

**Panipat Institute of Engineering and Technology**

**Department of Civil Engineering**

For Lecture's in **B. Tech. Civil Engineering III<sup>rd</sup> Semester**

Course No.	Title of the Course	Course Structure	
<b>CE-203A</b>	<b>Introduction to Fluid Mechanics</b>	<b>L-T-P</b>	<b>2-1-0</b>
<b>COURSE OUTCOMES (CO)</b>			
CO1	Students will be able to understand the different fluid properties and kinematics of fluid flow.		
CO2	Students will be able to understand the fluid pressure at rest and on submersed bodies.		
CO3	Students will be able to apply fundamental principles of fluid dynamics		
CO4	Students will be able to perform boundary layer analysis and dimensional analysis to evaluate and design fluid flow systems.		
UNIT NO`	Topics To Be Covered	Lecture Nos	
I	Introduction to Fluid mechanics	1	
	Fluid properties, mass density, specific weight, specific volume and specific gravity	2	
	Surface tension, capillarity	3	
	Pressure inside a droplet and bubble due to surface tension	4	
	Compressibility viscosity, Newtonian and Non-Newtonian fluids, real and ideal fluids	5	
	Steady & unsteady, uniform and non-uniform, laminar & turbulent flows	6	
	One, two- & three-dimensional flows	7	
	Stream lines, streak lines and path lines	8	
	continuity equation in differential form	9	
	Rotation and circulation	10	
	Elementary explanation of stream function and velocity potential	11	
	rotational and irrotational flows	12	
	Graphical and experimental methods of drawing flow nets	13	
II	Pressure-density-height relationship	14	
	gauge and absolute pressure	15	
	simple differential and sensitive manometers	16	

	Two liquid manometers	17
	pressure on plane and curved surfaces center of pressure	18
	Buoyancy, stability of immersed and floating bodies determination of metacentric height	19
	fluid masses subjected to uniform acceleration	20
	free and forced vortex.	21
III	Euler's equation of motion along a streamline and its integration	22
	limitation of Bernoulli's equation	23
	Pitot tubes	24
	venture meter	25
	Orifice meter	26
	flow through orifices & mouth pieces	27
	sharp crested weirs and notches	28
	Aeration of nappe	29
IV	Boundary layer thickness	30
	boundary layer over a flat plate	31
	laminar boundary layer	32
	turbulent boundary layer	33
	laminar sub-layer	34
	smooth and rough boundaries	35
	local and average friction coefficient separation and its control	36
	Dimensional analysis, Buckingham theorem	37
	Important dimensionless numbers and their significance, geometric, kinematic and dynamic similarity	38
	Model studies, physical modeling, similar and distorted models	39

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