AMIE10 FLUID MECHANICS AND MACHINERY

UNIT-1 FLUID PROPERTIES AND FLOW CHARACTERISTICS

1.1 Units and dimensions
1.2 Properties of fluids- mass density, specific weight, specific volume, specific gravity, viscosity, compressibility, vapor pressure, surface tension and capillarity.
1.3 Flow characteristics- concept of control volume
1.4 Application of continuity equation, energy equation and momentum equation.

UNIT-2 FLOW THROUGH CIRCULAR CONDUITS

2.1 Hydraulic and energy gradient-
2.2 Laminar flow through circular conduits and circular annuli-
2.3 Boundary layer concepts- types of boundary layer thickness-
2.4 Darcy Weisbach equation- friction factor
2.5 Moody diagram- commercial pipes- minor losses
2.6 Flow through pipes in series and parallel.

UNIT-3 DIMENSIONAL ANALYSIS

3.1 Need for dimensional analysis
3.2 Methods of dimensional analysis-
3.3 Similitude- types of similitude
3.4 Dimensionless parameters- application of dimensionless parameters- Model analysis.

UNIT-4 PUMPS

4.1 Impact of jets- Euler's equation-
4.2 Theory of roto-dynamic machines- various efficiencies
4.3 Velocity components at entry and exit of the rotor- velocity triangles-
4.4 Centrifugal pumps- working principle- work done by the impeller- performance curves-
4.5 Reciprocating pump- working principle- Rotary pumps- classification.

UNIT-5 TURBINES

5.1 Classification of turbines- heads and efficiencies- velocity triangles.
5.2 Axial, radial and mixed flow turbines.
5.3 Pelton wheel, Francis turbine and Kaplan turbines- working principles- work done by water on the runner- draft tube.
5.4 Specific speed - unit quantities- performance curves for turbines- governing of turbines.

References Books:

1. Streeter, V. L. and Wylie E. B., "Fluid Mechanics", McGraw Hill Publishing Co. 2010
2. Kumar K. L., "Engineering Fluid Mechanics", Eurasia Publishing House(p) Ltd., New Delhi 2004
3. Robert W.Fox, Alan T. McDonald, Philip J.Pritchard, "Fluid Mechanics and Machinery", 2011.