Course Title:	Course Code:	Credit Hrs:
Heat & Mass Transfer	ME-331	3+0

Textbook:

- Incropera& DeWitt, Wiley,Fundamentals of Heat and Mass Transfer

Reference Books:

- Mills & Ganesan, Heat Transfer.
- Frank Kreith, Principles of Heat Transfer. 4. J.P. Holman,Heat and mass transfer
- Yunus Cengel,Heat transfer 6. Ozisik, Heat Transfer
- D. Pitts, L. E. Sissom, Heat Transfer, Schaum's outline series New York

Course Objective:

Heat and Mass Transfer explores the principles of energy and material movement in engineering contexts, encompassing heat conduction, convection, radiation, and mass diffusion for practical applications in thermal and chemical processes.

Course Outline:

- Introduction to Heat transfer: Review of the concepts of equilibrium, steady state, heat and thermodynamics and Basic modes of heat transfer and their mechanisms.
- Conduction: Basic modes of heat transfer and their mechanisms, deriving heat conduction equation using principle, solving heat conduction problems using equivalent electrical networks, solving heat conduction problems using equivalent electrical networks. Extended surfaces and their performance parameters and Transient heat conduction and lumped heat capacity method and its corresponding electrical analogy.
- Radiation: Fundamental characteristics of thermal radiation and surfaces, Laws of black body radiation, Laws of black body radiation, Intensity of radiation and Solving problems of radiative heat transfer between surfaces and enclosures using equivalent electrical networks
- Convection: Deriving energy equation for convection, Heat transfer rate for laminar, turbulent and mixed boundary layers for external flow and internal flow problems, Buoyancy driven flows and their heat transfer rate for external flow problems and enclosed spaces, Heat transfer rate for phase change processes i.e. Boiling and condensation.

- Heat Exchangers: Classification and types of Heat exchangers, LMTD method and NTU-effectiveness method
- Mass transfer: Fick’s law of diffusion and mass diffusivity, Concept of concentration boundary layer and Solving mass transfer problems using convective heat transfer analogy.

Description	**Percentage Weightage (%)**
Assignments	05-10%
Quizzes	10-15%
Mid Semester Exams	30-40%
End Semester Exam	40-50%