

EART 142: Engineering Geology - Spring 2013

Instructor: Dr. Slawek Tulaczyk, EMS A208, 9-5207, office hours: **TTh 9am-10**
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TA: Allison Pfeiffer ampfeiff@ucsc.edu

Lectures: TuTh 10am-11:45am, EMS D236

Lab: M 9AM-Noon, EMS D236 (or in the field as specified by the instructor)

Text: Perry H. Rahn, *Engineering Geology – An Environmental Approach*
Engineering Geology Field Manual: <http://www.usbr.gov/pmts/geology/geoman.html>

Course Objectives

Engineering geology is the field of study in which geologic knowledge is applied to engineering problems. The term is sometimes used interchangeably with environmental geology. Both terms apply to study of applied geology: how humans are affected by geological phenomena and how humans can trigger geologic processes. Environmental/engineering geologists supply engineers with geologic information and insure that geologic factors are properly considered.

Course Structure

This is going to be a very work intensive and intellectually demanding course, in which maturity, great work ethics, and ability to take initiative and think on your feet will be needed to perform well. We have two lectures per week plus one 3-hour lab per week. There is a weekend trip (tentative schedule May 3-5). Each of the labs will have a one-page report due one week after it is assigned (on Tuesday at the beginning of class). Each student will give one topical presentation, 15 minute long, on a topic assigned by the instructor and on the day assigned by the instructor. There will be two open book / open notes exams. The final is comprehensive (June 11th at Noon to 3pm).

Evaluations

Midterm (open book)	20%
Final (open book)	25%
7 labs (3% participation, 2% report - no report without participation)	35%
Trip participation (10%)	10%
Topical oral presentation:	10%
Content (6% each)	
Structure (2% each)	
Presentation style (2% each)	

For clarity, here are some rules:

No extra credit, No make-up assignments, No credit for late assignments, Each page of text is a single-spaced page with a reasonable font size (e.g. Times 11), Follow instructions, ask questions if in doubt, All assignments have to be professionally executed (no hand-written assignments), clean, neat, and polished, We will return graded assignments one week after they are due, All lecture material will be posted on e-commons with some delay, All scores will be posted on e-commons with some delay

Lecture	Date	Topic	Reading Assignment
1	4/2	Introduction, syllabus, rock mechanics	Chapter 1, 2
2	4/4	Rock mechanics, rock mass strength	Chapters, 3, 4
3	4/9	Soil forming processes (Allison Pfeiffer)	Chapter 3
4	4/11	Soil mechanics	Chapter 5
5	4/15	Soil mechanics 2	Chapter 5
6	4/18	Slope processes and landslides (Marci Beitch)	Chapter 6
7	4/23	Groundwater	Chapter 7
8	4/25	Fluvial processes (Allison Pfeiffer)	Chapter 8
9	4/30	Land subsidence	Chapter 9
10	5/2	Midterm	

11	5/7	Earthquake geology and paleoseismology	Chapter 11
12	5/9	Coastal processes	Chapter 10
13	5/14	Coastal engineering (Dr. Gary Griggs)	Chapter 10
14	5/16	Geophysical techniques	Chapter 12
15	5/21	Geophysical techniques (Dr. Eli Silver)	Chapter 12
16	5/23	Topo mapping, remote sensing	Chapter 2
17	5/28	Energy	Chapter 13
18	5/30	Info from boreholes (Dr. Casey Moore)	TBD
19	6/4	Design with Nature	Chapter 14
20	6/6	Geotechnical and environmental reports (T. Rhodes)	TBD

Prescheduled field trip on May 3-5 (tentative)
 Open book / open notes final exam on 6/11, Noon-3pm

Lab	Date	Topic
1	4/8	Bedrock description, rock mass strength (meet in the classroom)
2	4/16	Visit to the <u>USGS Coastal Section with Dr. Curt Storlazzi</u>
3	4/22	Field soil description, characterization, and sampling (meet at the main entrance to the UCSC Farm)
4	4/29	Fluvial sediments and morphology, flooding (meet at the Big Rock Hole parking lot along Highway 9)
5	5/6	Geophysical investigations of a sinkhole (meet at the meadow across from the West Entrance)
6	5/13	Geophysical investigations of a fault (meet at the entrance to Pogonip)
7	5/20	Coastal lab (meet at Seabright Beach)

Presentation	Date	Student - Topic
1	4/9	Krista Myers - Yosemite rock falls
2	4/11	Lawrence Bush - Damage to foundations from expansive soils
3, 4, 5	4/15	Ren Chao - Engineering geology of debris flows
6	4/18	Ryan Harmon - Big Sur coastal landslides
7	4/23	Neal Hetzel - Land subsidence from groundwater withdrawal in CA
8	4/25	Lee Tyler - Flooding from rain-on-snow events in the Sierra Nevada, CA
9	4/30	Anthony Masuda - Construction and maintenance of CA aqueducts
10	5/7	Sean McDonald - Liquefaction hazard in SF Bay Area
11	5/9	Alexander Mitchell - Tsunami in Santa Cruz Yacht Harbor
12	5/14	Alexander Nakagawa - Climate warming and coastal erosion in CA
13	5/16	Tyler Nakamura - Geophysical techniques for detection and monitoring of leaking underground storage tanks
14	5/21	Marcel Peliks - Geophysical techniques for detection and monitoring of seawater intrusion
15	5/23	Steven Reistetter - Airborne laser and GPS mapping of beaches in CA
16	5/28	Coral Rudholm - Hydraulic fracking for hydrocarbon resources in CA
16	5/30	Henry Salas - Abandoned deep wells in California
17	6/4	Sarah Shokair - Natural hazards and zoning in California
18	6/6	Felipe Silva - UCSC expansion and Environmental Impact Reports

The following students will present during the field trip: Derek Gill, Lauryn Gutowski, Tyler Sproule, Corry Steinmetz, Kristina Tu, Connor Williams, Chanaphon Yordduangjun.