

## SIO 16 - Geology of National Parks Spring 2022 Syllabus

**Lectures:** M,W,F 2:00-2:50 in Cognitive Science Building 002

**Instructor:** Jeff Gee (jsgee@ucsd.edu; x44707)

**TA:** Sean Curran

**Office:** 300D Ritter Hall (Scripps Campus)

**email:** stcurran@ucsd.edu

**Office hours:**

- Wednesdays 3-4 p.m.
- Thursdays 10-11 a.m.
- Fridays 9-10 a.m.

We anticipate that these will likely be held in a hybrid mode (i.e. with a Zoom link as well as in person). On Wednesdays after class we will try to have a mixed Zoom/in-person session outdoors near the lecture hall. The Thursday and Friday Zoom sessions will be held from the computer lab at Scripps for those who might need in-person help or computer access for Google Earth exercises. We're happy to schedule additional times as needed. You can also post questions on the Discussion Board on Canvas as we will be monitoring this as well.

**Overview:** Have you ever wondered why there are so many geysers in Yellowstone or why there are all those rounded boulders at Joshua Tree National Park? In this class, we'll explore how geologic processes control the landscapes and features in our parks. By the end of this course, you should be able to (1) understand and describe the major processes (e.g. mountain building, volcanic activity, sedimentation, weathering, erosion, glaciation) that generate the landscapes in our national parks, (2) develop an ability to think and visualize these geologic processes in four dimensions, (3) understand how observations from the rock record are used to reconstruct the geological story of the parks and (4) recognize similarities among parks in geologic provinces and explain how these reflect the geologic processes that have shaped the western U.S.

**Course Format and Grading:** Grades will be based on one midterm exam (25% total), weekly activities (40%) and the final exam (35%), which will be cumulative but weighted toward the material after the midterm. **Note that both the midterm (Wed. May 4) and the final exam (Friday June 3) are in person exams.**

**Weekly Activities:** Each week there will be an exercise (called an activity) on Canvas that is designed to reinforce important concepts from lectures. We'll be using *Google Earth Pro* for parts of most of these exercises -- this is a great (free) tool for exploring landscapes and geological processes and hopefully will also get you excited to go visit some of the parks after the quarter ends. These activities will be due each Sunday. Late assignments generally will not be accepted but if you feel that an exception is warranted please let us know in advance.

**Readings:** There is no required text for this course. The readings for this course will be provided in three formats all available on Canvas.

- 1) Lecture notes (typically 4-5 pages/lecture) will be available before each class.

2) Powerpoint slides will also be available. Please note that nearly all slides have accompanying explanatory text.

3) Supplementary materials in each module on Canvas provide additional explanation for key concepts.

There is a new 2022 textbook (*Geology and Landscapes of America's National Parks*) written by UC Davis Professor Dave Osleger, who was one of the colleagues who helped develop a completely online version of this course. I can enthusiastically recommend this text but decided not to require it for the course this year as it is a bit pricy. For additional background reading there will be a few copies of this text (*Geology and Landscapes of America's National Parks*) and *Parks and Plates* (Lillie) on reserve in the library.

**Academic Integrity:** This course will adhere to the UCSD policy on academic integrity, which states in part: "For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind." Any suspected cheating will be dealt with following the UCSD policy on Academic Integrity Office site <https://students.ucsd.edu/academics/academic-integrity/index.html>.

**A note on collaborative work:** Work on the activities (but obviously not exams) for this course may be collaboratively done, but the work 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 completely without the aid of other people. Many of the exercises will have a space for you to note any collaborations that you might have had or resources that you might have used.

**Students with Disabilities:** We are happy to provide accommodations for this course for students with documented disabilities. Students must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD), located in University Center 202. Please provide your instructor and the OSD Liaison for the SIO department, Sid Eads (sleads@ucsd.edu) a copy of your AFA letter in advance so that accommodations can be arranged.

**Field Trips:** For those interested there will be an optional ~2 hour trip on Saturday April 23 where we will look at some of the local sedimentary rocks near the Scripps pier.

Date	Topic	Activity
March 28	Grand Canyon - a geologic view of time	
March 30	Grand Canyon - interpreting the sedimentary record	
April 1	Grand Canyon - relative time in the geologic record	Activity 1 due 4/3
April 4	Grand Canyon and Google Earth intro	
April 6	Grand Canyon - uplift and canyon incision	
April 8	Zion - weathering, erosion and the role of fractures	Activity 2 due 4/10
April 11	Arches, Canyonlands - arches, buttes and mesas	
April 13	Bryce Canyon, Capitol Reef	

April 15	Hawaii - lava flows, rift zones and volcanic features	Activity 3 due 4/17
April 18	Plates, plumes and the Hawaiian volcanic chain	
April 20	Cascade volcanoes - subduction setting, explosive volcanism	
April 22	Cascade volcanoes: Crater Lake	Activity 4 due 4/24
April 23	Optional local field trip at Scripps (10a.m.-noon)	
April 25	Cascade volcanoes: Lassen, Rainier	
April 27	Seafloor spreading and convergent margins (Olympic)	
April 29	Sierra Nevada - origin of Sierran granites	Activity 5 due 5/1
May 2	Yosemite - tracking glaciers in the Sierra Nevada	
May 4	Midterm exam	
May 6	Yosemite - cracks, joints and the Yosemite landscape	Activity 6 due 5/8
May 9	The Rocky Mountains: multiple uplifts and Rocky Mountain NP	
May 11	The Rocky Mountains: Glacier NP and the northern Rockies	
May 13	The Rocky Mountains: Grand Teton NP	Activity 7 due 5/15
May 16	Death Valley, Basin and Range extension	
May 18	Death Valley - faulting, wind features, sliding stones	
May 20	San Andreas Fault and Joshua Tree NP	Activity 8 due 5/22
May 23	Yellowstone - super eruptions above a continental hot spot	
May 25	Yellowstone - geysers, hydrothermal activity	
May 27	The Appalachian Mountains (Shenandoah)	Activity 9 due 5/29
May 30	No Class -- Memorial Day	
June 1	Assembling western North America	
June 3	Alaska parks (Denali, Katmai) - far-traveled terranes	Activity 10 due 6/5

Final exam: Friday, June 10; 3:00-6:00 p.m.