Chemical & Biomolecular Engineering 150A
Spring Semester, 2016

Lectures:	TuTh 3:30-5 pm	100 Lewis Hall
Discussion sections:	M 3-4 pm	182 Dwinelle
	M 2-3 pm	105 Latimer
	Tu 2-3 pm	105 Latimer
	W 2-3 pm	105 Latimer
	Th 10-11 am	105 Latimer
	Th 9-10 am	105 Latimer

Instructor: Professor Susan Muller
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Th 11am-12 pm, 201E Gilman

Teaching Assistants: Kyle Diederichsen
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W 5-6 pm, Chem Library Rm 100E

Philomena Weng
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Th 5-6 pm, Chem Library Rm 100F

Darwin Yang
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Office Hours: M 4-5 pm, Chem Library Rm 100E
W 11am-12pm, Chem Library Rm 100F

Course website: **bcourses.berkeley.edu**
Please check the website regularly for announcements, assignments, and other resources.

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	~ 5%
	Quizzes	~ 5-10%
	Exams 1 and 2	~ 22.5 - 25% each
	Final Exam	40%

Homework will be assigned on Thursdays and will be due the following Thursday <u>at the beginning of lecture</u>. 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 Thursday; solutions will be made available the following Thursday. 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 5% of your course grade. No credit will be given for late homework, and there are no regrades of homework.

Your understanding of the homework material, lectures, discussion section, and associated reading will be assessed through **quizzes in your *assigned* discussion section.** Quizzes will be closed book and notes, but relevant formulas and data will be provided. Quizzes will for the most part closely resemble homework problems and lecture examples. **Quizzes will account for approximately 5-10% of your final course grade.**

Midterm exams will be given on Thursday, February 25 and Thursday, March 31. Each of the midterm exams will be worth approximately 22.5 – 25% of your course grade. Midterm 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.

The final exam will be worth 40% of the course grade.

<u>The mid-term exams 1 and 2 are on Thursday, February 25 and Thursday, March 31, respectively.</u>

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

MIDTERM EXAM 1 IS Thursday, February 25, 2016.
MIDTERM EXAM 2 IS Thursday, March 31, 2016.