INSTITUTE	**FACULTY OF TECHNOLOGY**
PROGRAM	**BACHELOR OF TECHNOLOGY (CIVIL ENGINEERING)**
SEMESTER	**3**
COURSE TITLE	**FLUID MECHANICS**
COURSE CODE	**01CI1304**
COURSE CREDITS	**4**

Objective:

1 To know the properties of fluid and identify their types.
2 To calculate hydro static forces and the measurement techniques for pressure.
3 To understand the fluid kinematics and dynamics.
4 To classify various types of fluid flow.
5 To develop the concepts of (a) buoyancy force on immersed and floating body and (b) drag- lift force on the object

Course Outcomes: After completion of this course, student will be able to:

1 Identify the properties of different types of fluids
2 Measure the pressure and hydrostatic force generated by fluid.
3 Categorize various types of fluid flow through conduits
4 Evaluate the buoyancy force for the floating and immersed bodies in fluid

Pre-requisite of course:...

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Fluid Properties & Fluid Statics** Types of Fluid and Properties, Newton's Law of viscosity, Surface Tension, Compressibility, Fluid Pressure Measurement, Hydrostatic Pressure, Buoyancy And Floatation	18
2	**Fluid Kinematics** Fluid Flow analysis methods, Flow pattern stream line path line, Types of fluid flow, Velocity and Acceleration, Continuity equation for 1-D, 2-D and 3-D flow and application, Circulation and vorticity, velocity potential and stream function, flow net	6

DR. ANKUR CHANDRAKANT BHOGAYATA
Digitally signed by (Name of HOD)

DR. RAJENDRASINH BAHADURSINH JADEJA
Digitally signed by (Name of Dean/ Principal)

Contents : Unit	Topics	Contact Hours
3	**Fluid Dynamics** Euler's Equation, Bernoulli's Equation for Ideal and Real Fluid – Its Applications, Energy Correction Factor, Momentum equation and its application	4
4	**Flow Measuring Devices** Measurement of Discharge, Measurement of Velocity, Flow through reservoir opening, Mouthpiece, Notches and Weirs	10
5	**Compressible flow** Basic equations & Bernoulli's Equation, Mach number, Propagation of sound wave	4
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Experiment-1** To determine the different types of flow Patterns by Reynolds's experiment	2
2	**Experiment-2** To Validate Bernoulli's Theorem.	2
3	**Experiment-3** To determine the friction factor for different pipes	2
4	**Experiment-4** To determine the loss coefficients for different pipe fittings (for sudden enlargement and sudden contraction)	4
5	**Experiment-5** To determine the loss coefficients for different pipe fittings (for bend, Gate valve, ball Valve and elbow)	4
6	**Experiment-6** To determine the coefficient of discharge through an orifice meter and Rotameter	2
7	**Experiment-7** To determine the coefficient of discharge through venturi meter	2
8	**Experiment-8** To measure the velocity of flow using pitot tube	2
9	**Experiment-9** To determine the coefficient of discharge through open channel flow over a rectangular notch	2
10	**Experiment-10** To determine the coefficient of discharge through open channel flow over a V-shaped notch	2
11	**Experiment-11** To determine metacentric height of floating body	2

DR. ANKUR CHANDRAKANT BHOGAYATA
Digitally signed by (Name of HOD)

DR. RAJENDRASINH BAHADURSINH JADEJA
Digitally signed by (Name of Dean/ Principal)

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
12	**Experiment-12** Free and forced vortex flow	2
Total Hours		**28**

Textbook :

1 Fluid Mechanics and Hydraulic Machines, Er. R. K. Rajput, S. Chand & company, 2018

2 Fluid Mechanics & Hydraulic Machines, R.K. Bansal, Laxmi Publication, 2018

References:

1 Engineering Fluid mechanics, Engineering Fluid mechanics, K.L. Kumar, S. Chand & Company Ltd., 2008

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
5.00	35.00	40.00	10.00	10.00	0.00

Instructional Method:

1 Prerequisite of the course and its pattern shall be discussed on the commencement of the course.

2 Lectures shall be conducted in class room using various teaching aids.

3 Presence in all academic sessions is mandatory which shall carry 5% marks of the total internal evaluation.

4 At the end of each unit/topic an assignment based on the course content shall be given to the students which shall carry 5% weightage for timely completion and submission of the assigned work.

5 The laboratory experiments are planned in such a way that it covers the practical aspects of the course contents. The performance of these experiments shall bring the clarity of the theoretical concepts which the students have studied during the academic sessions.

Supplementary Resources:

1 https://byjus.com/physics/fluid-dynamics/

2 https://archive.nptel.ac.in/courses/105/103/105103095/

3 https://archive.nptel.ac.in/courses/105/103/105103192/

4 https://archive.nptel.ac.in/courses/112/105/112105269/

5 https://byjus.com/physics/fluid-dynamics/