

Devi Ahilya University, Indore, India Institute of Engineering & Technology				II Year B.E. (INFORMATION TECHNOLOGY)				
Subject Code & Name		Instructions Hours per Week		Credits				
VLR4C2 Fluid Mechanics - I		L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours		3	1	2	3	1	1	5

Learning Objectives:

To enhance the concepts of Fluids Mechanics.

COURSE CONTENTS

UNIT-1

Introduction: Scope and Application of Fluid Mechanics: Physical Properties of fluids; density; specific weight, specific volume, specific gravity, viscosity, dynamic and kinematic viscosity, Newton's law of viscosity, classification of fluids, compressibility, cohesion, adhesion, surface tension, capillarity, vapour pressure.

Equilibrium of fluids : Pressure at a point, variation, barometer, gauges, manometers, hydrostatic forces, equilibrium of fluid in motion, floatation – stability of floating and submerged bodies, fluid masses subjected to rotation, free and forced vortices.

UNIT-II

Kinematics of Fluid flow : Velocity field, classification of flows, stream, path and streak lines, continuity equation, stream function, velocity potential, flow-nets.

Dynamics of Fluid flow: Eulers equation of motion, Bernoulli's equation, pilot tube, prandil tube, flow through openings- orifices, mouth pieces etc., flow through notches weirs, empirical formulae.

UNIT-III

Dimensional Analysis & Model Study:Units and dimensions, dimensional homogeneity, Buckingham II Theorem, dimensionless numbers, principles of similitude and applications.

UNIT-IV

Flow through Pipes: Laminar flow, flow between parallel plates, measurement of viscosity, reynold's experiment, turbulent flow in pipes, solution of pipe flow problems, flow in pipe-

Network- Handy Cross Method, Losses in pipes, measurement of pipe flow- orifice, nozzle, bend meters, rotameters, concept of water hammer and surges.

UNIT-V

Flow through Open Channels : classification, geometric elements, continuity, energy and momentum equations, pressure, velocity distributions, uniform flow, concept of normal depth, chezy, manning and other formulae, best hydraulic sections, specific energy, specific force, hydraulic jump and its characteristics, gradually varied flow, surface profiles, dynamic equations.

[Sessional Works: Experiments on basis principles of fluid mechanics, Practical Exams: experimental and oral exam based on above sessional work, measurement of flow in open channels]

Books & References Recommended:

Text Books:

1. Nagaratnam S, *Fluid Mechanics*
2. Jain A K, *Fluid Mechanics*
3. Subramanaya K, *Fluid Mechanics*
4. Modi P N & S M Seth, *Hydraulics & Fluid Mechanics*

Reference Books:

1. Chow V T, *Open Channel Hydraulics*.
2. Rangaraju K G, *Flow through open channels*
3. Streeder V L, *Fluid Mechanics*.