RECOMMENDED BOOK(S)

Fundamentals of Heat Transfer by Incropera& DeWitt, John Wiley & Sons

REFERENCE BOOK(S)

Heat Transfer, a Practical Approach by Y. A. Cengel, McGraw-Hill Heat Transfer by J. P. Holman, McGraw-Hill Elements of Heat Transfer by Frank Keith, International Text Books Co

COURSE OBJECTIVES

The course covers the Basic and advance Heat and Mass Transfer. Understanding of basic principles of heat & mass transfer involved in thermo- fluids as well as another related fields. To design main mechanical component of industries e.g. heat exchanger, boilers, condensers, evaporators.

S. No.	CLO/PLOS MAPPING	DOMAIN	PLO
1	Explain the impact of materials properties on heat transfer.	C2	02
2	Use modes and processes of heat transfer and apply them to solve basic heat transfer problems.	C3	02
3	Analyze and relate the relevant heat transfer phenomena for a given problem and quantify the heat transferred.	C4	03
COURSE CONTENTS			

Conduction:

Heat equation, Fourier's law, one dimensional steady state heat conduction through plane and composite walls, cylinders and spheres with and without heat generating sources, critical thickness of insulation, heat transfer through extended surfaces, transient conduction, lumped capacitance method.

Convection:

Newton"s law of cooling, boundary layer, natural (free) and forced convection heat transfer. coefficient of heat transfer for free and forced convection, effects of laminar, transition and turbulent flow on coefficient of heat transfer, flow over flat plates, heat transfer for flow through pipes and ducts, non-dimensional parameters related to heat transfer and their applications. Shear stresses, friction coefficient for fully developed flow, Reynolds analogy, heat transfer with phase change, boiling, condensation.

Radiation:

Stefan Boltzmann"s law, black body radiation, absorptivity, reflectivity, transmissivity. Wien"s Displacement law, Kirchoff"s law, gray body radiation. Radiation shape factor and its applications.

Mass transfer:

Ficks law and its application, analogy between momentum, heat and mass transfer. Heat exchangers:

Classification, overall heat transfer coefficient.LMTD and NTU methods.