

BASICS OF MECHANICAL ENGINEERING

ME-101

L: 2 T: 1 P: 0 Cr: 3

COURSE OUTCOMES

1. Understanding various thermodynamic systems, properties and other related concepts
2. Expanding the knowledge of reversible and irreversible cycles
3. Learning the basics of first law and second law equations and related theories with numerical
4. Studying the kinematics of fluid flow
5. Understanding the dynamics of fluid flow

SYLLABUS

UNIT-I :

Thermodynamics systems, Properties, Thermal equilibrium, Zeroth Law of thermodynamics and concept of temperature. Work, displacement work in various Quasi-state systems, First law of thermodynamics, application to cyclic process, Internal energy, Enthalpy. Pure substance, control volumes, Application of first law to non-cyclic process, Steady Flow energy equation.

UNIT-II :

Reversible and Irreversible process, Second law of thermodynamics, Kelvin-Planck and Clausius statement and their equality. Entropy generation, Entropy balance equation for closed and open systems.

UNIT-III :

First law and second laws equations, Maxwell's relation, Carnot cycle. Definition and properties of fluids, Classification of fluids, Normal and shear stresses in fluids.

UNIT-IV :

Kinematics of fluid flow; Types of flow, flow pattern, Velocity and rotation, acceleration of fluid particle, velocity potential function, Differential equation of conservation of mass.

UNIT-V :

Dynamics of ideal fluids flow; Euler's equation of motion, Bernoulli's equation and its application, Flow measuring device, Venture-meter, orifice-meter and nozzle meter, pilot-static tube, hydraulic co-efficient, Flow through pipes, Major and Minor losses in pipe flow.

Text books:

1. Engineering Thermodynamics by: P. K. Nag, TMH.
2. Fundamental of classical thermodynamics by: Wan- Wylen&sonntag, John wiley&sons.
3. Engineering thermodynamics by: Spalding & code.
4. Engineering Mechanics: Statics and Dynamics: by J. L. Meriam and L. G. Kraige, John Wiley & Sons, Inc.
5. Engineering Mechanics: Dynamics: 12th Edition by R. C. Hibbeler, Prentice Hall
6. Engineering Mechanics: by K.L. Kumar, Tata Mc Graw Hill.