

E 27: Introduction to Manufacturing and Tolerancing, Fall 2018

General Info: Prof. McMains (510) 852-9359

Office Hours (5145 Etcheverry): (tentatively) M 4-5pm & W 3:10-4pm, or by appointment

Reaching me: I have an RSI (repetitive strain injury) from typing, so please include a phone number if you email me. Ask questions of general interest (such as homework clarifications) in lecture, lab, or the online discussion board. Ask quick questions not of general interest before or after class. 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 (a.k.a. TA): Sara Shonkwiler. If you have a private matter to discuss, email to sara_shonkwiler@berkeley.edu. Do not ask homework questions via email.

Homework questions and discussion: bCourses Discussions board. Only homework and exam questions posted to bCourses -- for all to see -- will be answered.

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 GSI can give you access during lab if you have a Calnet ID.

Lectures: M 3-4pm, 50 Birge. Makeup lectures for Monday holidays TBD.
About 1-2x per month there will be an online pre-lecture quiz on bCourses due 3 pm.

Laboratory: Fri or Tues, 9-12, or Thurs or Fri 2-5 pm, 210/220 Jacobs. Lab Th/Fri at the end of one week is same lab as Tues the start of the next week. Labs start the very first week!
Prelabs will be due the night before each lab.

Exams: Midterm: Thursday, Oct. 18, 6:30-8:30 pm
Final: Tuesday, Dec. 11, 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.

Required Course Materials:

- Safety glasses.
- An i-clicker (or i-clicker+ or i-clicker2) transmitter. Register it on bcourses (not the iclicker site).
- Lieu, D.K., and Sorby, S.A., Visualization, Modeling, and Graphics for Engineering Design, 2009 or 2017 (1st or 2nd edition are both acceptable, but not any of the abridged variations, which don't include the tolerancing material). On reserve at the circulation desk in the Engineering Library.
- Jacobs Maker Pass. <http://jacobsinstitute.berkeley.edu/our-space/makerpass/get-maker-pass/>

Optional reference texts (available at circulation desk in the Engineering Library):

- Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, by M.P. Groover, Wiley.
- Manufacturing Processes for Engineering Materials, by S. Kalpakjian and S. Schmid [KS], Prentice Hall.

Grading:

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

Electronic Devices:

No headphones in lab or lecture. No cellphone, computer, etc. use during lecture. Cell phones may be left on vibrate for emergency notification purposes. If you expect an important phone call, please inform me before class and quietly excuse yourself when you receive it.

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!

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 or files, and never have someone else's computer file in your possession.**

If you discussed your work with other students, or checked your answers against theirs, YOU MUST DESCRIBE THIS AT THE TOP OF YOUR WRITE-UP, 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. Because responding to in-class questions with the clicker is worth course credit, responding for another student will be treated as cheating, and both students will lose all clicker participation credit for the course. 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.

Clickers

You can only get clicker participation credit if you bring your clicker and respond to the clicker questions during class; it cannot be made up. We won't count the first lecture and all students will receive a "free" day of class participation. Save this for when you really need it! Because batteries die, students forget their clickers, etc. and that's tough to anticipate. You also need to register your clicker on bcourses by the end of the 5th week of classes (you'll get credit for your earlier clicks before you register as long as you register by this date, so even if you are waitlisted please participate with your clicker).

Lab

Labs begin the first week of classes. The lab given Th/Fri at the end of one week will be the same lab as Tues the start of the next week (except for the final week, due to holidays). Most weeks you will have a pre-lab, which will generally be due the night before your lab. Labs are done in groups; for the first couple weeks you will be randomly assigned to groups so you get to know each other, and then we'll let you pick your permanent group.

Jacobs Hall Maker Pass

Many of the lab sessions will take place in Jacobs Hall, for which a Maker Pass is required. The Jacobs Hall Maker Pass fee is \$75 for the semester, payable by check or Cal1 card. Fee waivers are available to students with financial need. Complete details are available at <http://jacobsinstitute.berkeley.edu/our-space/makerpass/get-maker-pass/>. You don't need to fill out the step 1 online form if you are enrolled in this course. You should go ahead and do the safety training (see below) even before you pay the fee. You don't need training on all equipment; we'll probably require training for 1-2 processes and have you pick your favorite other equipment to get trained on so that after you form final lab groups you can coordinate to get a good mix of skills in your team.

Safety

Please complete General Workshop Safety Training for Jacobs Hall as soon as possible: <https://bcourses.berkeley.edu/enroll/TY4ETA> (requires CalNet authorization). Please note that initially only the online GWS training is required; there will be subsequent deadlines for training on particular equipment (including the hands-on training).

Some labs will meet outside of Jacobs. There are two key things to be aware of for any lab session that takes place

anywhere in Hesse or in Etcheverry 1166:

1. Please ensure that you have safety glasses. You are required to bring your own safety glasses and wear them whenever indicated by signs or by staff. These can be purchased, for example, from the Cal Student Store at 2470/2480 Bancroft Way, or from Ace Hardware, 2020 Milvia St.
2. No shorts/skirts or open-toe footwear are allowed in these labs. Legs and toes must be covered to protect them during welding, injection molding, and machine shop labs.

Safety guidelines will require us to send you home to change if you do not follow these guidelines. In exceptional circumstances, the Hesse lab staff may be able to supply safety glasses to students who are able to pay using a CARS account, but this will need to be arranged in advance of the lab because there will not be time to supply glasses at the start of a lab session.

Keep the building and labs secure. Do not allow anyone without a Cal ID access, and make sure they swipe it before entering after hours if you open or hold the door for them. Please notify one of the instructors or campus security of any suspicious persons or events in, or near, the building. **DO NOT BLOCK OPEN THE DOORS. NO FOOD OR DRINKS IN THE LABS.** MakerPass and computer accounts subject to termination for policy violations.

Software

Several labs and homeworks will require software. Excel, Matlab, AutoCAD and SolidWorks are available on the computers in the CAD labs (10 Jacobs and 1171 Etcheverry); other software can also be downloaded to your personal computer, including:

Meshmixer: <http://meshmixer.com/>

Moldflow: <http://www.autodesk.com/education/free-software/moldflow-adviser-ultimate>

In the CAD labs, students can use their CalNet ID and their passphrase to logon to the computers. Please use the networked H: drive for saving the files you are working on in lab, NOT the hard drive of the lab computer. All students are responsible for backing up their own data, so store to a USB memory stick as often as necessary. There is a small free print quota every start-of-semester. When used up, additional quota can be charged to CARS at . You can also request after-hours cardkey access to 1171 at the same site.

Schedule

<u>Week</u>	<u>Dates</u>	<u>Material</u>
1	8/23, 8/24 or 8/28	No Monday lecture this week.
2	8/27	Subtractive processes intro.
3	9/3 makeup 9/5	Subtractive processes continued.
4	9/10	Subtractive processes wrap-up.
5	9/17	Tolerancing and metrology intro.
6	9/24	Tolerancing and metrology continued.
7	10/1	Additive processes.
8	10/8	Additive processes continued. Forming and processes intro.
9	10/15	Forming processes continued.
10	10/22	Geometric dimensioning and tolerancing (GD&T) intro.
11	10/29	GD&T: fits, position, datums.
12	11/5	Joining processes, welding.
13	11/12	Team communication.
14	11/19	GD&T continued. More datum related and datum independent tolerances.
15	11/26	GD&T conclusion. Datum optional tolerances, project drawing hints.

Final: Tuesday, Dec. 11, 7-10 pm

* Notes: No labs the Thurs or Fri of Thanksgiving week :).