# AMEV03 MECHANICS OF FLUID

## UNIT-1 FLUID PROPERTIES AND FLUID STATICS

1.1 Fluid- definition, distinction between solid and fluid- Units and dimensions

1.2 Properties of fluids- density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility, vapour pressure, capillarity and surface tension

1.3 Fluid statics: concept of fluid static pressure, absolute and gauge pressures

1.4 Pressure measurements by manometers and pressure gauges-forces on planes- centre of pressure- bouncy and floatation.

## UNIT-2 FLIUD KINEMATICS AND DYNAMICS

2.1 Fluid Kinematics- Flow visualization - lines of flow- types of flow

2.2 Velocity field and acceleration - continuity equation (one and three dimensional differential forms)

2.3 Equation of streamline- stream function - velocity potential function - circulation - flow net.

2.4 Fluid dynamics- equations of motion

2.5 Euler's equation along a streamline- Bernoulli's equation- applications-

2.6 Venturi meter, Orifice meter and Pitot tube. Linear momentum equation and its application.

## UNIT-3 FLOW THROUGH PIPES

3.1 Viscous flow- Shear stress, pressure gradient relationship

3.2 Laminar flow between parallel plates- Laminar flow through circular tubes (Hagen poiseulle's)

3.3 Hydraulic and energy gradient- flow through pipes

3.4 Darcy- Weisbach's equation- pipe roughness- friction factor-

3.5 Moody's diagram- Major and minor losses of flow in pipes- Pipes in series and in parallel.

## UNIT-4 BOUNDARY LAYER

4.1 Boundary layer- definition- boundary layer on a flat plate

4.2 Thickness and classification- displacement , energy and momentum thickness

4.3 Boundary layer separation and control

4.4 Drag in flat plate- drag and lift coefficients.

## UNIT-5 DIMENSIONAL ANALYSIS AND MODEL STUDIES

5.1 Fundamental dimensions - dimensional homogeneity

5.2 Rayleigh's method and Buckingham Pi-Theorem

5.3 Dimensionless parameters

5.4 Similitude and model studies - Distorted Models.

**References Books**

1. Streeter, V.L., and Wylie, E.B., "Fluid Mechanics", McGraw-Hill, 2000.
2. Jain A. K. "Fluid Mechanics", Khanna Publishers, 2010