

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 3

Civil Engineering

Subject Code 130602

Subject Name Fluid Mechanics

Sr.No	Course contents
1	Fluids: Definition- Types and properties, Fluids as a continuum, Control volume concept.
2	Hydrostatics: Pressure and its measurement, fluid pressure at a point, Pascal's law, pressure and its relation with height, atmospheric, absolute, gauge and negative pressure, measurement of pressure through piezo-meter and various types of manometer. Total pressure, intensity of pressure, centre of pressure. Pressure on horizontal, vertical, inclined and curved surface. Buoyancy, centre of Buoyancy, Meta centre and Meta centre height. Condition of equilibrium of floating and submerged body. Experimental and analytical method to determine Meta-centric height. Pressure in case of accelerated rigid body motion.
3	Fluid Kinematics: Methods of describing fluid motion,-Types of motion, Inviscid flows, Velocity and acceleration-Continuity equation-Potential flows-Velocity potential and Stream function, Flownet- Circulation and Vorticity- Source, Sink and Doublet
4	Fluid Dynamics: Types of forces, Forces influencing fluid motion-energy and Head-energy correction factor, Euler and Bernoulli's equations, Application of Bernoulli's equation. Flow measurement, Linear momentum equation, momentum correction factor, Application of momentum equation.
5	Flow Through Pipes: Introduction, Loss of energy in pipe, major and minor losses of energy in pipes, hydraulic gradient, total energy line, pipes in series, pipes in parallel, flow through branched pipes, and hydraulic transmission of power.
6	Measurement of Flow : (a) Orifice & Mouth piece Classification, hydraulic coefficients, experimental determination of hydraulic coefficient. Discharge through all types of orifice & mouthpiece, time of emptying the tank through orifice and mouthpiece. (b) Notches and Weirs Classification, discharge through various types of Notches and Weirs. Time of emptying a Reservoir or a Tank with notches & weirs.

7	Compressible Fluid Flow: Perfect gas equation, Continuity, Energy and Momentum equation, Speed of sound wave, Mach number, Propagation of sound wave, Stagnation properties, Shock waves.
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Reference Books:

1. Fluid Mechanics V.L Streeter,. and E.B Wylie,.. , McGraw Hill, 1985, New York
2. Theory and Applications of Fluid Mechanics, K Subramanya , Tata-McGraw Hill Publishing Co, 1993, New Delhi.
3. Introduction to Fluid Mechanics E.J Shaughnessy,.., I.M Katz,. and J.P Schaffer,. SI edition, 2005, Oxford University Press, New Delhi
4. Fluid Mechanics , F.M., White, 5th Edition, McGraw Hill, New York.
5. Fluid mechanics By Dr.D.S.Kumar
6. Fluid mechanics & Hydraulic Machines By Dr.P.N.Modi & Sheth
7. Fluid mechanics By Dr.A.K.Jain
8. Hydraulic Fluid mechanics & Fluid Machines By S.Ramamurthan
9. Engineering Fluid Mechanic By R.J.Garde & A.C.Mirajgaoker