University of California, Berkeley **Department of Mechanical Engineering**

ME 109: Heat Transfer

Course Information

Fall 2015

Lecture
MWF 10:10 am - 11:00 am
2 LeConte Hall

Instructor
Prof. Chris Dames
cdames@berkeley.edu
6107 Etcheverry Hall (Sometimes 6181 EH)
Office Hours: *TBD.*

Graduate Student Instructors

Wyatt Hodges (Tue. a.m. discussion)
wlhodges@berkeley.edu
Office Hours: *TBD.*

Vivek Mishra (Thu. p.m. discussion)
vivek.mishra@berkeley.edu
Office Hours: *TBD.*

Communications
Website: https://bcourses.berkeley.edu/
Emails to course staff: Begin subject line with "ME109: ..."

Description
ME 109. Heat Transfer. (3 units). 3 hours lecture + 1 hour discussion
Prerequisite(s): ME40 (Thermodynamics) and ME106 (Fluid Mechanics)

This course covers transport processes of mass, momentum, and energy from a macroscopic view with emphasis both on understanding why matter behaves as it does and on developing practical problem solving skills. The course is divided into four parts: introduction, conduction, convection, and radiation.

Required Text
Fundamentals of Heat and Mass Transfer, 7th Edition (2011)
Bergman, Lavine, Incropera, & DeWitt ("BLID-7th"), ISBN 9780470501979, Wiley.

Other Editions may be acceptable (e.g., IDBL-6th), but it is your responsibility to determine the correct homework problems and readings if they do not match up.

Supplemental Texts
Other introductory texts on heat transfer can be useful for gaining additional perspective. Recommended examples include:

A Heat Transfer Textbook, J. H. Lienhard IV and J. H. Lienhard V, available free online at http://web.mit.edu/lienhard/www/ahtt.html.

Heat and Mass Transfer, A. F. Mills (Irwin). Comparable style to BLID.

Heat Transfer, Bejan (Wiley, 1993). A bit more theoretical.

Heat Transfer, Nellis & Klein (Cambridge, 2009). Slightly more advanced than the above texts. E-version available on Oskicat.

Programming
You will write simple programs using software of your choice, such as Matlab, Python, Fortran, etc.

Topics See separate handout.

Evaluation

Homework, every 1-2 weeks.	30%
Midterms (*tentatively Sep. 30 and Oct. 28*).	20% each
Final (*Dec. 14, 8:00 am - 11:00 am*). Cumulative.	30%

Attendance Attendance at lectures and discussions is expected, but not required.

Homework We usually will only grade an unannounced *subset* of the problems each week. Solutions for all problems will be posted to the course website. Your one lowest HW score will be dropped at the end of the semester.

Exams Exams will be closed book/notes/computers/phones. Exceptions:
MT1: Allowed 1 sheet of your own notes (8.5" x 11", double-sided).
MT2: Allowed 2 sheets of your own notes (8.5" x 11", double-sided).
Final: Allowed 3 sheets of your own notes (8.5" x 11", double-sided).

Regrades Any serious concerns about grading should be addressed to the instructor (not the GSIs) *within 7 days* of receiving the graded homework or exam back. Include a *brief, written explanation* of your concern. Re-graded scores may go up, down, or stay the same. I reserve the right to re-grade the other problems on the homework or exam as well.

Absences, Late Work, and Make-ups

Lectures: Obtain notes from a classmate.

Homework: No late homework accepted.

Exams: Missing an exam will result in a zero grade for that exam unless alternative arrangements are made with the instructor *prior* to the exam. (Exceptions may be made for severe medical or family emergencies.) When granted, makeup exams may be oral or written, and may be more difficult than the original exam.

Other Expectations

- Questions are encouraged!
- Turn off cell phones.
- Treat your colleagues, instructor, and GSIs with respect.
- No food or drinks. (Exception: water.)

Collaboration vs. Academic Misconduct

Collaboration and discussion on the homework is encouraged in this class, but assignments turned in for a grade must be a student's own work. Consulting with your colleagues is fine, but *copying from somebody else's homework solution is considered academic misconduct.* (I strongly recommend that you *first* attempt every homework problem on your own, and only *then* meet with your colleagues to check and improve your work. The best learning usually comes after getting stuck on your own.)

"Academic misconduct is any action or attempted action that may result in creating an unfair academic advantage for oneself or an unfair academic advantage or disadvantage for any other member or members of the academic community." (Definition from UC Berkeley Center for Student Conduct). *Academic misconduct will be referred to the Student Conduct Office.*

Tentative schedule for ME109, Fall 2015
Mechanical Engineering, UC Berkeley
HW due in Week i will generally cover lecture content through Weds of Week i-1.

Date			Lecture	MT1	MT2	Theme	Detail
Aug	26	W	L1			Intro	
	29	F	L2			Conduct	
	31	M	L3			Conduct	
Sep	2	W	L4			Conduct	
	4	F	L5			Conduct	
	7	**M**	**Holiday**			**Holiday**	
	9	W	L6			Conduct	
	11	F	L7			Conduct	
	14	M	L8			Conduct	
	16	W	L9			Conduct	
	18	F	L10			Conduct	
	21	M	L11			Conduct	
	23	W	L12			Conduct	
	25	F	L13			Conduct	
	28	M	L14			Convection	
	30	**W**	**MT1**			**MT1**	
Oct	2	F	L15			Convection	
	5	M	L16			Convection	
	7	W	L17			Convection	
	9	F	L18			Convection	
	12	M	L19			Convection	
	14	W	L20			Convection	
	16	F	L21			Convection	
	19	M	L22			Convection	
	21	W	L23			Convection	
	23	F	L24			Convection	
	26	M	L25			Phase Change	
	28	**W**	**MT2**			**MT2**	
	30	F	L26			HX	
Nov	2	M	L27			Radiation	
	4	W	L28			Radiation	
	6	F	L29			Radiation	
	9	M	L30			Radiation	
	11	**W**	**Holiday**			**Holiday**	
	13	F	L31			Radiation	
	16	M	L32			Radiation	
	18	W	L33			Radiation	
	20	F	L34			Radiation	
	23	M	L35			Adv.: Multimode	
	25	**W**	**Holiday**			(Holiday)	
	27	**F**	**Holiday**			(Holiday)	
	30	M	L36			Adv.: MT	
Dec	2	W	L37			Adv.: MT	
	4	F	L38			Adv.: Nanoscale HT	
Dec	**14**	**M**	**Final: 8a-11a**				