PURDUE UNIVERSITY FORT WAYNE | Department of Civil and Mechanical Engineering

Course	ME 42500 – Intermediate Heat Transfer: Theory and Applications
Type of Course	Elective (Group 1) for ME students
Catalog Description	Analytical study of conduction; energy and momentum equations in convective heat transfer and review of empirical relations; boiling and condensation; applications in heat transfer such as heat exchangers, refrigeration and freezing of foods, cooling of electronic equipment, and heating and cooling of buildings.
Credits	3
Contact Hours	3
Prerequisite Courses	ME 32100
Corequisite Courses	None
Prerequisites by Topics	Heat Transfer
Textbook	A. F. Mills, *Heat Transfer*, Prentice Hall, current edition.
Course Objectives	To enhance student's knowledge of the fundamentals of conduction and convection heat transfer; to provide practice in approaching heat transfer problems analytically; and to continue their exposure to practical heat transfer/phase change applications, such as heat exchangers.
Course Outcomes	Students who successfully complete this course will have demonstrated an ability to:

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1. Analyze and solve variable cross-section fin problems. **(1)**
2. Apply separation of variables to steady-state and transient heat conduction problems in Cartesian and cylindrical coordinate systems. **(1)**
3. Apply separation of variables to steady-state conduction with heat generation. **(1)**
4. Analyze and solve boundary layer problems. **(1)**
5. Solve internal and external flow, forced convection problems. **(1)**
6. Solve external flow natural convection problems. **(1)**
7. Identify different regimes of boiling and condensation. **(1)**
8. Analyze heat exchangers and cooling of electronic components. **(1, 2)**

9. Design a heat transfer device and communicate the results. **(1, 2, 3)**

Lecture Topics	1. Introduction—review of heat transfer modes
	2. Steady-state conduction
	3. Transient conduction
	4. Forced convection
	5. Free convection
	6. Heat exchangers
	7. Boiling and condensation
	8. Heat transfer applications

Computer Usage   Medium

Laboratory Experience   None

Design Experience   Low

Coordinator   Hosni Abu-Mulaweh, Ph.D.

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