Name of Subject	Introductory Fluid Mechanics
L-T-P	3-1-0
Credits	4
Name of the Department	Civil Engineering
Status of the subject	(a) Semester: Spring (b) Level of Subject: 1st year UG (c) Nature of Subject: Core (d) Semester to be offered: 1st (e) Programme in which the course is included: B.Tech. (H) in Civil Engineering
Prerequisites	None
Objectives	The objective of this course is to introduce the fundamental concepts of fluid mechanics to the students of Civil Engineering. This course serves as a foundation course for other advanced courses to be taken by the students later.
Names of the faculty members of the department who have the necessary expertise to teach the course	All Hydraulics & Water Resources Engineering Faculty
Any overlap with existing subjects	NONE
Recommended Text Books	1. Fluid Mechanics and Hydraulic Machines by K. Subramanya, Tata McGraw Hill Education (India). 2. Mechanics of Fluids by Merle C. Potter, David C. Wiggert, and Bassem H. Ramadan; Cengage Learning. 3. Fluid Mechanics by Yunus A. Cengel and John M. Cimbal; McGraw Hill Education (India).

Topics to be Covered	Name of the Topic	Hourly Breakup
	Properties of Fluids: Mass density, specific weight, specific gravity, specific volume, vapour pressure, compressibility, elasticity, surface tension, capillarity.	3 lectures
	Newton's law of viscosity; Classification of fluids; Viscosity: Dynamic and Kinematic; Variation of viscosity with temperature.	3 lectures
	Fluid Statics: Measurement of pressure; Pressure variation in a static fluid; Pascal's law; Units and scales of pressure measurement; Atmospheric pressure, Absolute Pressure, Gauge Pressure and Vacuum Pressure.	6 lectures
	Piezometer; U-tube manometer; Single-column manometer; U-tube differential manometer; Inverted U-tube differential manometer; Micro-manometers; Mechanical pressure gauges.	6 lectures
	Hydrostatic pressure: Forces on plane and curved surfaces; Total pressure and Center of Pressure; Pressure diagram; Total pressure on plane surfaces and depth of	6 lectures

	Center of Pressure; Total pressure on curved surfaces; Practical applications of total pressure and Center of Pressure; Buoyancy and Flotation; Buoyant force; Buoyancy and Center of Buoyancy; Archimedes Principle; Principle of Floatation.	
	Metacentre and metacentric height; Equilibrium of floating bodies and submerged bodies; Evaluation of metacentric height: Theoretical and experimental methods.	2 lectures
	Fluid kinematics: Fluid flow methods of analysis of fluid motion; Streamlines; Path lines; Streak lines and Stream tubes.	3 lectures
	Types of fluid flow Steady and unsteady flow, Uniform and non- uniform flow, Laminar, Transitional and Turbulent flow Reynolds number, Reynolds Experiment, Rotational and Irrotational flow, Subcritical, Critical and Supercritical flow, Compressible and Incompressible Flow.	3 lectures
	One, Two and Three Dimensional Circulation and vorticity; Velocity potential and Stream function; Flow-net.	2 lectures
	Dimensional analysis: similitude.	2 lectures
	Fluid Dynamics: Euler's equation, Bernoulli's equation.	3 lectures