

**Instructor** Professor Phillip Messersmith  
Office: 218 Hearst Memorial Mining Building

**Office Hours** 1-2 pm Monday, 10-11am Tuesday, or by appointment.

**Course Website** bCourses

**Lecture** MWF 12:10-1PM, 390 Hearst Memorial Mining Building

**Textbook** W.D. Callister, Jr. & D. G. Rethwisch, Materials Science and Engineering an Introduction, 9<sup>th</sup> Edition, Wiley (2014).

### Description

This 3-unit course consists of three (3) 50-minute lectures each week. The long-term objectives are to provide students with a basic working understanding of materials, in support of a career as a practicing engineer. The course provides broad coverage of the field for non-majors who may not take another course in materials science & engineering, and it serves as the introductory course in the major field, laying the foundation for understanding the relationship between the internal structure of matter and the properties of materials that make them attractive for practical applications. This course will apply basic principles of physics and chemistry to the engineering properties of materials. Primary emphasis will be devoted to the structure-properties-processing relationships of metals, polymers, ceramics, and composites, and principles of materials selection.

**GSIs:** Alla Zamarayeva ([allazamarayeva@gmail.com](mailto:allazamarayeva@gmail.com)) Office Hours: 1-2pm Tue; 12-1pm Thu  
Arvind Dasgupta ([arvind.dasgupta@gmail.com](mailto:arvind.dasgupta@gmail.com)) Office Hours: 3-4pm Mon; 1-2pm Wed  
All GSI office hours will be in 350 HMMB.

**Grading Policy** Homework 15%  
Participation 20%  
Exam I 20%  
Exam II 20%  
Final Exam 25%

There are no individual thresholds assigned to the different components of your grade. All components are scored, weighted and pooled to determine the overall course grade at the end of the semester.

### Homework

There will be approximately 9 problem sets throughout the semester. You will be allowed to drop the lowest grade.

You are allowed to work together with one other student to solve homework problems if you wish. If you choose to do this, then the exact same document (with both names on it) must be submitted by both students. Both students will receive the same grade.

Homeworks are to be turned in online via bCourses by noon on the due date. Homeworks must be submitted in .pdf format. No raw word-processing file formats will be accepted. It is strongly suggested to use word-processing software with an appropriate equation-editor. If you choose to hand write your answers and then scan, points will be taken off if your handwriting is illegible.

No late assignments will be accepted unless prior arrangements are made with the instructor for valid excuses. Valid excuses include, but are not limited to, deaths in the family, jury duty, hospitalization for illness, etc.

## Exams

There will be two 50-minute exams, occurring in class on **February 23** and the other on **April 5**. Exams begin at 12:10 PM and end at 1:00 PM sharp. Each exam contributes equally to your grade. Your lecture notes are your best guide to examination content, as not all sections of the textbook are covered in lecture.

The examinations are “closed book” unless otherwise noted. No electronic devices other than a calculator are permitted. No graphing or wireless capable calculators are allowed. Cell phones must be turned OFF and stowed. You are allowed a supply of pencils and pens, erasers, and a straightedge (long enough to construct figures across an 8.5 by 7 inch page). Exam Booklets: You are required to bring your own exam booklet (e.g. Blue Book, 8.5” x 7”, 16 pages) for each exam. Recording your answers on loose paper is not allowed. Booklets can be purchased at stores on or near campus.

The final examination will be cumulative – covering all topics from the entire course but weighted toward the content in lectures after Exam II. The final exam will take place on **Wednesday May 9, 2018 from 3-6PM in 390 HMMB**.

There will be **no makeup exams**. For situations in which there is a valid reason for missing an exam (e.g., doctor’s excuse, death in the family, etc.) I will work with you to reach an acceptable time to take the exam.

## Participation

Participation accounts for 20% of your grade and is meant to reinforce the material found in the textbook and lectures. We will use iClicker for between 2-4 questions per class. 2/3 of this grade is based on just being present. If you attend every class and respond with your iClicker to any of the questions you will get 2 points per class even if your answers are wrong. The other 1/3 of participation grade will be based on a multiple choice question covering the reading assignment/current lecture. In this question only, you will get a point if you answer correctly.

You will be allowed 3 missed classes with no questions asked. For instance, assume we have 35 total lectures. The points available for the participation grade will be 96 (accounting for the 3 allowed missed classes and 2 pts/class for showing up and 1 pt/class for getting the reading question correct). If you attended 32 or more classes you are guaranteed to receive at least 64/96 pts on this portion of your grade. If you attend 25 classes and get every reading question correct, you will receive 75 pts (50+25) on this portion of the grade.

There will be no credit for participation unless you use the iClicker – in other words if you forget your iClicker, your dog ate it, batteries run out, etc. that is one of your allowed absences.

## Re-grading Policy

Re-grading of exams, reports, and homeworks is a timely and serious undertaking. In order to assure only valid cases come before the class staff, the following policies will be in place. Failure to adhere to these policies will mean that your requests will go unheeded:

1. Re-grade requests must be submitted within one week of score posting.
2. Students are required to type up a written request with the following information:
  - Student Name and ID
  - Homework or Exam and problem number in question
  - A detailed written description of what you have done and why you think it merits a re-grade, using complete sentences, punctuation and no SMS/social media abbreviations. THX!
3. Re-grade requests along with the original assignment/exam will first go to the Instructor for consideration. At this point the Instructor can reject re-grade requests that do not meet the above guidelines. Compliant requests will then be addressed as follows.
  - Simple fixes such as addition errors will be corrected immediately.
  - More extensive requests will go to the appropriate grader or GSI who will then consult with the Instructor with one of two outcomes: 1) a complete re-grade of the entire assignment or 2) rejection of the appeal. Note that complete re-grading may uncover previously undetected errors on other problems that could lower or increase your grade further.
  - The results of re-grading will be final and binding.

### **Academic Code of Conduct**

This course has a “zero-tolerance” policy concerning cheating and plagiarism. Students are referred to the University of California, Berkeley [Student Code of Conduct](#) for complete details on expectations. Special attention should be given to Section V and Appendix II. Cheating and plagiarism will be dealt with according to established campus policy. Students caught cheating will receive a failing grade and a report to the [Center for Student Conduct](#) will be filed. The following is a partial list of common cheating/plagiarism situations to avoid:

- **Homework.** Your homework submissions should be your own work. However, you are allowed to work together with one other student to solve homework problems if you wish. If you choose to do this, then the exact same document (with both names) must be submitted by both students. Both students will receive the same grade. Homework sets that contain similar solutions that are not labelled as a team effort will lead to additional scrutiny and may be considered academic dishonesty. You may not use solutions to questions that are available from various student organizations that maintain databases of previous year’s solutions. If you do this you are engaging in plagiarism.
- **Re-grading.** Attempts to “doctor” or manipulate answers after grading to enhance scores will be considered academic dishonesty and dealt with as described above.

**Class Schedule:** THE FOLLOWING COURSE SCHEDULE IS SUBJECT TO CHANGE

Date	Topic	Reading	HW Due
W 1/17	Introduction	Ch. 1	
F 1/19	Lecture- Atomic Structure & Bonding	Ch. 2	
M 1/22	Lecture- Crystal Structure	Ch. 3, 12.2-4	
W 1/24	Lecture- Crystal Structure	Ch. 3, 12.2-4	
F 1/26	Lecture- Crystal Structure/X-ray Diffraction	Ch. 3	
M 1/29	Lecture- Crystal Defects	Ch. 4, 12.5	
W 1/31	Guest Lecture: Chapter 2		
F 2/2	Lecture- Crystal Defects	Ch. 4, 12.5	HW1
M 2/5	Lecture- Diffusion	Ch. 5	
W 2/7	Lecture- Diffusion	Ch. 5	
F 2/9	Lecture- Mechanical Properties	Ch. 6	HW2
M 2/12	Lecture- Mechanical Properties	Ch. 6	
W 2/14	Lecture- Mechanical Properties	Ch. 6	
F 2/16	Lecture- Dislocations/Plasticity	Ch. 7	HW3
M 2/19	No Lecture- Academic Holiday		
W 2/21	Lecture- Dislocations/Strengthening Mechanisms	Ch. 7	
F 2/23	<b>Exam 1</b>		
M 2/26	Lecture- Fracture/Fatigue	Ch. 8	
W 2/28	Lecture- Phase Diagrams	Ch. 9, 12.7	
F 3/2	Lecture- Phase Diagrams	Ch. 9, 12.7	
M 3/5	Lecture- Phase Diagrams	Ch. 9, 12.7	
W 3/7	Lecture- Fe-C/Steel Alloys	Ch. 11.2	
F 3/9	Lecture- Other Alloys		HW4
M 3/12	Lecture- Nucleation and Growth	Ch. 10	
W 3/14	Lecture- Nucleation and Growth	Ch. 10	
F 3/16	Lecture- Phase Transformations	Ch. 10	HW5
M 3/19	Lecture- TTT/Martensite	Ch. 10	
W 3/21	Lecture- Shape Memory/Superelasticity		
F 3/23	Lecture- Ceramics	Ch. 12,13	HW6
M 3/26-30	Spring Break		
M 4/2	Lecture- Ceramics/Glasses	Ch. 12,13	
W 4/4	<b>Exam 2</b>		
F 4/6	Lecture- Polymer	Ch. 14,15	
M 4/9	Lecture- Polymerization	Ch. 14,15	
W 4/11	Lecture- Polymers-Molecular Weight	Ch. 14,15	
F 4/13	No Lecture		HW7
M 4/16	Lecture- Polymer Structure/Crystallinity	Ch. 14,15	
W 4/18	Lecture- Polymers-Thermal Transitions		
F 4/20	Lecture- Polymer Viscoelasticity	Ch 20/21	HW8
M 4/23	Lecture- Shape Memory Polymers	Ch. 17	
W 4/25	Lecture- Composites	Ch. 16	
F 4/27	Lecture- Interfacial Properties		HW9
W 5/9	<b>Final Exam, 3-6pm</b>		