ESCI-161L: LAB IN GEOLOGY OF THE NATIONAL PARKS

Cuyahoga Community College

Viewing: ESCI-161L : Lab in Geology of the National Parks

Board of Trustees:
2015-05-28

Academic Term:
Fall 2021

Subject Code
ESCI - Earth Science

Course Number:
161L

Title:
Lab in Geology of the National Parks

Catalog Description:
Laboratory studies include use of topographic maps, aerial photos, remote sensing images, and geologic maps; volcanism and earthquakes, physiographic provinces; identification of igneous, sedimentary and metamorphic rocks and structures; studies of depositional and erosional features of streams, winds, glaciers, and waves; fossil identification; analyses of climatic and biological data; plate tectonics; investigations into ecological problems of many national parks. Field work required.

Credit Hour(s):
1

Lecture Hour(s):
0

Lab Hour(s):
3

Other Hour(s):
0

Requisites

Prerequisite and Corequisite
ESCI-1610 Geology of the National Parks or concurrent enrollment.

Outcomes

Course Outcome(s):
Apply geological laboratory techniques to studies of the earth.

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):
1. Explain the role of plate tectonics in determining land forms.
2. Identify and describe the significances of igneous, sedimentary, and metamorphic rocks.
3. Identify and describe the significances of igneous and sedimentary structures.
4. Identify and describe the formation of the different types of folding and faulting.
5. Differentiate, locate, and identify erosional and depositional features of landscapes formed by wind, streams, glaciers, waves, volcanoes, and tectonic deformation.

6. Differentiate between erosional and depositional features and how they are formed.

Course Outcome(s):

Apply geological laboratory principles to daily life.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Predict climate (temperature, precipitation, and prevailing winds) based on landform, elevation, and location.
2. Locate the different physiographic provinces on a map and explain the variety of landforms that are found.
3. Use topographic maps and aerial photos to visualize the landscape of an area.
4. Interpret geologic maps and be able to use them to describe the geologic processes that have operated and that continue to operate in the national parks.
5. Make observations and measurements in the field.

Methods of Evaluation:

1. Quizzes
2. Lab exams (practicals)
3. Participation in class and on field trips
4. Laboratory reports

Course Content Outline:

1. Interpretation of topographic maps
    a. Location by latitude and longitude
    b. Location by tier and range
    c. Scales - graphic, verbal and representative fractions
    d. Contour lines, index contours and contour intervals
    e. Determination of relief and stream gradients
    f. Symbols and legends
    g. Topographic profiles and vertical exaggeration
2. Physiographic provinces of the individual parks
3. Topography and elevation
    a. Relationship to temperature
    b. Relationship to precipitation
4. Identification of rocks
    a. Texture
    b. Composition
    c. Intrusive igneous rocks
    d. Extrusive igneous rocks
    e. Sedimentary rocks
    f. Metamorphic rocks
5. Identification of rock structures
    a. Sedimentary structures
    b. Igneous structures
6. Plate tectonics
    a. Rate and direction of plate movements
    b. Earthquake occurrences
    c. Exotic terranes
    d. Types of boundaries and their related volcanism
7. Volcanic features
    a. Aerial photo stereopairs
    b. Topographic maps
    c. Geologic maps
    d. Shield volcanoes

   e. Strato/composite volcanoes
   f. Cinder cones
8. Geologic time scale
   a. Relative dating
   b. Principles of faunal succession, superposition, original horizontality, cross cutting relationships
   c. Unconformities - nonconformities, disconformities, angular unconformities
   d. Absolute dating
9. Geologic structures
   a. Folds - anticlines, synclines, domes, basins
   b. Faults - normal, reverse, transform
   c. Strike and dip
   d. Glaciers, waves, wind, streams, ground water
   e. Erosional features
   f. Depositional features
   g. Types of glaciers - alpine and continental
   h. Stream patterns and drainage basins
   i. Stream characteristics in arid vs. moist environments
10. Fossils
   a. Classification
   b. External anatomy
11. Field work
   a. Identification of sedimentary features
   b. History of the local strata based on sedimentary structures
   c. Determination and plotting of joint bearings
   d. Determination of water temperatures and their relationship to location
   e. Determination of stream gradients

Resources

Harris, A., E. Tuttle, and S. Tuttle. *Geology of National Parks.* 6th ed. Dubuque, IA: Kendall/Hunt Publishing, 2004.

Harris, David V., and Eugene P. Kliver. *The Geology of US Parklands.* 5th ed. New York: John Wiley and Sons, 1999.

Lillie, Robert J. *Parks and Plates: The Geology of Our National Parks, Monuments, and Seashores.* New York : W.W. Norton, 2005.

Busch, R.M., and Dennis G. Tasa. *Laboratory Manual for Physical Geology.* 10th ed. Upper Saddle River: Prentice Hall, 2014.

CCC-Western Campus. *ESCI-161L Lab Manual.* {ts '2002-08-15 00:00:00'}.

Instructional Services

OAN Number:
Ohio Transfer 36 TMNS

Top of page
Key: 1899