AL IMAM MOHAMMAD IBN SAUD ISLAMIC UNIVERSITY
COLLEGE OF ENGINEERING
Department of Mechanical Engineering

Course Information	
Course Code and Name:	ME324: Heat Transfer
Credit Hours**:**	**3 (**3 Lecture + 1 Tutorial)
Prerequisites:	ME222 Fluid Mechanics

Course Description
One-dimensional axial and radial heat conduction. Steady state and transient heat conduction. Analogy of thermal systems with electrical systems (thermal circuit modeling).Dimensionless numbers. Convection heat transfer in internal and external flows. Conduction-convection systems (lumped capacitance method). Heat exchanger design (the LMTD and NTU methods), Surface radiation properties. Radiation heat transfer from black and gray surfaces.Net radiation exchange in enclosures.

Textbook			
Title	FUNDAMENTALS OF HEAT AND MASS TRANSFER		
Authors	Incropera, DeWitt, Bergman and Lavine		
Publisher	Wiley	Year and Edition	2007, 6th edition

Course Contents
1. Physical origins, rate equations and conservation of energy.
2. Fourier's Law and the Heat Equation.
3. One-dimensional steady state conduction with and without thermal energy generation.
4. Extended surface heat transfer (fins).
5. Transient conduction: The lumped capacitance method.
6. Transient conduction: Spatial Effects and the Role of Analytical Solutions.
7. Introduction to Convection: Flow and Thermal Considerations.
8. External Flow: The Flat Plate in Parallel Flow
9. External Flow: Flow over Cylinders, Spheres and Packed Beds; Impinging Jets.
10. Internal Flow: General Considerations and Heat Transfer Correlations.
11. Heat Exchangers: Design Considerations
12. Heat Exchangers: The Effectiveness – NTU Method
13. Radiation: Processes and Properties
14. Radiation Exchange in Enclosures

Academic Coordinator	**Signature**
Dr. Syed Muhammad Fakhir Hasani	

Official Stamp