20CE3452- MECHANICS OF FLUIDS LAB

Offering Branches	CE		
Course Category:	Professional Core	Credits:	1.5
Course Type:	Laboratory	Lecture-Tutorial-Practical:	0-0-3
Prerequisites:	Nil	Continuous Evaluation:	15
		Semester End Evaluation:	35
		Total Marks:	50

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	**Apply** the Bernoulli's principle to determine the discharge through pipes by using venturi meter, orifice meter, the discharge from tanks by using small orifice at constant head and mouth piece at varying head.	K3
CO2	**Apply** the Bernoulli's equation and energy dissipation in hydraulic jump.	K3
CO3	**Analyse** loss of head in pipes due to friction and minor energy losses.	K4
CO4	**Analyse** the efficiency of the turbines	K4
CO5	**Analyse** the efficiency of the pumps	K4

Contribution of Course Outcomes towards achievement of Program Outcomes

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

1- Low **2-Medium** **3-High**

Course Content

Experiment No.1	Calibration of Venturi-meter & Orifice meter	**CO1**
Experiment No.2	Determination of Coefficient of discharge for a small orifice by a constant head method	
Experiment No.3	Determination of Coefficient of discharge for a mouth piece by variable head method	
Experiment No.4	Calibration of Triangular Notch /Rectangular Notch	CO2
Experiment No.5	Verification of Bernoulli's equation.	
Experiment No.6	Study of Hydraulic jump	
Experiment No.7	Determination of coefficient of discharge for Rectangular Weir	
Experiment No.8	Determination of Coefficient of loss of head in a sudden contraction and friction factor.	CO3
Experiment No.9	Demo on performance test on Pelton wheel turbine	CO4
Experiment No.10	Demo on performance test on Francis turbine.	
Experiment No.11	Study of efficiency test on centrifugal pump.	CO5
Experiment No.12	Study of efficiency test on reciprocating pump.	

Learning Resources

Text Books	**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.

Reference Books	1. To determine the coefficient of discharge of Venturi-meter and Orifice-meter. 2. (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 mouthpiece and small orifice by constant head and falling head methods. 4. (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) 5. 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) 6. (IS 13083: 1991(2003), IS0 4377: 1990- Liquid Flow Measurement in Open Channels - Flat-V Weirs) 7. To compute the friction factor using Darcy-Weisbach Equation for pipes of different diameters. 8. (IS 2595 (Part I): 1965 (Reaffirmed 2003) – Head loss in Straight Pipes due to frictional resistance. 9. To study the performance characteristics of Pelton wheel turbine. 10. (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) 11. To study the performance characteristics of the Francis turbine. 12. (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) 13. To study the working principles of a centrifugal pump. 14. (IS 9137: 1978 (1993) – Code for Acceptance Tests for Centrifugal, Mixed Flow and Axial Pumps - Class C) 15. ISO 9905: 1994 - Technical specifications for centrifugal pumps — Class I 16. Other codes: IS 9118: 1979 (2001) – Method for Measurement of Pressure by means of Manometers
e-Resources& other digital material	1. http://fm-nitk.vlabs.ac.in/ 2. https://nptel.ac.in/courses/112/105/112105171/