MEEN 3210.001 **Heat Transfer** **Summer 2012(5W2)**

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Office Hours: MoTuWeTh 10:00AM-12:00 AM or by appointment.
Lecture Time: MoTuWeTh 8:00AM-9:50 AM room D202
(July 9th 2012- August 10th 2012)

Required Textbook: Introduction to Heat Transfer, 6th edition
Incropera, DeWitt, Berman, & Lavine
ISBN-13: 978-0-470-50196-2

Course Description:
3 hours. Fundamental concepts and properties of flow in differential and integral form, thermal boundary layers, pipe flow and heat transfer, turbulence, heat and fluid flow correlations for objects of simple shape. Basic concepts of steady and unsteady conduction, elements of radiation, black and gray body radiation, f-factor analysis, combined modes of heat transfer, simple heat exchange devices and systems
Pre-requisites: MEEN 3120 Fluid Mechanics.

Course Learning Outcomes (CLO):
Upon successful completion of this course, students will able to:
1. Apply conservation of mass, momentum, and energy to heat transfer problems.
2. Understand the concepts of one-dimensional steady-state heat conduction.
3. Understand the concepts of multi-dimensional steady-state heat conduction.
4. Understand the concepts of transient heat conduction.
5. Use thermal Ohm's law (thermal circuits) to solve heat transfer problems.
6. Understand the concepts of internal and external forced convection for both laminar and turbulent flows.
7. Understand the concepts of natural convection.
8. Perform heat exchanger analysis using both the e-NTU and LMTD method.
9. Understand the basic theory behind radiation heat transfer.

CLO	ABET Student Outcomes (SO)										
	SO1	SO2	SO3	SO4	SO5	SO6	SO7	SO8	SO9	SO10	SO11
1	X				X						
2	X				X						
3	X				X						
4	X				X						
5	X				X						
6	X				X						
7	X				X						
8	X				X						
9	X				X						

Grades:	Homework	15%	≥ 85%	A
	Pop Quizzes (4 out of 5)	20%	70-84.9%	B
	Midterm	30%	55- 69.9%	C
	Final	30%	40-54.9%	D
	Class participation	5%	< 40%	F
	Total	100%		

Homework: Please turn in your homework on the due day before the lecture starts. **NO delayed homework will be collected.**

Exam and Quiz: quizzes are open book and notes. Exams are closed book closed notes with formula sheets. **There will be NO make-up exam/quiz.** Only students who missed an exam with valid excuse (for instances: medical emergency of him/herself and close relatives, with valid hospital records or doctor's note) will be given make-up exam.

Disability Accommodations: If you need academic accommodations for disability you must have document which verifies the disability and makes you eligible for accommodations, then you can schedule an appointment with the instructor to make appropriate arrangements.

Academic Dishonesty:
There is a zero tolerance policy. Cheating of whatsoever will result in an automatic 'F' in this course and the matter will be turned over to the appropriate student disciplinary committee.

Guidelines for Solving Homework and Exam Problems:
Please provide the following information and clearly label it when completing homework and exam problems.
1. Schematic diagram of problem.
2. Given/Known: State the given information of the problem.
3. Find: State the variables which need to be found.
4. Solution: (a) If necessary show control volume on schematic diagram of the problem, (b) write out complete equations which govern the problem, (c) solve the governing equations and show all work, and (d) put a box around your final answer and do not forget to include proper units.
5. Sanity check: Make sure your answer makes sense and is reasonable.

EXAM DATES
Midterm: 07/26/2012; Thursday
Final: 08/10/2012 Friday

MEEN 3210.001 Heat Transfer
Schedule Overview (subject to change)

Week	Lecture Dates	Lecture Topics
1	07/09 07/10 07/11 07/12	**Overview of syllabus** **Ch.1: introduction to heat transfer: three modes of heat transfer** **Ch 2: introduction to conduction: Heat Equation** **Ch 3: One Dimensional, Steady-State Conduction: Thermal resistance** **HW Assignment Due 07/12**
2	07/16 07/17 07/18 07/19	**Ch 3: One Dimensional, Steady-State Conduction: Fin** **Ch 4: Two-dimensional steady state conduction: Analytical Method** **Ch 4: Two-dimensional steady state conduction: Numerical Method** **Ch 5: Transient conduction: LCM method** **HW Assignment Due 07/19**
3	07/23 07/24 07/25 07/26	**Ch 5: Transient conduction: One Term Approximation** **Ch 6: Introduction to convection: Thermal Boundary Layer** **Ch 6: Introduction to convection: Similarity** **Midterm Exam (07/26 Thursday) covers Ch1-Ch6** **HW Assignment Due 07/26**
4	07/30 07/31 08/01 08/02	**Ch 7: External Flow: boundary layers and Flat Panel correlations** **Ch 7: External Flow: Cylinder correlations** **Ch 8: Internal Flow: Mean Velocity** **Ch 8: Internal Flow: Energy Balance and correlations** **HW Assignment Due 08/02**
5	08/06 08/07 08/08 08/09 **08/10**	**Ch 9: Free convection: Correlations** **Ch 11: Heat exchangers: LMTD method** **Ch 11: Heat exchangers: NTU method** **Ch 12: Radiation: Blackbody radiation** **Final Exam (08/10 Friday) covers Ch7-Ch12 (no Ch 10)**

Document History:
Dr. Xiaohua Li, Prepared on 06/08/2012