Geology 310 – Spring 2019
Geomorphology and Geology of California

Instructors:	Greg Hancock, gshanc@wm.edu	
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	Eston Worthington, eworthington@wm.edu	
Class Schedule:	Monday 6:00-7:00 (not all Mondays)	
Office Hours:	Tue 11-1, Wed 9:30-11:30 (Greg)	
	Fri 11-12 (Linda)	
	Wed 9:15-10:45 (Jim)	
Field dates:	Arrive Wednesday, May 15, San Jose, CA, airport (arrive by ~2 p.m.)	
	Depart Friday, May 31, San Jose airport	
Expenses:	Transportation, camping fees, etc.	$800 (paid to college)
	Food (according to food group choices)	depends on food group
	Airfare (on your own)	depends on your flight needs
Required texts:	Cadillac Desert: The American West and the Disappearing Water, Reisner (1993)	
	Farewell to Manzanar, Jeanne Wakatsuki Houston and James Houston (1973)	

Course Summary

A semester-long course followed by a two-week field trip to California. Field work will include a series of exercises ranging in duration from a few minutes to a full day. The goal is to give you practice in field methods and interpretation of data collected from geomorphic, geologic, and tectonic features. The specific skills to be introduced and reinforced during this course include:

1) Accurately locate yourself and geologic features on maps, and interpret map relationships;
2) Measure, estimate, and record basic data on landscape features (distance, area, volume, direction and orientation);
3) Recognize geomorphic surfaces and tectonic features, trace boundaries in the field, and plot their locations on maps;
4) Identify and describe a variety of sedimentary deposits; construct stratigraphic sections and cross-sections;
5) Recognize different rock types and contacts between them; trace contacts in the field; and plot their locations on maps;
6) Interpret geologic history using data collected, and estimate relative ages and rates of tectonic and geomorphic processes.
7) Create an organized, thorough record of field observations in a field book;

Grading

Pre-field class participation (discussion)	20%
Field Projects	50%
Participation, attitude, helpfulness	15%
Post-field trip exam (due July 1, 2019)	15%

Because all students will not have an equal background in Geology, the evaluation system will be adjusted to compensate for the variation in student background; in other words, a junior geology major is expected to exhibit a greater understanding than students with only one or two geology courses.

Class Schedule, Spring Semester 2019

Date	Subject	Assignments Due for Class
Mon, Jan 28	Flights, outline, introductions, and logistics	Start Reading, Answer Questions *Farewell to Manzanar: all Cadillac Desert: Ch 2: The Red Queen and Ch 10: Chinatown*
Mon, Feb 11	California Geography & Geology I	*Flight reservations due in class*
Mon, Feb 25	California Geography & Geology II	*Choose 3 Field Presentation Topics (send to Greg by 3/4/19, 7 pm)*
Mon, Mar 11	*Questions and Discussion* Farewell to Manzanar	*Discuss your answers* Farewell to Manzanar
Mon, Mar 25	Camping & Cooking Groups	*Outline & Bibliography of Research Topic Due*
Mon, Apr 8	*Questions and Discussion* Cadillac Desert	*Discuss your answers* The Red Queen & Chinatown
Mon, Apr 15	Student Presentations I	
Mon, Apr 22	Student Presentations II Packing Strategies, Final Arrangements	
Fri, April 26	Turn in your field presentation	*Send to Linda by 7 pm*
Wed, May 15	Arrive at San Jose Airport by 2 pm	

Attendance is expected at each meeting. Contact us in advance if a problem arises that prevents you from attending a meeting, and we will make alternate arrangements.

Field Gear Check List

Please limit yourself to these items - space in the vans will be limited, and you will need to be portable with your gear in hand.

Tent (everyone must have tent space)	Sleeping bag & sleeping pad
Boots (waterproof)	1 other pair of shoes (running shoes, etc.)
2 pairs of long field pants	4 -5 field shirts (short and long sleeve
1-2 pairs of shorts	1 sweater/sweatshirt
1 light jacket/fleece	1 pair of thermal underwear (bottom & top)
1 waterproof raincoat	1 pair of warm gloves (thin)
1 broad-rimmed hat to shade head & ears	10+ pairs of socks
10+ pairs of underwear	1 belt (you need this)
1 towel	1 washcloth or bandana
Medication, if necessary	Sunscreen and lip protection
Toiletries, keep to a minimum	Sunglasses
Internal Frame Pack/Duffel Bag	Flashlight (headlamps are handy)
Small backpack/day pack	**4 Water Bottles (enough to carry 1 gallon)**
Pocket Knife	Ground Cloth or Tarp
High-Quality Field Notebook (see Carol)	Colored Pencils
3 Mechanical Pencils	1 protractor
Ruler (cm & 1/10 inches)	Hand Lens (see Carol)
Waterproof marking pens	1 cup or mug
Knife, Fork, & Spoon	Money, suggest $200+
1 plate or all purpose bowl	Drivers license
Health & ID Card	Folder to hold handouts

Other useful items (not required!)

Camera, Rock Hammer, iPhone/iPod/etc.

You are responsible for all of your equipment. Put your name on your valuables. All of your gear *must* fit into your duffel bag/ backpack + daypack. Go light.

GEO310: California Geomorphology and Geology
Research Projects 2019

Your own piece of California

You will select one of the topics below.
1) Mono Lake: Birds and Bugs in a saline lake
2) History of Pleistocene glaciation of the Sierra Nevada
3) Nature's own parking lot: The formation of desert pavement
4) Alluvial fans of Death Valley: Origins and ages
5) Linking climate to rivers: Terraces of the Owens River
6) Towers and tombstones: The origins and forms of tufa
7) The Long Valley Caldera: Ready to blow?
8) The Bishop Tuff: Tales of eruptions past
9) Late Cenozoic volcanism of the Owens Valley
10) Rock vs. Glaciers: How does ice beat rock?
11) Slow and steady: Motion along the creeping segment of the San Andreas
12) The Sierra Nevada Fault and the 1872 Lone Pine Earthquake
13) The Garlock Fault: Going against the grain
14) Creating the lowest place in North America: Tectonics of the Death Valley region
15) Origins and ages of granites in the Sierra Nevada
16) Raising the Sierra Nevada: Mechanisms and timing of uplift in the Range of Light
17) The drying of the Owens Lake and the consequences
18) Black gold: Origins and extraction of oil in the San Joaquin Valley
19) Fruitbasket of a Nation: Agriculture in the San Joaquin Valley
20) Nature improved: History and operation of the California Aqueduct
21) The Los Angeles Aqueduct: Water theft or "best use"?
22) Owens Lakebed Dust Emissions as a Health Hazard
23) Impact of Groundwater Pumping on Plant Communities in central Owens Valley
24) She'll be Coming 'Round the Mountain: Debris flow sources, mechanisms and rheology
25) The Salinas River Valley: How significant is farming in this region?
26) Topaz Solar power in the Carrizo Plain: Who, when, and how much?

Once selected, you will do the following:

1) Outline & Bibliography of Research Topic
Due: Monday, February 25
2 pages with outline of the topic/what you plan to put in the paper/reference list (primary, secondary, and internet sources)

2) The Paper
Final Draft Due: Monday, April 15
3-4 pages text (12 pt. Times New Roman, 1.5 line spacing, 1" margins)
2-4 figures, maps, or tables in addition to text (must be well illustrated, and should have captions)
Well written, informative, and properly referenced; the text must be linked to the figures - they are not separate entities

3) The Classroom Presentation
4 minutes in length
Well-illustrated presentation using PowerPoint and a 1-page summary handout with figures
use this opportunity to teach your peers!

4) Present Handout and Field Presentation. You will be the site expert and responsible for communicating the importance of the location. I can help you locate an appropriate place, if needed. ***Prepare a handout, 1 page only (front and back) , include important figures, photos, minimal text. Handout due on Friday, 4/26/19.***