GEOL A135: GEOLOGY OF THE NATURAL PARKS AND MONUMENTS

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	191400 - Geology
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)

Course Description

Geology of national parks, seashores and monuments and its influence on land forms, climate and human history. Classes will vary each semester in order to develop particular skills in interpreting field problems and relationships unique to a given area. Approximate locations will be selected from one of four geologic provinces–The Mojave Desert, Basin and Range, Sierra Nevada, or Colorado Plateau. Field trip required. Transfer Credit: CSU; UC.

Course Level Student Learning Outcome(s)

1. Compare and contrast geologic processes at divergent and convergent plate boundaries, using National Park examples.
2. Use National Park examples to compare and contrast geologic processes at transform plate boundaries, hotspots, and other sites.
3. Describe and interpret earth materials, geologic principles, plate tectonics and plate boundary interactions.

Course Objectives

- 1. Locate geographically all of the National Parks covered in the class.
- 2. Describe the geologic and geomorphic features peculiar to each.
- 3. Apply the Scientific Method and Principle of Uniformity to the study of each parks history.
- 4. Identify, classify, and interpret the important rock forming minerals
- 5. Identify, classify, and interpret igneous, sedimentary, and metamorphic rocks
- 6. Demonstrate a mastery of the Geologic Time Scale.
- 7. Produce chronologic sequences or geologic histories using principles of Superposition, Cross-cutting Relations, and Faunal Succession.
- 8. Produce paleogeographic and lithofacies maps.
- 9. Apply the model of Plate Tectonics to the rock cycle, continental drift, orogenesis, continental accretion, vulcanism, and to the geologic history of each park.
- 10. Describe the hydrologic processes which have shaped the individual parks landforms.
- 11. Create a stratigraphic column and local geologic history for each park.
- 12. Construct and analyze a geologic history of the Western United States by integration of individual park histories.

Lecture Content

Earth materials: elements, mineral, rocks and rock cycle, formation and classification of igneous, metamorphic and sedimentary rocks Interpretation of sedimentary rocks: texture, composition, primary structures, formation, facies, Stenos Laws, unconformities Hydrologic processes; mechanical and chemical weathering, mass wasting and slope retreat, stream processes, Evolution of landscapes by glacial, Aeolian, groundwater and beach processes Tectonic processes: introduction to plate tectonics, plate boundaries and the rock cycle, origin and evolution of ocean basins and continents, continental accretion and orogenesis, continental drift, and paleogeography Fossils: types of fossilization, fossils as history of life, Law of Faunal Succession Features and geologic histories of convergent parks: Olympic, Mt. Lassen, Crater Lake, Mt. St. Helens, Yosemite, Sequoia/Kings Canyon Great Smoky Mountains, Acadia and others. Features and geologic histories of divergent parks: Great Basin, Great Sand Dunes, Grand Teton, Grand Canyon and others Features and geologic histories of transform parks: Pt. Reyes, Channel Islands, Joshua Tree, Virgin Islands and others. Features and geologic histories of hotspot parks: Hawaii and Yellowstone Features and geologic histories of parks related to the growth of North America: Isle Royale, Mammoth Cave, Mt. Rushmore, Badlands, Rocky Mountain, Arches, Canyonlands, Capitol Reef and others. Features and geologic histories of accreted parks: Northern Cascades, Denali, Gates of the Arctic and others.

Method(s) of Instruction

- Lecture (02)

Instructional Techniques

Lecture Formal lecture periods augmented by use of images, computer animations, and videos to further illustrate lecture topics.

Reading Assignments

Students will spend approximately two hours per week on readings assigned from textbook(s) and department handouts as preparation for scheduled exams and "pop" quizzes.

Writing Assignments

Students will spend approximately two hours per week on the following: Written assignments that analyze and critically evaluate various types of arguments Lecture exams consisting of essays and short answer questions Chapter questions (may be required or optional) Term project paper and presentation

Out-of-class Assignments

Students will spend approxiamtely two hours per week on homework including textbook exercises, audio-visual programs and worksheets provided on Blackboard. Outside reading or alternative contact with subject material as approved by instructor.

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

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: Masters degree in geology, geophysics, earth sciences, meteorology, oceanography, or paleontology OR bachelors degree in geology AND masters degree in geography, physics, or geochemistry OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Lillie, R. J.. Parks and Plates: The Geology of Our National Parks, Monuments, and Seashores, 1st ed. New York: W. W. Norton, 2005 Rationale: . 2. Required Harris, A.. Geology of National Parks, 6th ed. Dubuque: Kendall Hunt, 2004 Rationale: . 3. Required Dickas, A. B.. 101 American Geo-Sites Youve Gotta See (Geology Underfoot), 1st ed. Mountain Press Publishing Company, 2012