

MECH 420/820 (Fall 2013)

Heat Transfer

Instructor Sidy Ndao, Assistant Professor
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Schedule MWF 10:30 – 11:20 AM

Office hours Tuesday 11:30 – 12:30 PM in my office (W317.4C)
Friday 11:30 – 12:30 PM in my office (W317.4C)
Or by appointment

Prerequisites [MECH 310](#) or equivalent or the instructor's permission

Course Objectives At the conclusion of the course you should be able to:

- Describe the three modes of heat transfer and give examples of engineering applications.
- Analyze the performance of devices that involve conduction heat transfer such as fins and heat sinks.
- Find heat transfer coefficients for heat-convection situations from theory and from empirical relations for a variety of engineering devices including pipe flow, external flow, and buoyancy-driven flow.
- Analyze heat-exchanger performance for gas-gas, gas-liquid, and liquid-liquid applications.
- Analyze radiation heat-transfer devices with black and non-black analysis methods.
- Find thermal property values in both American and SI units from property tables or other reference materials.
- Communicate your knowledge in both written and verbal form.

Textbooks Fundamentals of Heat and Mass Transfer, Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. Dewitt, 7th Edition, John Wiley, 2011

Grading

420 students		820 students	
Two 1-hour exams	50%	Two 1-hour exams	40%
Homework, best 8 of 9	15%	Homework, best 8 of 9	15%
Final Exam (2 hours)	35%	Final Exam (2 hours)	35%
		Project	10%
TOTAL	100%	TOTAL	100%

Exams Closed book, closed notes

- Homework policy**
- Put problems in numerical order.
 - Staple all pages together.
 - Print your name at the top of each page.
 - Assigned nearly every two weeks. Late homework will not be accepted.

Blackboard Lecture notes, homework solutions, and grades are posted on Blackboard

TENTATIVE COURSE SCHEDULE (SUBJECT TO CHANGES)

Week	Meeting days	Topics	Exams / Homework	Book chapters
1	26, 28, 30 AUG	Introduction		Chapter 1
***	2 SEPT	Labor day		
2	4, 6 SEPT	Fourier's law, Heat Equation	HW#1 due SEPT 4	Chapter 2
3	9, 11, 13 SEPT	1D steady state conduction		Chapter 3
4	16, 18, 20 SEPT	Extended surfaces & 2D steady state conduction	HW#2 due SEPT 16	Chapter 3, 4
5	23, 25, 27 SEPT	Transient conduction	HW#3 due SEPT 23	Chapter 5
6	30 SEPT; 2, 4 OCT	Convection – Introduction	HW#4 due SEPT 30 EXAM 1, FRI. OCT 4	Chapter 6
7	7, 9, 11 OCT	Convection – Introduction, External flow		Chapter 6, 7
8	14, 16, 18 OCT	Convection – Internal flow	HW#5 due OCT 14	Chapter 8
***	21 – 22 OCT	Fall break		
9	23, 25 OCT	Convection – Internal, Natural		Chapter 8, 9
10	28, 30 OCT; 1 NOV	Convection – Natural	HW#6 due OCT 28	
11	4, 6, 8 NOV	Heat exchanger		Chapter 11
12	11, 13, 15 NOV	Heat exchanger cont.	HW#7 due NOV 11 EXAM 2, FRI. NOV 15	Chapter 11
13	18, 20, 22 NOV	Boiling & Condensation		Chapter 10
14	25 NOV	Radiation	HW#8 due NOV 25	Chapter 12
***	27 – 30 NOV	Thanksgiving		
15	2, 4, 6 DEC	Radiation, Radiation Exchange		Chapter 12, 13
16	9, 11, 13 DEC	Radiation Exchange, Review	HW#9 due DEC 13 PROJECT DUE (820 only) FRI. DEC 13	Chapter 13
Classes End – Dec 14, 2013				