

Course	ME 50500 – Intermediate Heat Transfer
Type of Course	Elective for ME program (Group 1) Required for MSE-ME concentration
Catalog Description	Heat and mass transfer by diffusion in one-dimensional, two-dimensional, transient, periodic, and phase change systems. Convective heat transfer for external and internal flows. Similarity and integral solution methods. Heat, mass, and momentum analogies. Turbulence. Buoyancy driven flows. Convection with phase change. Radiation exchange between surfaces and radiation transfer in absorbing-emitting media. Multimode heat transfer problems.
Credits	3
Contact Hours	3
Prerequisite Courses	ME 32100
Corequisite Courses	None
Prerequisites by Topics	Heat Transfer
Textbook	A. F. Mills, <i>Heat Transfer</i> , 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: <ol style="list-style-type: none">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. Recognize, model, and solve radiation heat transfer problems. **(1)**

Lecture Topics

1. Introduction, review
2. Steady-state conduction
3. Transient conduction
4. Forced Convection
5. Free Convection
6. Radiation
7. Boiling and condensation

Computer Usage

Low

Laboratory Experience

None

Design Experience

None

Coordinator

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Date

26 February 2018