



SYLLABUS FOR FLUID MECHANICS (XE: SECTION B)

(Optional Section)

Fluid Properties:

Relation between stress and strain rate for Newtonian fluids.

Hydrostatics:

Buoyancy, manometry, forces on submerged bodies.

Eulerian and Lagrangian description of fluid motion, concept of local and convective accelerations, steady and unsteady flows, control volume analysis for mass, momentum and energy.

Differential equations of mass and momentum (Euler equation), Bernoulli's equation and its applications.

Concept of fluid rotation, vorticity, stream function and potential function.

Potential flow: elementary flow fields and principle of superposition, potential flow past a circular cylinder.

Dimensional analysis:

Concept of geometric, kinematic and dynamic similarity, importance of non-dimensional numbers.

Fully-developed pipe flow, laminar and turbulent flows, friction factor, Darcy-Weisbach relation.

Qualitative ideas of boundary layer and separation, streamlined and bluff bodies, drag and lift forces.

Basic ideas of flow measurement using venturimeter, pitot-static tube and orifice plate.