MEEN 3210 Heat Transfer Summer 2018

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Lecture Time: Tuesday & Thursday 2:30 p.m.- 4:20 p.m. room NTDP B155
Office Hours: MWF: 10:00-12:00 plus open office policy; email to make appointment

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

Course Description: This is a required course in MEE program
3 hours. A basic course covers the fundamentals of heat transfer by conduction, convection and radiation, together with applications to typical engineering systems. Topics include one- and Two-dimensional steady state heat conduction, transient heat conduction, internal convection, external convection, and natural convection
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 forced convection for both laminar and turbulent flows.
7. Understand the concepts of external forced convection for both laminar and turbulent flows.
8. Understand the concepts of natural convection.
9. Understand the basic theory behind radiation heat transfer.

ABET Student Learning Outcomes (SO)
1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

CLO	ABET Student Outcomes (SO)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	X	X		X			
2	X	X		X			
3	X	X		X			
4	X	X		X			
5	X	X		X			
6	X	X		X			
7	X	X		X			
8	X	X		X			
9	X	X		X			

Grades:

Homework (10)	10%	≥ 90	A
Quizzes (highest 3/5)	10%	80-89.9	B
Exam #1 (Ch1, 2&3)	25%	70-79.9	C
Exam #2 (Ch4, 5&6)	25%	60-69.9	D
Final (Exam #3) (Ch 7, 8 &9)	25%	< 60	F
Attendance (5/6)	5%		
Total	100%		

MEEN 3210 Heat Transfer Schedule Overview

Week	Date	Topic
#1	Jun. 5 Jun. 7	Overview of syllabus; Ch.1: introduction Ch.1: introduction to heat transfer: three modes of heat transfer
#2	Jun. 12 Jun. 14	Ch 2: introduction to conduction: Thermal Conductivities Ch 2: introduction to conduction: The Heat Equation; Quiz#1 (Ch1 &2)
#3	Jun. 19 Jun. 21	Ch 3: One Dimensional, Steady-State Conduction: Plain Wall and Thermal Resistance Concept Ch 3: One Dimensional, Steady-State Conduction: Thermal Circuit Method; Quiz#2(Thermal circuit method)
#4	Jun. 26 Jun. 28	Ch 3: One Dimensional, Steady-State Conduction: Extended Surface Ch 3: One Dimensional, Steady-State Conduction: Extended Surface
#5	Jul. 3 Jul. 5	Review and HW Session -Exam #1:covers Ch 1,2 and 3
#6	Jul. 10 Jul. 12	Ch 4: Two-dimensional Steady State Conduction: Finite Difference Method Ch 5: Transient conduction: LCM method
#7	Jul. 17 Jul. 19	Ch 5: Transient conduction: Exact Solution & one term approximation Quiz#3(Ch 4 & 5) Ch 6: Introduction to convection: Convection Boundary Layers
#8	Jul. 24 Jul. 26	Exam #2: covers Ch 4, 5 and 6 Ch 7: External Flow: Flat Plate in Parallel Flow
#9	Jul. 31 Aug. 2	Ch 7: External Flow: Cylinder & Sphere in Cross Flow Quiz#4 (Ch7) Ch 8: Internal Flow : Hydrodynamic & thermal considerations
#10	Aug. 7 Aug. 9	Ch 8: Internal Flow : Energy Balance Quiz#5 (Ch 8) Ch 9: Free convection
	Aug. 10	Exam #3 (Final): covers Ch 7, 8, 9