UNIVERSITY OF CALIFORNIA Department of Civil and Environmental Engineering
Fall Semester, 2019 Instructor: Paulo J.M. Monteiro

CE 60 The Structure and Properties of Civil Engineering Materials

Date		Lectures	Reading Assignment
Aug.	29	Introduction	
Sept	3	Atomic Structure and Bonding	Lecture notes
	5	Crystal Structures	reader pp. 3-22
	10	Mechanical Properties	reader pp. 46-64
	12	Alloys and their Phase Diagrams	reader pp. 95-136
	17	Alloys and their Phase Diagrams	reader pp. 95-136
	19	Equilibrium Microstructure of Steel Alloys	reader pp. 137-148
	24	Phase Transformations	reader pp. 23-38
	26	Heat Treatment of Steel Alloys	reader pp. 148-178
Oct	1	Review	
	3	**FIRST MIDTERM**	
	8	Introduction to Concrete	Download the CE60 special printouts
	10	Proportioning of Concrete Mixes	
	15	Hydraulic cements	
	17	Microstructure of cement paste	
	22	Aggregates for concrete	
	24	Strength of concrete	
	29	Properties of fresh concrete	
	31	Elastic behavior, shrinkage, and creep	
Nov	4	Temperature effects in concrete	
	7	**SECOND MIDTERM**	
	12	Durability of Concrete	
	14	Durability of Concrete II	
	19	Environmental Impact of Concrete	
	21	Microstructure and mechanical properties of wood	notes
	26	Shrinkage and creep of wood	notes
	2	Durability	Notes
	6	Review	

Grade: CE 60 two midterms 15% each + HW 10% + Lab reports 20% + final 40%

Textbooks:

Required

*Foundation of Materials Science and Engineering, W.F. Smith, McGraw-Hill. (ASUC has a special printout)

Recommended (download from the library)

**Concrete: Structure, Properties and Materials by Mehta and Monteiro, Fourth Edition, McGraw-Hill 2014.

For more info on concrete: Visit http://monteiro.ce.berkeley.edu/

Office hours: M 2-3 pm and TuTh 10-11 am in 725 floor Davis Hall.

Late HW Policy: 50% off if handed in the next lecture (please do not place it in my mailbox or under the door of my office…). HW will not be accepted after that.

Final Exam:

Weds	12/18/19	8–11 am

Policy regarding reviews of the midterms: You're welcome to bring your exam to discuss until the last day of class.

Policy regarding lab reports: A late report will not be accepted, unless you have a proper justification.

In case you bought different editions of the Smith's textbook

Reading Assignment for Smith's 4th edition

Lectures	Reading Assignment
Introduction	
Atomic Structure and Bonding	
Crystal Structures	Smith, Chapter 3 pp. 49-82
Mechanical Properties	Smith Chapter 6 pp. 169-198
Alloys and their Phase Diagrams	Smith Chapter 8 pp. 239-270
Alloys and their Phase Diagrams	Smith Chapter 8 pp. 239-270
Equilibrium Microstructure of Steel Alloys	Smith Chapter 9 pp. 292-307
Phase Transformations	Smith Chapt. 4 pp. 124-144
Heat Treatment of Steel Alloys	Smith Chapt. 9 pp. 307-314
Composite Materials	Smith Chapter 12, 396-411

Reading Assignment for Smith's 3rd edition

Lectures	Reading Assignment
Introduction	
Atomic Structure and Bonding	Smith* pp. 19-60
Crystal Structures	Smith pp. 67-81; 90-97
Mechanical Properties	Smith pp. 193-215
Alloys and their Phase Diagrams	Smith pp. 379-417
Alloys and their Phase Diagrams	Smith pp. 379-417
Equilibrium Microstructure of Steel Alloys	Smith pp. 427-442
Phase Transformations	Smith pp. 117-136
Heat Treatment of Steel Alloys	Smith pp. 442-469
Composite Materials	

CE 60 PROPERTIES OF CIVIL ENGINEERING MATERIALS

LABORATORY SCHEDULE

Experiments	**Lab Sec.1 Monday**	**Lab Sec. 2 Tuesday**	**Lab Sec. 3 Wednesday**
Experiment I: Stress-Strain Behavior of Bungee Cords:	Sep. 09	Sep. 10	Sep. 11
Experiment II: Tensile Test of Steel	Sept. 16	Sept. 17	Sept. 18
Experiment III: Steel Heat Treatment - Jominy Test	Sept. 23	Sept. 24	Sept. 25
Demonstration Lab	Sep. 30	Oct. 01	Oct. 02
Experiment IV: Concrete Mix Design (Trial Batch Method)	Oct. 07	Oct. 08	Oct. 09
Experiment V: Concrete Mix Design (ACI Method)	Oct. 14	Oct. 15	Oct. 16
High Strength Competition Lab	Oct. 21	Oct. 22	Oct. 23
Experiment VI: Measurement of Mechanical Properties of Concrete (Test 6x12's)	Oct. 28	Oct. 29	Oct. 30
Experiment IV (Continuation): Mechanical Tests on Trial Batch Mixes	Nov. 04	Nov. 05	Nov. 06
Experiment V (Continuation): Mechanical Tests on ACI Mixes	Nov. 18	Nov. 12	Nov. 13
Experiment VII: Measurement of Mechanical Properties of Wood	Nov. 25	Nov. 26	Dec. 04

Note: All the labs will be performed in the 2nd floor of Davis Hall