**ME6502 HEAT AND MASS TRANSFER L T P C**

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**OBJECTIVES:**

 To understand the mechanisms of heat transfer under steady and transient conditions.

 To understand the concepts of heat transfer through extended surfaces.

 To learn the thermal analysis and sizing of heat exchangers and to understand the basic

concepts of mass transfer.(Use of standard HMT data book permitted)

**UNIT I CONDUCTION 9**

General Differential equation of Heat Conduction– Cartesian and Polar Coordinates – One

Dimensional Steady State Heat Conduction –– plane and Composite Systems – Conduction with Internal Heat Generation – Extended Surfaces – Unsteady Heat Conduction – Lumped Analysis – Semi Infinite and Infinite Solids –Use of Heisler’s charts.

**UNIT II CONVECTION 9**

Free and Forced Convection - Hydrodynamic and Thermal Boundary Layer. Free and Forced

Convection during external flow over Plates and Cylinders and Internal flow through tubes .

**UNIT III PHASE CHANGE HEAT TRANSFER AND HEAT EXCHANGERS 9**

Nusselt’s theory of condensation - Regimes of Pool boiling and Flow boiling. Correlations in boiling and condensation. Heat Exchanger Types - Overall Heat Transfer Coefficient – Fouling Factors - Analysis – LMTD method - NTU method.

**UNIT IV RADIATION 9**

Black Body Radiation – Grey body radiation - Shape Factor – Electrical Analogy – Radiation Shields. Radiation through gases.

**UNIT V MASS TRANSFER 9**

Basic Concepts – Diffusion Mass Transfer – Fick’s Law of Diffusion – Steady state Molecular Diffusion – Convective Mass Transfer – Momentum, Heat and Mass Transfer Analogy –Convective Mass Transfer Correlations.

 **TOTAL : 45 PERIODS**