EART 3: Geology of National Parks Online
Winter Quarter 2016

About

Geology of National Parks Online is an activity-based class collaboratively created by three Earth Science faculty members from UC Santa Cruz, UC Davis, and UC San Diego. This course will cover introductory geologic concepts with special focus on U.S. National Parks.

Through a series of activities, mini-lectures and readings, we'll explore how geologic processes control the landscapes and features in our parks. Along the way you'll learn about the concepts of geologic time, plate tectonics and how the rock record can be used to reconstruct the geological story of the parks.

Instructor Information: Your instructor for this class is UCSC Earth and Planetary Sciences Professor Susan Schwartz

Online Office Hours: TBA

Textbook: Exploring Geology, 3rd or 4th edition by Stephen Reynolds, Julia Johnson Paul Morin, and Chuck Carter (hard copy or ebook)

Module Workflow and Estimated Time Required

- Read & Watch (3-4 hours per week)
  - Read assigned text
  - Watch through mini-lectures- take notes
  - You may find it beneficial to alternate reading and watching
  - Complete comprehension quiz
- Learn and Apply (2-6 hours per week)
  - Work through the tutorials and graded activities
- Connect (1 hour per week)
  - Interact with your classmates and instructors through Piazza and Office Hours

Module Activities

Each module has one comprehensive activity designed to enhance your understanding of course material. Your lowest scored module activity for modules 1-9 will be dropped from your final grade. All students have to complete the module 10 activity as a study guide for the final.

Quizzes

There will be 1 short quiz associated with each module. These will be graded but you will have unlimited attempts to complete these quizzes.
There will be two longer quizzes that are timed and you submit after a single attempt. These will take place at the ends of modules 3 (Quiz 1) and 8 (Quiz 2).

**Exams**

The midterm and final exams are administered online by Proctor U (for a fee). The dates of the midterm and final are the only time students will need to be available at particular dates/times.

- Midterm: 2/4/16
- Final: 3/16/16

**Grading**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Final (Multiple Choice, Matching, etc)</td>
<td>25%</td>
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<tr>
<td>Midterm (Multiple Choice)</td>
<td>15%</td>
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<tr>
<td>Quizzes (2)</td>
<td>10%</td>
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<tr>
<td>Application Activities</td>
<td>45%</td>
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<tr>
<td>Comprehension Quizzes</td>
<td>5%</td>
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**Academic Integrity**

- We expect the highest levels of academic integrity in this class. Any cheating of any kind will be referred to the university for disciplinary action.
- Work may be collaboratively done, but the work that you hand in must be your own. A simple way to figure out if the work is your own is to ask whether or not you can reproduce it in entirety without the aid of any other people or your assignments.

**Content Overview**

<table>
<thead>
<tr>
<th>Module</th>
<th>National Parks</th>
<th>Topics</th>
<th>Reading</th>
<th>Assignments</th>
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</table>
| 1      | Grand Canyon   | 1. Sedimentary Rocks  
2. Depositional Environments  
3. Sea Level Change  
4. Weathering and Erosion | Ch. 7.0-7.14 | Introduction to Topographic Maps  
Topographic Maps in the Grand Canyon using Google Earth |
| 2      | Grand Canyon   | 1. Deep Time  
2. Relative and Numerical Dating  
3. Unconformities | Ch. 9.0-9.13 | Introduction to Relative Dating  
Relative Dating in the Colorado Plateau |
| 3      | Zion  
Bryce  
Arches  
Canyonlands | 1. Sedimentary Structures  
2. Differential Weathering  
3. Fracture and Joints | Ch. 2.2-2.11, 15.1-15.4 | Exploring Geology of Zion using Google Earth |
| 4      | Rainier  
Mt. St. Helens  
Crater Lake  
Lassen | 1. Igneous Rocks- Minerals  
2. Types of Volcanoes  
3. Magma Types and Genesis | Ch. 5.0-5.10, Ch. 6.0-6.14 | Concept Sketch of Crater Lake Formation |
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| 5 | Hawaii Volcano Yellowstone | 1. Hot Spot Volcanism  
2. Plate Motions  
3. Mantle Plumes  
4. Hydrothermal Activity | Ch. 10.3-10.5, 10.9 | Plate Rates from Hot Spot Tracks |
| 6 | Yosemite | 1. Intrusive igneous rocks  
2. Evolution of the Sierra Ice Ages  
Ch. 15.5-15.9 | Geologic Features of Yosemite- Google Earth |
| 7 | Rocky Mountain Glacier | 1. Mountain Building  
2. Rock Deformation  
3. Metamorphism  
4. Glacial Features | Ch. 8.1-8.13  
Ch. 11.1-11.6 | Structural Geology and Metamorphism  
Glacial Retreat at Grinnell Glacier |
| 8 | Death Valley Grand Tetons | 1. Extensional Tectonics  
2. Basin and Range  
| 9 | Pinnacles Pt Reyes | 1. Origin of the San Andreas Fault  
2. Earthquakes and Seismic Waves  
3. Shoreline Processes | Ch. 12.1-12.17  
Ch. 14.12-14.17 | Locating Earthquakes  
San Andreas Fault- Google Earth |