

Course	ME 32100 – Heat Transfer
Type of Course	Required for ME program
Catalog Description	Fundamental principles of heat transfer by conduction, convection, and radiation; mass transfer by diffusion and convection. Application to engineering situations.
Credits	3
Contact Hours	3
Prerequisite Courses	None
Corequisite Courses	ME 31800
Prerequisites by Topics	Thermodynamics and Differential Equations
Textbook	Incropera and DeWitt, <i>Fundamentals of Heat and Mass Transfer</i> , John Wiley & Sons, current edition.
Course Objectives	To give students a foundation in the fundamentals of conduction, convection, and radiation heat transfer; practice in approaching heat transfer analytically as well as numerically; and an introduction to practical applications, such as heat exchangers.
Course Outcomes	<p>Students who successfully complete this course will have demonstrated an ability to:</p> <ol style="list-style-type: none">1. Recognize, model, and solve steady-state, one-dimensional heat conduction problems with and without heat generation. (1)2. Analyze and solve fin problems analytically and numerically (steady-state, one-dimension). (1)3. Recognize, model, and solve transient heat conduction problems without heat sources. (1)4. Solve, analytically and numerically, both steady-state, two-dimensional and transient, one-dimensional heat conduction problems. (1)5. Recognize, model, and solve forced convection heat transfer problems. (1)6. Recognize, model, and solve natural convection heat transfer problems. (1)7. Understand the boundary-layer concept. (1)8. Determine shape factors. (1)

9. Recognize, model, and solve radiation heat transfer problems. **(1)**
10. Apply the knowledge gained in items 1-9 to design of thermal systems and open ended design problems. **(1, 2, 3)**

Lecture Topics

1. Introduction, Fourier's law
2. One-dimensional, steady-state conduction
3. Two-dimensional, steady-state conduction
4. Transient conduction
5. Numerical methods
6. Introduction to convective transport
7. Forced convection heat and mass transfer
8. Free convection
9. Radiation heat transfer
10. Multiple effects and special topics

Computer Usage

Low

Laboratory Experience

None

Design Experience

Medium

Coordinator

Hosni Abu-Mulaweh, Ph.D.

Date

26 February 26, 2018