B. Tech. Civil Engineering				
Course code: Course Title	**Course Structure**			**Pre-Requisite**
CE 205: Fluid Mechanics	**L**	**T**	**P**	**NIL**
	3	**0**	**2**	

Course Objective: To train undergraduate students about the basic concepts of Fluid Mechanics and fluid measurement techniques (concepts of fluid statics, fluid kinematics, and fluid dynamics)

S. No	Course Outcomes (CO)
CO1	Determine the fluid pressure and use various devices for measuring fluid pressure.
CO2	Calculate the hydrostatic force and use of law of conservation of mass for fluid flow.
CO3	Apply Bernoulli's equation to fluid flow problems and boundary layer theory to determine lift and drag forces on a submerged body.
CO4	Apply appropriate equations and principles to analyze pipe flow problems.
CO5	Use of different fluid flow measuring devices.

S. No	Contents	Contact Hours
UNIT 1	**Introduction and Fluid Statics**: Properties of fluids, types of fluids, and continuum principle. Basic definition, hydrostatic law, Pascal's law, manometers, hydrostatic forces on submerged surfaces, buoyancy.	8
UNIT 2	**Kinematics of flow and Fluid dynamics**: Types of flow, streamline, path line, principle of conservation of mass, velocity, acceleration, velocity potential and stream function, vorticity and circulation. Euler's equation, Bernoulli's equation, and their applications, Pitot tube, Venturimeter, Orifices, and mouth pieces.	8

UNIT 3	**Laminar and turbulent flow in pipe**: Laminar flow through pipes, Reynolds experiment, flow of viscous fluid in circular pipe: turbulent flow; loss of head due to friction in pipe, velocity distribution in pipe flow, flow through pipes, minor energy losses in pipes, hydraulic gradient and total energy line, equivalent pipe, power transmission through pipes.	8
UNIT 4	**Dimensional analysis and models**: Dimensional homogeneity, Rayleigh's and Buckingham's π theorem, dimensionless numbers, Types of models and model analysis.	8
UNIT 5	**Boundary layer theory and Flow** around Submerged bodies: Boundary layer definitions and characteristics, laminar and turbulent boundary layers, boundary layer thickness, laminar sub-layer, Forces exerted by flowing fluid on a resting body, drag and lift, streamlined body and bluff body, skin friction, drag on sphere, cylinder and flat plate.	10
	Total	**42**

REFERENCES

S.No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1	Bansal, R. K. "Fluid Mechanics and Hydraulics Machines", Laxmi Publications(P) Ltd. (ISBN 81 7008 311 7).	2008
2	Garde, R.J. and Mirjankar, A.G. "Engineering fluid Mechanics", Nem Chand & Bros. (ISBN 81 88429 01 5).	2000
3	Kumar, K.L., "Engineering Fluid Mechanics", Eurasia Publishing House (P) LTD. (ISBN 81 219 0100 6).	2000
4	Ojha, C.S.P., "Fluid Mechanics and Machinery, OXFORD, University Press. (ISBN 01 19 569963 7).	2010
5	Subramanya, K., "Fluid Mechanics", TMH New Delhi. (ISBN 0-07-462446-6)Fluid Mechanics.	1997