FLUID MECHANICS LAB

Course Code	19CE3351	Year	II	Semester	I
Course Category	Program Core	Branch	CE	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Physics and Mathematics
Continuous Internal Evaluation:	25	Semester End Evaluation:	50	Total Marks:	75

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Determine the discharge through pipes by using venturi meter and orifice meter Determine the discharge from tanks by using small orifice at constant head and mouth piece at varying head
CO2	Understand the Bernoulli's equation and its application and energy dissipation in hydraulic jump
CO3	Calculate loss of head in pipes due to friction and minor energy losses
CO4	Gain knowledge about the efficiency of the turbines
CO5	Gain knowledge about the efficiency of the pumps

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1				3	3				2				2	2
CO2				3	3				2				2	2
CO3				3	3				2				2	2
CO4				3	3				2				2	2
CO5				3	3				2				2	2

Syllabus

Unit No.	Contents	Mapped CO
I	1. Calibration of Venturi-meter & Orifice meter 2. Determination of Coefficient of discharge for a small orifice by a constant head method 3. Determination of Coefficient of discharge for a mouth piece by variable head method	CO1
II	4. Calibration of Triangular Notch /Rectangular Notch 5. Verification of Bernoulli's equation. 6. Study of Hydraulic jump 7. Determination of coefficient of discharge for Rectangular Weir	CO2
III	8. Determination of Coefficient of loss of head in a sudden contraction and friction factor.	CO3
IV	9. Demo on performance test on Pelton wheel turbine 10. Demo on performance test on Francis turbine.	CO4

V	11. Study of efficiency test on centrifugal pump. 12. Study of efficiency test on reciprocating pump.	CO5

Standards:-

1. To determine the coefficient of discharge of Venturi-meter and Orifice-meter. (IS 14615 (Part 1) : 1999 (2004), IS0 5167-1 : 1991 – Measurement of Fluid Flow by Means of Pressure Differential Devices, Part 1: Orifice Plates, Nozzles and Venturi Tubes Inserted in Circular cross-section conduits running full)

2. To determine the coefficient of discharge of mouthpiece and small orifice by constant head and falling head methods. (IS 14615 (Part 1): 1999 (2004), IS0 5167-1: 1991 – Measurement of Fluid Flow by Means of Pressure Differential Devices, Part 1: Orifice Plates, Nozzles and Venturi Tubes Inserted in Circular cross-section conduits running full)

3. To determine the coefficient of discharge of V-notch (triangular notch) & rectangular notch.(IS 9108 : 1979 (2003) – Liquid Flow Measurement in Open Channels using Thin Plate Weirs) (IS 13083: 1991(2003), IS0 4377: 1990- Liquid Flow Measurement in Open Channels - Flat-V Weirs)

4. To compute the friction factor using Darcy-Weisbach Equation for pipes of different diameters. (IS 2595 (Part I): 1965 (Reaffirmed 2003) – Head loss in Straight Pipes due to frictional resistance.

5. To study the performance characteristics of Pelton wheel turbine. (IS 12800 (Part 3) : 1991 (2003) - Guidelines for Selection of Hydraulic Turbine, Preliminary Dimensioning and Layout of Surface Hydroelectric Powerhouses, Part 3 - Small, Mini And Micro Hydroelectric Power Houses)

6. To study the performance characteristics of the Francis turbine. (IS 12800 (Part 3) : 1991 (2003) - Guidelines for Selection of Hydraulic Turbine, Preliminary Dimensioning and Layout of Surface Hydroelectric Powerhouses, Part 3 - Small, Mini And Micro Hydroelectric Power Houses)

7. To study the working principles of a centrifugal pump. (IS 9137: 1978 (1993) – Code for Acceptance Tests for Centrifugal, Mixed Flow and Axial Pumps - Class C)
   ISO 9905: 1994 - Technical specifications for centrifugal pumps — Class I

Other codes: IS 9118: 1979 (2001) – Method for Measurement of Pressure by means of Manometers

Learning Resources

Laboratory Manuals

1. Laboratory Manuals available in FM Laboratory.
2. Sarbjit Singh, Experiments in Fluid Mechanics, Prentice Hall of India Pvt. Ltd, Learning Private Limited, Delhi, 2012.
3. V.P. Gupta J. Chadra and K.S. Gupta, Laboratory Manual of Fluid Mechanics and Machines, CBS Publishers and Distributors, New Delhi,2006.