

**CE 60 The Structure and Properties of Civil Engineering Materials**

Date		Lectures	Reading Assignment
Aug.	27	Introduction	
Sept	1	Atomic Structure and Bonding	Lecture notes
	3	Crystal Structures	reader pp. 3-22
	8	Mechanical Properties	reader pp. 46-64
	10	Alloys and their Phase Diagrams	reader pp. 95-136
	15	Alloys and their Phase Diagrams	reader pp. 95-136
	17	Equilibrium Microstructure of Steel Alloys	reader pp. 137-148
	22	Phase Transformations	reader pp. 23-38
	24	Heat Treatment of Steel Alloys	reader pp. 148-178
	29	Review	
Oct	<b>1</b>	<b>FIRST MIDTERM</b>	
	6	Introduction to Concrete	Download the CE60 special printouts
	8	Proportioning of Concrete Mixes	
	13	Hydraulic cements	
	15	Microstructure of cement paste	
	20	Aggregates for concrete	
	22	Strength of concrete	
	27	Properties of fresh concrete	
	29	Elastic behavior, shrinkage, and creep	
Nov	3	Temperature effects in concrete	
	<b>5</b>	<b>SECOND MIDTERM</b>	
	10	Durability of Concrete	
	12	Durability of Concrete II	
	17	Environmental Impact of Concrete	
	19	Microstructure and mechanical properties of wood	notes
	24	Shrinkage and creep of wood	notes
Dec	1	Durability	Notes
	3	Review	

**Grade:** CE 60 two midterms 20% each + HW 10% + Lab reports 20% + final 30%

**Important note:** The exams will be proctored by Zoom

**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.

You can access this textbook, free of charge, as part of your library's subscription to McGraw-Hill Education's [AccessEngineering](#). Feel free to copy the line below to the course syllabus or forward to your students:

[AccessEngineering: Concrete: Microstructure, Properties, and Materials](#)

Note that you will need to be logged into the university network in order to have access to this content. Here's a link to login to AccessEngineering if you're working from home:

<https://libproxy.berkeley.edu/login?url=http://accessengineeringlibrary.com/>

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

**Office hours:** M 1-2:00 pm and TuTh 10-11:00 am

**Late HW Policy:** 50% off if submitted in the next lecture. HW will not be accepted after that.

**Final Exam:**

Weds	12/16/20	8-11 am
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**Academic honesty**

The exams will be proctored using Zoom and everybody will be required to follow our honor code: "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others." You are encouraged to form study groups and work together to understand course material, but all written work as well as responses to in-class questions should be your own. You may not copy other students' work. Academic integrity and ethical conduct are of utmost importance in the College of Engineering and at U.C. Berkeley.

**Policy regarding reviews of the midterms:** You're welcome to make an appointment to discuss your exam until the last day of class (Dec 3).

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

**Accommodation policy:** We honor and respect the different learning needs of our students, and are committed to ensuring you have the resources you need to succeed in our class. If you need religious or disability-related accommodations, if you have emergency medical information you wish to share with us, or if you need special arrangements in case the building must be evacuated, please share this information with us as soon as possible.

**Inclusion:** We are committed to creating a learning environment welcoming of all students that supports a diversity of thoughts, perspectives and experiences, and respects your identities and backgrounds (including race/ethnicity, nationality, gender identity, socioeconomic class, sexual orientation, language, religion, ability, etc.) To help accomplish this:

- If you have a name and/or set of pronouns that differ from those that appear in your official records, please let us know.

- If you feel like your performance in the class is being impacted by your experiences outside of class (e.g., family matters, current events), don't hesitate to come and talk with us. We want to be resources for you.
- We (like many people) are still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to us about it.

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

### **Reading Assignment for Smith's 4<sup>th</sup> edition**

<b>Lectures</b>	<b>Reading Assignment</b>
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 3<sup>rd</sup> edition**

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

**CE 60 PROPERTIES OF CIVIL ENGINEERING MATERIALS**  
*LABORATORY SCHEDULE*

<b>Experiments</b>	<b>Lab Sec.1 Monday</b>	<b>Lab Sec. 2 Tuesday</b>	<b>Lab Sec. 3 Thursday</b>
Experiment I: Stress-Strain Behavior of Bungee Cords:	Aug. 31	Sep. 01	Sep. 03
Experiment II: Tensile Test of Steel	Sept. 14	Sept. 15	Sept. 17
Experiment III: Steel Heat Treatment - Jominy Test	Sept. 21	Sept. 22	Sept. 24
Demonstration Lab	Sep. 28	Sep. 29	Oct. 01
Experiment IV: Concrete Mix Design (Trial Batch Method)	Oct. 05	Oct. 06	Oct. 08
Experiment V: Concrete Mix Design (ACI Method)	Oct. 12	Oct. 13	Oct. 15
Concrete Mixing Demo*	Oct. 19	Oct. 20	Oct. 22
Experiment VI: Measurement of Mechanical Properties of Concrete (Test 6x12's)	Oct. 26	Oct. 27	Oct. 29
Experiment IV (Continuation): Mechanical Tests on Trial Batch Mixes	Nov. 02	Nov. 03	Nov. 05
Experiment V (Continuation): Mechanical Tests on ACI Mixes	Nov. 09	Nov. 10	Nov. 12
Experiment VII: Measurement of Mechanical Properties of Wood	Nov. 16	Nov. 17	Nov. 19

\*Note: All the labs will be performed online. Depending on University policy for in-person classes a short demonstration of concrete mixing will be done in the lab the week of Oct. 19<sup>th</sup> during lab sessions (2-5pm)