University of California, Berkeley
Civil & Environmental Engineering Department

Robert Kayen
Fall, 2015

CEE 70: ENGINEERING GEOLOGY

General Information

Instructor:	Professor Robert Kayen
Email:	rkayen@berkeley.edu
Office Address:	417 Davis Hall
Office Hours:	Office Hours: Tuesday. after class 9:30 -12:00 a.m.
GSI:	Margaret Christina Parks, mcparks@gmail.com Michael Chamberlain, MCHAMBERLAIN31@gmail.com David Tamborrell, dj9384@berkeley.edu
Grad. Reader:	Carly Schaeffer , cschaeffer@berkeley.edu
bCourse web site:	https://bcourses.berkeley.edu/courses/1376963
Communication:	For any email always put CEE 70 and YOUR NAME in the subject header: **CEE 70 Jane Doe**
Lectures:	Tuesday, Thursday 8:00-9:30A 106 STANLEY
Laboratory Sections:	101 DIS M 5-7P 544 DAVIS 102 DIS Tu 5-7P 544 DAVIS 103 DIS W 5-7P 544 DAVIS 104 DIS Th 5-7P 544 DAVIS

All readings, materials, assignments, lab write-ups will be through bCourses

Textbook: *Earth:Portrait of a Planet*, 4th Edition, by Stephen Marshak, Norton & Co., NY, publishers. We will be covering the highlights of one or two chapters each week. The textbook is oriented toward the scientific aspects of the earth science, and the lectures will highlight the scientific, engineering, and environmental aspects of earth science. The different topics will be illustrated with slides, lecture demonstrations and video presentations during lectures.

Field Trip: A day-long field trip will be held on *Saturday, Oct. 24 (Last name starting with A-M)* and *Sunday, Oct. 25 (N-Z)*. **Attendance on this field trip is required.**

Laboratory: 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.

Grading: Rock Quiz: 15% (Week 8 tentative)
Midterm: 25 %
Field Trip: 10%
Homework/Labs: 15%
Final: 35%

Final Exam: Exam Group 11 - Wednesday, 3-6pm December 16, 2015.
Exam Format: multiple choice answer format with some short answer questions.

Lecture and Reading Outline:

Day	Lecture Topics	Reading
Th, Aug 29	Introduction,	Chapter P1-1
Tu, Sept. 1	Earth Systems, Structure of the Earth	Chapter 2,4
Th, Sept. 3	Rock Cycle/Rock Forming Minerals,	Chapter 5
Tu, Sept. 8	Igneous Processes and Rocks	Chapter 6
Th, Sept. 10	Volcanism; Volcanic Rocks	Chapter 9
Tu, Sept. 15	Sedimentation-Sedimentary Rocks	Chapter 7
Th, Sept. 17	Carbonates/Karst and Evaporites	Chapter 7,19.8
Tu, Sept. 22	Metamorphism-Metamorphic Rocks	Chapter 8
Th, Sept 25	Geologic Time Scale - Age Dating	Chapter 12
Tu, Sept. 29	Weathering and Erosion	Chapter 7
Th, Oct. 1	Slope Processes - Mass Wasting	Chapter 16
Tu, Oct. 6	Streams and Stream Processes	Chapter 17
Th, Oct. 8	Coastal Processes	
		Chapter 18
Tu, Oct. 13	Groundwater	Chapter 19
Th, Oct. 15	Midterm	
Tu, Oct. 20	Deserts and Wind	Chapter 21
Th, Oct. 22	Glaciers and Glacial Deposits	Chapter 22
Sat. Oct. 24	Field trip A 8:30 am – 5 pm – SF Bay Area	
Sun. Oct. 25	Field trip B 8:30 am – 5 pm – SF Bay Area	
Tu, Oct. 27	Deformation of Rocks	Chapter 11
Th, Oct. 29	Geologic Maps and Structural Geology	Handout

Tu, Nov. 3	Structural Geology	Chapter 11
Th, Nov. 5	Seismicity	Chapter 10
Tu, Nov. 10	Faulting and Seismicity	Slides
Th, Nov. 12	Earthquakes	Slides
Tu, Nov. 17	Earthquakes and Spectral Acceleration	Slides
Th, Nov. 19	Earthquake Damage	Slides
Tu, Nov. 24	Tunnels, Dams, and Underground Space	Chapter 14-15
Th, Nov. 26	Thanksgiving Recess	
Tu, Dec. 1	Tunnels, Dams, and Underground Space/ Global Warming and Sustainability	Slides
Th, Dec. 3	Global Warming and Sustainability	Slides
Tu, Dec. 8	*** Study Week *** No lecture	
Th, Dec. 10	Review	
Wed, Dec 16	Final Exam Group 11, 3-6 p.m.	

Laboratory Outline:

WEEK	**CE 70 Fall 2015 Laboratory Topic / Project Schedule**
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 smineral assemblages as an indicator for stress history and tectonic setting.
8	**Review**
9	**Rock Quiz**

10	**Air Photos and Remote Sensing** – introduction to air photo review and stereoscopic coverage. Remote sensing technologies and their use.
11	**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.
12	**Structural Geology** – Review of principles of structural geology, strike & dip measurements, and solution of 3-point problems and projection of outcrops on topography
13	**Geologic Mapping and Cross Sections** – Discussion about geologic maps and use of geologic information to develop and interpret geologic cross-sections. Map project will include developing topographic profiles, transferring geologic information and cross-section development
14	**No labs**
15	**UCB and the Hayward Fault** – Walking tour of the Hayward Fault as it crosses campus. North and south sides of the stadium and Dwight street curb offsets.