fossilization process and the processes of erosion leads to the formation and discovery of fossils", the instructor might lead an in-class discussion about the fossilization process.

Typical Out of Class Assignments

Reading Assignments

1. To address Course Lecture Objective #4, students will be asked to read location specific materials before going into the field (e.g. The Bridger Formation in Wyoming). Students will use the information to identify rock formations and fossils encountered during the trip. 2. To address Course Lecture Objective #2 and Course Laboratory Objective #8, students will be asked to review maps and information on the site to be visited during the trip. This information is essential to prepare the students to identify and record the organisms they encounter on the trip.

Writing, Problem Solving or Performance

1. To address Course Laboratory Objective #8, students will be asked to keep detailed field notes, both on site and en route to the site. Field notes are an essential component of field work and science. These notes will need to be comprehensive and exhaustive. 2. To address Course Lecture Objective #5, students will be asked to reconstruct the field environment using field notes. This requires the use of the information on geology and ecology from the lecture. Proper reconstruction requires students to critically think about the environment and to make conclusions about their data.

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- The Laws Guide to Nature Drawing and Journaling
  - Author: Laws, John Muir
  - Publisher: Heyday Books
  - Publication Date: 2016
  - Text Edition: 1st
  - Classic Textbook?:
  - OER Link:
  - OER:
- The World Encyclopedia of Fossils & Fossil-Collecting
  - Author: Steve Parker
  - Publisher: Southwater
  - Publication Date: 2014
  - Text Edition:
  - Classic Textbook?:
  - OER Link:
  - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.