CEE 70 ENGINEERING GEOLOGY
Fall Semester 2019

Instructor: Nicholas Sitar 449 Davis Hall
Office Hours: Tu 10 am -12 pm; W 10 am-12 pm; or by appointment
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Textbook: *Earth: Portrait of a Planet*, 5th Edition, by Stephen Marshak, Norton & Co., NY, publishers (renting or using the 4th edition, used is the cheap alternative)
Focus will be on covering the highlights of one or two chapters each week. The textbook is oriented toward the scientific aspects of the earth science, while the lectures will highlight the practical, engineering and environmental aspects of earth science. The different topics will be illustrated with slides, lecture demonstrations and video presentations during lectures.

Prerequisite: Chem 1A or equivalent, may be taken concurrently.

Field Trip: A day-long field trip will be held on *Saturday, Nov. 2(A-K) & Sunday Nov. 3* (L-Z) **Attendance on this field trip is required**.

Laboratory Sessions:

101 M 5-7 PM in 410 Davis	**103** W 5-7 PM in 410 Davis
102 Tu 4-6 PM in 410 Davis	**104** Th 4-6 PM in 410 Davis

The function of the laboratory sessions is to provide opportunity for hands-on learning. The material covered is essential to understanding of the material and augments the lecture material. Each student is responsible to learn the basic rocks and minerals and pass a rock identification test.

Exam Format: Exams will be based on a multiple choice answer format with some short answer questions.

Grading:

Rock Quiz:	15 (Week 9 tentative)
Midterm:	25
Field Trip:	5
Homework/Labs:	20
Final:	35

Final Exam: Tu, Dec 17, 2019, 8-11 AM.

University of California Department of Civil and Environmental Engineering

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Week	Date	Lecture Topics	Reading
1	Tu, Aug 27	-----	
	Th, Aug 29	Introduction – Why Engineering Geology?	Ch P1-1
2	Tu, Sept. 3	Earth Systems, Structure of the Earth	Ch 2-4
	Th, Sept. 5	Rock Cycle/Rock Forming Minerals,	Ch 5, Interlude C
3	Tu, Sept. 10	Igneous Processes and Rocks	Ch 6, Interlude A
	Th, Sept. 12	Volcanism; Volcanic Rocks	Ch 9
4	Tu, Sept. 17	Sedimentation-Sedimentary Rocks	Ch 7
	Th, Sept. 19	Carbonates/Karst and Evaporites	Ch 7,19.8
5	Tu, Sept. 24	Metamorphism-Metamorphic Rocks	Ch 8
	Th, Sept. 26	Geologic Time Scale - Age Dating	Ch 12, Interlude E
6	Tu, Oct. 1	Weathering and Erosion	Ch 7, Interlude B
	Th, Oct. 3	Slope Processes - Mass Wasting	Ch 16
7	Tu, Oct. 8	Streams and Stream Processes	Ch 17
	Th, Oct. 10	Coastal Processes	Ch 18
8	Tu, Oct. 15	Groundwater	Ch 19
	Th, Oct. 17	Midterm	
9	Tu, Oct. 22	Deserts and Wind	Ch 21
	Th, Oct. 24	Glaciers and Glacial Deposits	Ch 22
10	Tu, Oct. 29	Deformation of Rocks	Ch 11
	Th, Oct. 31	Structural Geology	Handout
	Nov. 2, Sat. & Sun Nov. 3 Field trip 8:30 am – 5 pm – SF Bay Area		
11	Tu, Nov. 5	Geologic Maps and GIS	Slides
	Th, Nov. 7	Faulting and Seismicity	Ch 10
12	Tu, Nov. 12	Earthquakes and Earthquake Damage	Ch 10
	Th, Nov. 14	Use of Stone as Engineering Material	Ch 15.2
13	Tu, Nov. 19	Dams – Design, Construction, Impact	Slides
	Th, Nov. 21	Tunnels and Underground Space	Slides
14	Tu, Nov. 26	Hayward Fault Trip	Slides
	Th, Nov. 28	*Thanksgiving Recess*	
15	Tu, Dec. 3	Resources and Energy	Ch 14-15
	Th, Dec. 5	Climate change, CA Water, Sustainability	Ch 23 & Discussion
16	Tu, Dec. 10	---	
	Th, Dec. 12	---	
	Tu., Dec. 17	Final Exam, 8-11 AM, TBD	

CE 70 Fall 2019 Laboratory Topic Schedule

Week	Topic/Project
1&2	No Lab
3	**Introduction to Rock forming Minerals** - Review of mineral structures, physical properties used for mineral identification.
4	**Rock forming Minerals**, contd. – See above
5	**Igneous Rocks** – Study of mineral assemblages found in igneous rocks and igneous rock classification, review of engineering issues commonly encountered in igneous rock masses.
6	**Sedimentary Rocks** – Study of sedimentary rock textures, structures and classification including discussion of sedimentary environments. Review of engineering issues commonly encountered in sedimentary rock masses.
7	**Metamorphic Rocks** – Study of metamorphic rock textures and mineralogy for classification, including discussion of metamorphic grades, facies and mineral assemblages as an indicator for stress history and tectonic setting.
8	**Review**
9	**Rock Quiz**
10	**Groundwater and Potentiometric Surfaces** – review of head distribution in an aquifer system. Water level measurements and interpolation of water levels to estimate the potentiometric surface of an aquifer.
11	**Structural Geology** – Review of principles of structural geology, strike & dip measurements, and solution of 3-point problems and projection of outcrops on topography
12	**Geologic Mapping and Air Photos** – Discussion about geologic maps and use of geologic information to develop and interpret geologic cross-sections. Use of GIS tools for map generation and processing.
13	**GIS and Remote Sensing** – introduction to air photo review and stereoscopic coverage. Remote sensing and drone imagery in developing spatial data.
14	**UCB and the Hayward Fault** – Walking tour of the Hayward Fault as it crosses campus. **During lecture on Tuesday – No labs**
15	**Review**