

E 27: Introduction to Manufacturing and Tolerancing, Fall 2020

(<https://berkeley.zoom.us/j/95389514946>)

General Info: Prof. McMains
Contact via bCourses message, or (510) 852-9359 if necessary.
Office Hours (Zoom): (tentatively) W 4-5pm & Tu 4:10-5pm, or by appointment.

Reaching me: I have an RSI (repetitive strain injury) from typing, so please include a phone number if you email me. Please ask questions of general interest (such as homework clarifications) in lecture, lab, or the online discussion board. I used to tell students to ask quick questions not of general interest before or after class, but we'll see how well that works in a big class with Zoom (possibly with breakout rooms or the waiting room feature? It's an adventure...). For more in-depth discussions, come to my office hours, or if you have a conflict with office hours, see me before or after class to set up an alternate meeting time. Any email you send needs to include your phone number. Please also include "E27" in the subject line.

GSI(s) (a.k.a. TAs): Sara Shonkwiler and Cody Yanna.

If you have a private matter to discuss, message your GSI in bCourses. Do not ask homework questions via email; instead...

Homework questions and discussion: bCourses Discussions board. Post your homework and exam questions to bCourses -- so all will be able to see the questions and answers from the staff.

We will be using bCourses for the course website, <https://bcourses.berkeley.edu/>. Use your CalNet ID and password to login. If you are concurrent enrollment, the GSIs can give you access if you have a Calnet ID.

Lectures: W 3-4pm (<https://berkeley.zoom.us/j/95389514946>)
Note: About 1-2x per month there will be an online pre-lecture quiz on bCourses, posted the day before, and due 3 pm right before lecture. The first one is due before lecture 2.

Laboratory: Lab sections are still being adjusted. Updates soon!
Prelabs will be due the night before each lab.

Exams: Midterm: Monday, Oct. 19, 6:30-8:30 pm (tentative)
Final: Tuesday, Dec. 15, 7-10 pm

Prerequisite: E25 (may be taken concurrently)

Availability for lectures, laboratories, and all examinations is required for enrollment in the class. Please see the professor for accommodation of religious beliefs, disabilities, and other special circumstances before the end of the first week of classes for any foreseeable issues. No make-up exams will be available.

Course Materials:

- Some basic tools e.g. calipers, screwdriver, ruler, etc. required. More info closer to the labs when you need them.
- Three chapters from Lieu, D.K., and Sorby, S.A., Visualization, Modeling, and Graphics for Engineering Design [Lieu and Sorby] will be required reading. Either 2009 or 2017 (1st or 2nd edition) are acceptable. (This is the E25 textbook for those who have it.) We will also work to get the most important chapters put "on reserve" online at the Engineering Library before they are assigned.
- Other important reading and references will be posted on bCourses. For example, some annotated excerpts from Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, by M.P. Groover [Groover].
- (Figures from these texts in the lecture slides will be annotated with the respective reference in square brackets. Some additional figures are taken from Manufacturing Processes for Engineering Materials, by S. Kalpakjian and S. Schmid [KS].)

Grading:

25% Homework
30% Laboratory Reports and Group Design Project
10% Quizzes, surveys, class, lab & discussion board participation
15% Midterm Examination
20% Final Examination

Attendance

While we intend to have at least some synchronous activities at virtually every lecture and lab meeting, we will record the sessions on zoom so that when unforeseen events, of which we are all experiencing far more than usual, prevent attendance, you will still be able to access the material at a later time.

Late HW Policy

Late homework and lab reports will be marked off by 50% and will only be accepted up to one week late (unless we need to discuss the solutions earlier e.g. before an exam, in which case an announcement will be made). You must turn in all problems together (i.e. you can't turn in some on time and others late). If a hw file you upload is incomplete or unreadable, you will only be able to correct the error up to the late deadline, and it will count as late, so always check your files after you upload!

Prelabs and prelecture quizzes are in preparation for the respective lab or lecture, so they will not be accepted after the lab/lecture in question.

Evaluating the merit of student excuses for late homework is not an activity I enjoy; therefore, *all* students will automatically be given one "free" late homework or lab report (but not both) without penalty. (You don't need to tell us ahead of time when you are using your free late assignment.) Save this for when you really need it! Especially since sometimes the teammate who was supposed to turn in your lab report might forget and that's tough to anticipate. (Late penalties will not show up on bcourses; they will be subtracted when we calculate your final grade.)

Academic Honesty

The student community at UC Berkeley has adopted the following Honor Code: "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others." For homework assignments in this class, you are allowed to *discuss* the problems and techniques with other students *currently* in this course, but each student must write up his or her own solution for written problems. **Never give a classmate a copy of your homework.**

If you discussed your work with other students, or checked your answers against theirs, YOU MUST DESCRIBE THIS WHEN YOU SUBMIT, ACKNOWLEDGING THE STUDENT(S) WHO ASSISTED YOU OR EXPLAINING WHO YOU ASSISTED AND HOW (all students will receive full credit in this case). Turning in someone else's work or group work as your own (or letting someone else turn in your work as their own), on the other hand, will be treated as cheating, and will result in a grade of zero on the assignment for all students involved. Cheating on a midterm or final exam may result in a failing grade for the entire course. In all cases of cheating, your actions will also be reported to the Center for Student Conduct for administrative review.

Lab

Most weeks you will have a pre-lab, which will generally be due the night before your lab. Labs are generally done in groups; for the first couple weeks you will probably be randomly assigned to groups so you get to know each other, and then we'll finalize permanent groups. Many weeks we will have sign-ups with the GSI so that you can consult on progress without needing to attend the entire lab.

Software

Several labs and homeworks will require software. Excel, Matlab, Moldflow, AutoCAD and SolidWorks will be available on the computers in the CAD labs via remote login, if you do not have them. Remote access instructions will be provided closer to the dates you will use them. Some software is also available to be downloaded to your personal computer, including from <https://software.berkeley.edu/>

Schedule

<u>Week</u>	<u>Date</u>	<u>Material</u>
1	8/26	Subtractive processes intro.
2	9/2	Subtractive processes continued.
3	9/9	Subtractive processes wrap-up.
4	9/16	Tolerancing and metrology intro.
5	9/23	Tolerancing and metrology continued.
6	9/30	Additive processes.
7	10/7	Additive processes continued. Forming processes intro.
8	10/14	Forming processes continued.
9	10/21	Geometric dimensioning and tolerancing (GD&T) intro.
10	10/28	GD&T: fits, position, datums.
11	11/4	Joining processes, welding.
(12)	11/11	Veteran's Day. No lecture, just labs.
13	11/18	GD&T continued. More datum related and datum independent tolerances.
(14)	11/25	Non-instructional day (Thanksgiving). No lecture or labs this week.
15	12/2	GD&T conclusion. Datum optional tolerances, project drawing hints.

Final: Tuesday, Dec. 15, 7-10 pm

<u>Week</u>	<u>Reading</u>
1	
2	Lieu & Sorby: Fabrication Processes (available on bCourses)
3	Fabrication Processes, pp. 2-14 of the chapter, any other sections about subtractive processes in the chapter (e.g. pp.19-21,31-32,34-36)
4	Excerpts from Groover text on bCourses. Fabrication Processes pp. 40-41, 57-58
5	Lieu & Sorby: Tolerancing (pp. 1-15) Design Process readings
6	Lieu & Sorby: Tolerancing Machinery's Handbook (homework reference)
7	Lieu & Sorby: Fabrication Processes
8	Lieu & Sorby: Fabrication Processes
9	Lieu & Sorby: Tolerancing
10	Lieu & Sorby: Tolerancing
11	Lieu & Sorby: Fabrication Processes
12	Excerpts on bCourses
13	Lieu & Sorby: Tolerancing
15	Lieu & Sorby: Working Drawings