

SYLLABUS :-

Introduction - properties of fluids, concept of continuum, pressure and stress tensor

Fluid statics - pressure variation in a static fluid, force on submerged surfaces, stability of floating bodies

Kinematics - Lagrangian and Eulerian description, streamline, streakline and pathline, acceleration of a fluid element, continuity equation, stream-function, rotation and angular deformation, irrotational flow, velocity potential

Inviscid flow - Euler equation, Bernoulli's equation and its applications

Reynolds transport theorem - conservation of mass, linear and angular momentum

Stokes law of viscosity and Navier-Stokes equations - some exact solutions

Dimensional analysis and similarity - Buckingham Pi theorem

Internal flows - pipe flow, friction factor, Moody diagram, minor and major losses, pipe networks, hydraulic diameter

External flows - boundary layer approximation, momentum integral method, flow over a flat plate, flow separation

Turbulence - Reynolds experiment, Reynolds decomposition, time averaged Navier-Stokes equation, eddy viscosity

Potential Flow - elementary plane flow solutions, Magnus effect

Fluid Machinery - similarity, Euler equation for turbomachines, centrifugal pump, hydraulic turbines, cavitation