ME 335 (HEAT TRANSFER), Sections 01 and 02, MWF 9:30-10:30 and 12:30-1:30, 2211 GGB, Fall 2009

DEPARTMENT OF MECHANICAL ENGINEERING, UNIVERSITY OF MICHIGAN

WEEK OF	SUBJECT	READING	PROBLEMS
September 7	• **First Class Wednesday, September 9** •Introduction: Control Volume and Surface, Heat Flux Vector, Mechanisms of Heat Transfer, Energy Conservation Equation	1.1 - 1.6	HW # 1
September 14	• Energy Equation for Differential Volume, Integral Volume, Combined Integral- and Differential-Length Volume, and Small-Finite Volume	2.1 - 2.2	HW # 2
September 21	• Work and Energy Conversion: Mechanisms of Energy Conversion, Bounding-Surface Thermal Conditions, Methodology for Heat Transfer Analysis	2.3 - 2.5	HW # 3
September 28	• Conduction: Specific Heat and Thermal Conductivity of Matter, Steady-State Conduction: Conduction Thermal Resistance	3.1 - 3.3	HW # 4
October 5	• Steady-State Conduction: Composites, Thermal Circuit Analysis, Contact Resistance, Conduction-Energy Conversion, Thermoelectric Cooling	3.3	HW # 5
October 12	• Transient Conduction: Distributed Capacitance Transient, Lumped Capacitance Transient	3.4 - 3.6	HW # 6
October 19	• **Monday and Tuesday are Fall Study Days** •Surface Radiation: Surface Emission, Interaction of Radiation and Surface, Thermal Radiometry • **EXAM I (THURSDAY, OCTOBER 22, 6:30-8:00 pm, 220 Chrysler and 1504 G.G. Brown, Covering Chapters 1, 2 and 3: Energy Equation and Conduction)** • No Class on Friday	4.1 - 4.3	
October 26	• Surface Radiation: Diffuse-Gray Enclosures, Radiation Resistances, Thermal Circuit Analysis, Two- and Three-Surface Enclosures	4.4	HW # 7
November 2	• Inclusion of Substrate (Steady State, and Lumped Capacitance Transient) •Surface Convection (Semi-Bounded Fluid): Flow and Surface Characteristics, Parallel Flow over Semi-Infinite Plate	4.6 6.1 -6.2	HW # 8
November 9	• Surface Convection (Semi-Bounded Fluid): Parallel Flow over Semi-Infinite Plate, Péclet and Nusselt Numbers, Surface-Convection Resistance, Prandtl and Reynolds Numbers, Parallel Turbulent Flow, Perpendicular Flows	6.2 - 6.4	HW # 9
November 16	• Surface Convection (Semi-Bounded Fluid): Thermobuoyant Flows, Liquid-Vapor Phase Change, Nusselt Number Correlations, Inclusion of Substrate and Extended Surfaces	6.5 - 6.8	HW # 10
November 23	• Surface Convection (Bounded Fluid): Flow and Surface Characteristics, Tube Flow and Heat Transfer • **Thanksgiving Recess, November 25-26**	7.1 - 7.2	
November 30	• Surface Convection (Bounded Fluid): Fluid Temperature Variation along Tube, Average Convection Resistance, Nusselt Number for Laminar and Turbulent Flows in Tubes, Entrance Effects, Phase Change, Other Geometries • **EXAM II (THURSDAY, DECEMBER 3, 6:30-8:00 pm, 220 Chrysler and 1504 G.G. Brown, Covering Chapters 4 and 6: Surface Radiation, and Surface Convection: Semi-Bounded Fluid)** • No Class on Friday	7.3	HW # 11

December 7	• Surface Convection (Bounded Fluid): Nusselt Number Correlations, Hydraulic Diameter, Particle Diameter (Large Surface-Convection Area,), Inclusion of Substrate, Inclusion of Substrate, Heat Exchangers (Two Fluid Steams)	7.4 - 7.6	HW # 12
December 14	• Selection of Heat Transfer Media and Bounding Surfaces: Primary Thermal Functions of Media and Surfaces, Review, Course Evaluation • **Classes End, Monday, December 14**	8.1 - 8.2	

•FINAL EXAM (Covering Chapters 1, 2, 3, 4, 6 and 7: all Materials)
Monday, DECEMBER 21, 8:00-10:00 AM

Instructor: **Massoud Kaviany**, 3108 G.G. Brown, Phone: 936-0402, e-mail: kaviany@umich.edu
GSI: **Jedo Kim**, 764-3487 e-mail: jedokim@umich.edu

Office hours: Massoud Kaviany: Tu and Th 12:30 - 1:30 PM, 3108 GGB, and by Appointment
Jedo Kim: M: 5:00 - 7:00 PM and Tu: 5:00 -7:00 PM, 1504 GGB

Grade Policy: HW: 20%, Exam I: 20%, Exam II: 20%, Final Exam: 40%
The average grade for the class is B+

Textbook: *Principles of Heat Transfer*, M. Kaviany, Wiley, 2001, ISBN 0-471-43463-9 (make sure to have the latest printing which has 1007 numbered pages and is available in local bookstores)

Please briefly **browse over** the day's topic **before** the class and **bring** your book to class

Homework: Will be collected every **Wednesday,** Solutions are posted every Wednesday on Class Website
Class Website: http://www.engin.umich.edu/class/me335/

Exams **Open book, up to four pages (two 8.5x11 inch sheets) of summary notes, and a calculator (no other notes and homework solutions and no computer)**

Course Profile: **ME 335 Course Profile** (Including Objectives and Outcomes) is posted at
http://me-web.engin.umich.edu:8282/ME/CommitteesGroups/abet/printviewprofile?catNumber=335