Course Syllabus

Chemical & Biomolecular Engineering 150A - Fall Semester, 2020

Lectures: MWF 9-10 am Via Zoom (see link and password below)

https://berkeley.zoom.us/j/91514206056?pwd=UDdhZnM3M2I5WFFENWRxZ3BTWTBRdz09 (https://www.google.com/url?q=https://berkeley.zoom.us/j/91514206056?pwd%3DUDdhZnM3M2I5WFFENWRxZ3BTWTBRdz09&sa=D&source=calendar&ust=1598140704266000&usg=AOvVaw3HfbpLCBJt3PD00w-RoNxt)

Meeting ID: 915 1420 6056 Passcode: 394492

Discussion sections: M 3-4 pm

Tu 3-4 pm

Zoom: **https://berkeley.zoom.us/j/92527376364?pwd=TU1wZVdBWEpVdm5BT1pvb3dZcm1RZz09 (https://berkeley.zoom.us/j/92527376364?pwd=TU1wZVdBWEpVdm5BT1pvb3dZcm1RZz09)**

Meeting ID: 925 2737 6364 Passcode: 246014

Find your local number: **https://berkeley.zoom.us/u/alPDDlsMo (https://berkeley.zoom.us/u/alPDDlsMo)**

* make sure to log into zoom with @berkeley.edu account

Instructor: Professor Susan Muller **muller2@berkeley.edu (mailto:muller2@berkeley.edu)**

Prof. Muller's Office Hours:

M 10-11 am immediately following lecture, via the same Zoom link as lecture

Tu 10-11 am via Zoom at:

https://berkeley.zoom.us/j/93226800740?pwd=cFl5L3JXNEdYRXh5emp1ZHZSYm9UQT09 (https://www.google.com/url?q=https://berkeley.zoom.us/j/93226800740?pwd%3DcFl5L3JXNEdYRXh5emp1ZHZSYm9UQT09&sa=D&source=calendar&ust=1598141264521000&usg=AOvVaw03vYWyTWzPk1WLsR7Ozt3I)

Meeting ID: 932 2680 0740 Passcode: 602407

Teaching Assistant: Emily Carvalho **emily_carvalho@berkeley.edu (mailto:emily_carvalho@berkeley.edu)**

Emily's Office Hours:

M 4-5 pm following M discussion section (but open to all), via the same Zoom link as that discussion

Tu 4-5 pm following Tu discussion section (but open to all), via the same Zoom link as that discussion

Zoom: **https://berkeley.zoom.us/j/92527376364?pwd=TU1wZVdBWEpVdm5BT1pvb3dZcm1RZz09 (http://%20https://berkeley.zoom.us/j/92527376364?pwd=TU1wZVdBWEpVdm5BT1pvb3dZcm1RZz09)**

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Online (Zoom) Study Halls:

As noted in an announcement on Aug 27, online study halls will be available on Mondays, Tuesdays, and Thursdays from 5-7 pm. These will be at:

https://berkeley.zoom.us/j/97554192164?pwd=eDQwak9sL2IyUkxVVm1YSmI4M04xZz09 (https://www.google.com/url?q=https://berkeley.zoom.us/j/97554192164?pwd%3DeDQwak9sL2IyUkxVVm1YSmI4M04xZz09&sa=D&source=calendar&ust=1599011573424000&usg=AOvVaw0lJ7-5rKtTgQ7Xp8m8KrWL)
Meeting ID: 975 5419 2164 Passcode: 648924

Course website: bcourses.berkeley.edu (https://bspace.berkeley.edu/)

Please check the website regularly for announcements, assignments, quizzes, and other resources. Please **set your bCourses notifications (https://s3.amazonaws.com/tr-learncanvas/docs/CanvasNotifications.pdf)** so that you do not miss any announcements or assignments.

Text: **Denn, *Process Fluid Mechanics*, Prentice-Hall, NJ (1980).**

This is the primary text for the first 10 weeks of the course. The last 4 weeks of the course will draw on the text by **Welty, Wicks, Wilson, and Rorrer** below, which is one of the required texts for ChE 150B.

Other references:

White, *Fluid Mechanics*, 2nd edition (or later), McGraw-Hill, NY (1986).

Bird, Stewart, and Lightfoot, *Transport Phenomena*, 2nd ed., Wiley, NY (2002).

Middleman, *An Introduction to Fluid Dynamics*, Wiley, NY (1998).

Welty, Wicks, Wilson, & Rorrer, *Fundamentals of Momentum, Heat, and Mass Transfer*, 5th edition, John Wiley & Sons, NY (2008).

Incropera and DeWitt, *Fundamentals of Heat and Mass Transfer,* 5thed.,Wiley, NY (2002).

Course Grade:

Homework	10%
Lecture assignments & Participation	12%
Quizzes (7)	7% each*
Final Exam	36%

*Lowest quiz grade will be dropped.

Homework will be assigned on Wednesdays and will be due the following Wednesday at the beginning of lecture. Late homework will NOT be accepted. Working on the homework problems and understanding their solution is ***critical*** to your learning in this course. Homework problems will be made available through bCourses each Wednesday; you should upload your solution to **Gradescope as a PDF** through the link on bCourses. Solutions will be made available the following Wednesday. While homework sets will be graded, you should consult the published solution each week to insure that you understand the material. **Homework is worth approximately 10% of your course grade. No credit will be given for late homework, and there are no regrades of homework.**

There will be very short **lecture assignments** after most lectures, due by 2 pm the day following that lecture. (So for a Monday, 9am lecture, the short assignment will be due on Tuesday by 2 pm.)

Your understanding of the homework material, lectures, discussion section, and associated reading will be assessed through **Quizzes.** Quizzes will be open book and open notes (with some restrictions: you may use the course text and notes, and any materials on the course bCourses website, but you may not use other books, notes, or online resources), and will be scheduled roughly every other week and will be announced at least 1 week in advance. The 7 quizzes will each take approximately 30-45 minutes. Each quiz will be timed, but you may take the quiz at any time during a 24 hour window. Quiz problems are expected to test not only your familiarity with the homework problems and course material, but your ability to synthesize and think critically about the material. Quizzes will be made available on bCourses at the announced time; your solution should be uploaded as a PDF to both bCourses (through Quizzes, for time-stamping) and to Gradescope (for grading).

The final exam will be worth 36% of the course grade. It will be similar to the quizzes in terms of resources you may use, it will be timed, and you may take it within a 24 hour time window. The final exam will consist of approximately 6 problems, and you may divide the allotted 3 hours up and take breaks between problems (however, once you begin a problem, bCourses begins the timer, so you may only take breaks between problems.)

Remote instruction:

Lectures and discussion sections will be held at the regularly scheduled time via Zoom. Synchronous attendance will *not* be mandatory but we ***strongly encourage you to attend the live lectures and the live discussion sections if you can***. Be prepared for opportunities to converse with your peers during the class time. We plan to use the “Chat” and “Breakout Room” features of Zoom to enable questions and answers between students and instructors and to

facilitate smaller group conversations. We will be frequently asking you to answer questions, respond to prompts or briefly summarize lecture or discussion section content.

We will endeavor to post all lecture and discussion section recordings and notes on bCourses, barring technical difficulties, following the live sessions. These will be posted under "Media Gallery".

Zoom:

- **Activate your free UC Berkeley Zoom account (https://studenttech.berkeley.edu/zoompro)** and always join the Zoom meeting with your Berkeley account.
- Please keep the Zoom link private—do not share with anyone outside of the course.
- Please set your Zoom name to be the name you would like the instructors to call you.
- Please leave your audio on mute during the lecture, but be prepared to unmute yourself to ask or answer questions or participate in breakout rooms.
- We will be recording all Zoom lectures. The instructor will announce when the recording is beginning during each lecture. If you do not wish to be recorded, please turn off your video, mute your audio, and use chat to ask questions. The chat record will be deleted immediately after class ends.
- We will use Zoom features such as breakout rooms, polls, and the whiteboard as well as external tools such as Google Drive, Mentimeter, and bCourses. To maximize your ability to participate during lecture we recommend joining Zoom via a computer or tablet with a video camera and microphone if possible.
- We understand that your specific situation may present challenges to class participation. Please contact the instructors if you would like to discuss your ability to access course material. The **Student Technology Equity Program (https://technology.berkeley.edu/STEP)** (STEP) is available to help students get access to a laptop, Wi-Fi hotspot, and other peripherals (e.g. webcam, headphones, etc.).
- You may ask questions during lecture and discussion section by unmuting yourself or via the chat or the “raise hand” feature.

Piazza

- We will use Piazza as an alternative format to Office Hours to respond to questions about course content.
- The same expectations for respectful communication hold for Piazza as they do for face to face interaction.
- Instructors will check Piazza and respond to questions on **Monday, Tuesday, and Thursday at 6 pm**. We may not be able to respond to every question.
- Respond to your peers! We encourage you to help each other by responding to students’ questions. Please do not share complete answers to homework problems until the solutions have been posted.
- Anonymous posting has been activated, you may post your questions anonymously.

Gradescope

- You will upload your homework assignments to Gradescope through the link on bCourses. Be sure to assign the correct pages to each problem, the grader will only grade what has been designated for each problem. We recommend writing each problem on a new page.

- **Use a free scanning app like Scannable (https://gradescope-static-assets.s3-us-west-2.amazonaws.com/help/submitting_hw_guide.pdf)** to upload handwritten work. Graders will not grade work that is not legible. Whether you use Scannable or another means of converting written work to submittable formats, **it is your responsibility to make sure that it is legible.**
- You may use the regrade request feature in Gradescope for Quizzes. Regrade requests must be submitted within 1 week of the grades being posted. Please include a comment thoroughly explaining why you believe more points should be awarded based on the rubric.

Students' Questions

- All questions about course content (e.g., homework problems, lecture concepts, due dates, exam format) must be asked during lecture, discussion section, office hours, or over **Piazza** so that all may benefit from the answer.
- The only questions that may be asked by email to the instructors are those related to your personal situation, such technical difficulties you are experiencing or if you need an extension/ accommodation due to a health issue. We will do our best to respond to your email within 24 hours on weekdays.

Expectations of Academic Integrity and Ethics:

We are privileged to participate in the pursuit of knowledge and truth in higher education at UC Berkeley, where students and instructors are expected to maintain academic integrity and an environment of respect for the course of study and one another at all times. Direct any concerns about classroom environment immediately to the instructor.

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."*** The transition to remote instruction means that exams will not be proctored in person and creates the need for each member of our learning community to commit fully to the Honor Code. The instructors expect that you will adhere to this code without fail. *Anyone caught cheating on a quiz or exam, including working with a peer where individual work was specifically required, will receive a failing grade in the course and will be reported. You will be asked to sign an extended version of the Honor Code, that includes any restrictions on materials that may be accessed, as part of each quiz and the final exam.*

Below are links to important University policies and resources.

1. **UC Berkeley Academic Honor Code (http://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines#anchor1)**
2. **Accommodation of Religious Creed (http://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines#anchor2)**
3. **Conflicts Between Extracurricular Activities and Academic Requirements (http://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines#anchor3)**
4. **Absences Due to Illness (http://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines#anchor4)**

5. **Accommodation for Disability** (http://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines#anchor5)
6. **Accommodation for Pregnancy and Parenting** (http://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines#anchor6)
7. **Reading, Review, Recitation (RRR) Week** (http://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines#anchor7)
8. **Commencement Ceremonies and Final Exams** (http://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines#anchor8)
9. **Hardship Accommodations** (https://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines#anchor10)
10. **Accommodation and Support Measures for Sexual Harassment and Sexual Violence** (https://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines#anchor9)

Help is available for students:

College can be a simultaneously rewarding and challenging experience. To support students at UC Berkeley counseling services are available to you through the Tang Center:

https://uhs.berkeley.edu/counseling (https://uhs.berkeley.edu/counseling) .

https://uhs.berkeley.edu/coronavirus/student-mental-health (https://uhs.berkeley.edu/coronavirus/student-mental-health)

In addition, help is available for students requiring extra assistance with basic needs and with technology during the COVID-19 pandemic:

UC Berkeley Basic Needs Center (https://basicneeds.berkeley.edu/about#services)

UC Berkeley Student Technology Fund (https://techfund.berkeley.edu)

Peer tutoring services are for the College of Chemistry are available online. For more information, see the **CoC tutoring web page** (https://chemistry.berkeley.edu/ugrad/current-students/tutoring) .

COURSE OUTLINE & READING ASSIGNMENTS

Week #	Chapters	Topics
1	1, 2	physical properties, dimensional analysis, hydrostatics

2	3, 4	pipe flow, flow past a sphere, particulates
3	4, 5	macroscopic balances: conservation of mass, energy, and linear momentum
4	6	applications of macroscopic balances
5	6, 7	macroscopic balances, the Bernoulli equation, viscous losses, intro to microscopic balances
6	7	Navier-Stokes equations
7	8	one-dimensional flows, applications of microbalances
8	9.1-9.4, 11	accelerating flow, ordering & approximation
9	12	creeping flow, flow past a sphere, form & friction drag
10	14, 15.1-15.4	potential flow, the boundary layer approximation
11	16	turbulence, introduction to heat transfer
12	tba	Fourier’s law, microscopic conservation of energy equation, solution to conduction problems
13	tba	convective heat transfer, dimensional analysis, thermal boundary layers
14	tba	turbulent heat transfer, correlations for convective heat transfer, heat transfer equipment
15	tba	Review & Recitation