GUJARAT TECHNOLOGICAL UNIVERSITY

BACHELOR OF ENGINEERING SYLLABUS

Subject Code : 3145103

Subject Name : Fluid Mechanics

WEF Academic Year :	2022-23
Semester :	4
Category of the Course :	Professional Core

Rationale : The course is designed to give fundamental knowledge of fluid, its properties and behavior under various conditions.

Course Scheme :

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Practical		
L	T	PR	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
4	0	2	5	70	30	30	20	150

Course Content :

Sr. No.	Course Content	No. of Hours	% of Weightage
1	**Introduction** Units and Dimensions, Properties of fluids: Density, Specific weight, Specific Volume, Specificgravity, Viscosity, Thermodynamic properties, Compressibility and Bulk modulus, Surface tension and Capillarity, Vapour pressure and cavitation.	8	15
2	**Pressure and its Measurement** Fluid pressure at a point, Pascal's law, Pressure variation in a fluid at rest, Absolute, Gauge, Atmospheric andvacuum pressures, Measurement of pressure, Simple manometers, Differential manometers	9	20
3	**Fluid Statics** Hydro static forces on surfaces, Total pressure and center of pressure, Vertical plane surface submerged in liquid, Horizontal plane surfacesubmerged in liquid, Inclined plane surface submerged in liquid, curved surface submergedin liquid	9	15
4	**Basic Concepts in Fluid Flow** Kinematics of flow, Types of fluid flow-Rate of flow, continuity equation, continuity equation in three dimensions, velocity and acceleration, velocity potential function and stream function, Dynamics of Fluid flow- Equations ofmotion, Euler's equation of motion	6	20
5	**Basic Concepts in Fluid Flow Measurement** Bernoulli's equation, Practical applications of Bernoulli's equation, Venturi meter, Orifice meter, Pitot tube	3	10

6	**Flow through Pipes** Reynolds Experiment, Laminar and turbulent flow, Loss of energy in pipes, Loss of energy due to friction, Minorenergy losses, Hydraulic gradient and Total Energy line, Flow through pipes in series, Equivalent pipe, Flowthrough parallel pipes, Flow through branched pipes, Power transmission through pipes, Water hammer in pipes	10	20

Reference Book :

1) Bansal, R.K., "Fluid Mechanics and Hydraulic Machines", Laxmi Publications, New Delhi, 9th edition, 2011.
2) Modi, P.N. and Seth, S.M., "A Text book of Fluid Mechanics and Hydraulic Machines", Standard Book House, New Delhi, 2007.
3) Som, S.R and Biswas, "Introduction to Fluid Mechanics and Fluid Machines", Tata McGraw Hill, 2nd edition, 2007.
4) Rajput, R.K., "A Text book of Fluid Mechanics and Hydraulic Machines", S. Chand and Co., New Delhi, 2008.
5) Agarwal, S.K., "Fluid Mechanics and Machinery", Tata Mc Graw Hill Co. New Delhi, 2006

Course Outcome :

After Completion of the Course, Student will able to:

No.	Course Outcomes	RBT Level*
01	Recognize the various properties of fluids.	RM
02	Express the units of different properties of fluids.	UN
03	Describe the pressure and its measurement.	UN
04	Calculate the forces acting on bodies submerged in different positions in liquids.	AN
05	Identify the type of flow of fluid	AP

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Suggested Course Practical List :

1) Determination of coefficient of discharge of Venturi meter.
2) Determination of coefficient of discharge of Orifice meter.
3) Determination of discharge through Rotameter.
4) Determination of pipe friction and pressure drop due to sudden contraction and expansion during fluid flow.
5) To determine the different types of flow Patterns by Reynolds's experiment.
6) To determine the Friction factor for the different pipes.
7) To determine the loss coefficients for different pipe fittings.
8) To determine the viscosity of fluid by viscometer.
9) Study of various types of pipes and pipe fittings.
10) Study of different types of valves.
11) Study of reciprocating pump.

List of Laboratory/Learning Resources Required :

Equipment :

1) Pitot Tube
2) Venturi meter apparatus
3) Reynold's apparatus
4) Pressure Measurement apparatus
5) Orifice meter apparatus
6) Pipe fitting apparatus
7) Metacentric height apparatus
8) Open Channel apparatus (Notches)
9) Nozzle Meter
10) Manometer
11) Viscometer

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