Program : **Diploma inMechanical Engineering/ Manufacturing Technology**	
Course Code :**4028**	Course Title: **Fluid Mechanics Lab (Mechanical)**
Semester : **4**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3 (L:0, T:0, P:3)**	Periods per semester:**45**

Course Objectives:

- Toapply the knowledge in fluid mechanics for various practical experiments.
- To familiarize with the various applications of fluid mechanics.

Course Prerequisites:

Topic/Description	Course Code	Course Title	Semester
Basic mathematics		Mathematics I&II	1&2
Basic physics		Applied Physics I&II	1& 2
Basic theoretical concepts in fluid mechanics and hydraulic machines		Fluid mechanics and hydraulic machines	4

Course Outcome

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Describe the methods for pressure measurement and determine the metacentric height of floating body.	9	Applying
CO2	Measure various properties such as pressure, velocity, flow rate using various instruments and perform the experiments to understand Bernoulli's theorem and its applications.	10	Applying
CO3	Distinguish various pipe fittings and determine co-efficient of friction and minor losses in pipe flow.	12	Applying

CO4	Determine the co-efficient of discharge of Notches and Hydraulic co-efficients of orifice based on experiments	12	Applying
	Lab Exam	2	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	1			2
CO2	3	3	2	1			2
CO3	3	3	1	1	1	1	2
CO4	3	3	1	1	1	1	2

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Describe the methods for pressure measurement and determine the metacentric height of floating body.**		
M1.01	Familiarize various pressure measuring instruments like, piezometer, Manometer, Bourdon tube pressure gauges. Describe the principle of operation of each equipment.	6	Understanding
M1.02	Comprehend the metacentric height. Use the metacentric apparatus to determine the meta centric height of floating body.	3	Applying
Contents: - Pressure measuring instruments- piezometer, Manometer, Bourdon tube pressure gauge. Determine the metacentric height of the floating body.			
CO2	**Measure various properties such as pressure, velocity, flow rate using various instruments and perform the experiments to understand Bernoulli's theorem and its applications.**		

M2.01	Appreciate the Bernoulli's theorem Demonstrate the use of Bernoulli's theorem apparatus Verify Bernoulli's theorem using the apparatus Draw the graph, total energy Vs Length of pipe Interpret the curve.	4	Applying
M2.02	Appreciate the venturi meter, rotameter and water meter Appreciate the coefficient of discharge through venturi meter State the functions and applications of a venturi meter Determine the coefficient of discharge Plot the graph, discharge Vs head Comments on curve.	6	Applying
	Lab Exam I	1	
Contents: - Verification of Bernoulli's theorem Determination of Coefficient of Discharge of Venturi meter.			
CO3	**Distinguish various pipe fittings and determine co-efficient of friction and minor losses in pipe flow.**		
M3.01	Explain the pipe fittings, pipe joints and valves Identify the various types of pipe fittings, joints and valves	4	Understanding
M3.02	Explain the pipe friction apparatus Use the pipe friction apparatus to determine the Darcy's constant Explain the term coefficient of friction in pipes State the effect of friction in pipes Determine the coefficient of friction of pipes of different diameters Plot total energy line and hydraulics gradient line Comments on the graph.	4	Applying
M3.03	Explain the minor losses in pipes Estimate the minor losses in flow through pipes	4	Applying
Contents: - Pipe fittings, pipe joints and valves Determination of coefficient of friction of flow through pipes. Determination of minor losses of flow through pipes.			
CO4	**Determine the co-efficient of discharge of Notches and Hydraulic co-efficients of orifice based on experiments.**		

M4.01	Appreciate the Notch apparatus (Rectangular & triangular) Demonstrate different types of Notches Determine the coefficient of discharge of Rectangular Notch Determine the coefficient of discharge of Triangular Notch Plot the graph, coefficient of discharge Vs Head.	6	Applying
M4.02	Explain the Orifice apparatus Appreciate the coefficient of discharge through orifices Demonstrate the circular orifices and its functions Determine the coefficients of discharge, velocity and contraction. (Cd, Cv, C_c) Plot the graph, coefficient of discharge Vs head Comments on graph.	6	Applying
	Lab Exam II	1	
Contents: - Determine the co-efficient of discharge of Various Notches. Determine Hydraulic co-efficient of orifice.			

Text /Reference:

T/R	BookTitle/Author
T1	K C John, Mechanical workshop & Laboratory manual
R2	R K Bansal, Fluid mechanics & Hydraulic Machines
R3	P M Modi & S M Seth, Hydraulics & Fluid mechanics including Hydraulic machines.
R4	Damodara Reddy Annapureddy, Fluid Mechanics and Hydraulic Machines Lab, LAP Lambert Academic Publishing Manual.

Online Resources

Sl No	Website Link
1	https://www.cambridge.org/core/books/an-introduction-to-fluid-dynamics/18AA1576B9C579CE25621E80F9266993
2	https://nptel.ac.in/courses/112105183/