

ME 335 (HEAT TRANSFER), Sections 01 and 02, MWF 9:30-10:30 and 12:30-1:30, Fall 2008
 DEPARTMENT OF MECHANICAL ENGINEERING, UNIVERSITY OF MICHIGAN

WEEK OF	SUBJECT	READING	PROBLEMS
September 3	<ul style="list-style-type: none"> • First Class Wednesday, September 5 • Introduction: Control Volume and Surface, Heat Flux Vector, Mechanisms of Heat Transfer, Energy Conservation Equation 	1.1 - 1.6	HW # 1
September 10	<ul style="list-style-type: none"> • Energy Equation for Differential Volume, Integral Volume, Combined Integral- and Differential-Length Volume, and Small-Finite Volume 	2.1 - 2.2	HW # 2
September 17	<ul style="list-style-type: none"> • Work and Energy Conversion: Mechanisms of Energy Conversion, Bounding-Surface Thermal Conditions, Methodology for Heat Transfer Analysis 	2.3 - 2.5	HW # 3
September 24	<ul style="list-style-type: none"> • Conduction: Specific Heat and Thermal Conductivity of Matter, Steady-State Conduction: Conduction Thermal Resistance 	3.1 - 3.3	HW # 4
October 1	<ul style="list-style-type: none"> • Steady-State Conduction: Composites, Thermal Circuit Analysis, Contact Resistance, Conduction-Energy Conversion, Thermoelectric Cooling 	3.3	HW # 5
October 8	<ul style="list-style-type: none"> • Transient Conduction: Distributed Capacitance Transient, Lumped Capacitance Transient 	3.4 - 3.6	HW # 6
October 15	<ul style="list-style-type: none"> • Monday and Tuesday are Fall Study Days • Surface Radiation: Surface Emission, Interaction of Radiation and Surface, Thermal Radiometry • EXAM I (THURSDAY, OCTOBER 18, 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 22	<ul style="list-style-type: none"> • Surface Radiation: Diffuse-Gray Enclosures, Radiation Resistances, Thermal Circuit Analysis, Two- and Three-Surface Enclosures 	4.4	HW # 7
October 29	<ul style="list-style-type: none"> • 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 5	<ul style="list-style-type: none"> • Surface Convection (Semi-Bounded Fluid): Parallel Flow over Semi-Infinite Plate, Peclet and Nusselt Numbers, Surface-Convection Resistance, Prandtl and Reynolds Numbers, Parallel Turbulent Flow, Perpendicular Flows 	6.2 - 6.4	HW # 9
November 12	<ul style="list-style-type: none"> • Surface Convection (Semi-Bounded Fluid): Thermobuoyant Flows, Liquid-Vapor Phase Change, Nusselt Number Correlations 	6.5 - 6.7	HW # 10
November 19	<ul style="list-style-type: none"> • Surface Convection (Semi-Bounded Fluid): Inclusion of Substrate (Including Extended Surfaces) • Surface Convection (Bounded Fluid): Flow and Surface Characteristics, Tube Flow and Heat Transfer, • Thanksgiving Recess, November 22-23 	6.8 7.1 - 7.2	HW # 11

- November 26 • 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 7.2 - 7.3
 • **EXAM II (THURSDAY, NOVEMBER 29, 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
- December 3 • 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 10 • Selection of Heat Transfer Media and Bounding Surfaces: Primary Thermal Functions of Media and Surfaces, Review, Course Evaluation 8.1 - 8.2
 • **Classes End, Tuesday, December 11**

• **FINAL EXAM (Covering Chapters 1, 2, 3, 4, 6 and 7: all Materials)**
Monday, DECEMBER 15, 10:30-12:30

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, and by Appointment,
 Jedo Kim: M: 6:00-8:00 at 1109 FXB , Tu: 5:00-7:00 at 1109 FXB

Class Conduct If more than 10 minutes late, refrain from attending class.
 Please remain in class during lecture.
 For every unexcused class missed, 2% of total score is deducted.
 Pick up graded homework and exams in class on return day.

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 8.5x 11 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>