

Course Title: Fluid Mechanics and Hydraulic Machines Laboratory (0:1:2)

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER – IV

Subject Code	15CVL47	IA Marks	20
Number of Lecture Hours/Week	03 (1hr tutorial + 2hr laboratory)	Exam Marks	80
Total Number of Lecture Hours	42	Exam Hours	03

CREDITS – 02

Course objectives: This course will enable students to;

1. calibrate flow measuring devices
2. determine the force exerted by jet of water on vanes
3. measure discharge and head losses in pipes
4. understand the fluid flow pattern

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
1. Verification of Bernoulli's equation	3 Hours	L1, L2
2. Determination of C_d for Venturimeter and Orifice meter	3 Hours	L1, L2
3. Determination of hydraulic coefficients of small vertical orifice	3 Hours	L1, L2
4. Calibration of Rectangular and Triangular notch	3 Hours	L1, L2
5. Calibration of Ogee and Broad crested weir	3 Hours	L1, L2
6. Determination of C_d for Venturiflume	3 Hours	L1, L2
7. Experimental determination of force exerted by a jet on flat and curved plates (Hemispherical Vane).	3 Hours	L1, L2
8. Experimental determination of operating characteristics of Pelton turbine	3 Hours	L1, L2
9. Determination of efficiency of Francis turbine	3 Hours	L1, L2
10. Determination of efficiency of Kaplan turbine	3 Hours	L1, L2
11. Determination of efficiency of centrifugal pump.	3 Hours	L1, L2
12. Determination of Major and Minor Losses in Pipes	3 Hours	L1, L2
13. Demonstration Experiments: <ol style="list-style-type: none"> a. Reynold's experiment to understand laminar and turbulent flow b. Flow Visualization c. Calibration of Sutro-weir 	6 Hours	L1, L2

Course outcomes:

During the course of study students will develop understanding:

- Properties of fluids and the use of various instruments for fluid flow measurement.
- Working of hydraulic machines under various conditions of working and their characteristics.

Program Objectives (as per NBA):

- o Engineering Knowledge.

- Problem Analysis.
- Design / development of solutions (partly).
- Interpretation of data.

Question paper pattern:

- All experiments are to be included in the examination except demonstration exercises.
- Candidate to perform experiment assigned to him
- Marks are to be allotted as per the split up of marks shown on the cover page of answer script

Text Books:

1. Sarbjit Singh , *Experiments in Fluid Mechanics* - PHI Pvt. Ltd.- New Delhi
2. Mohd. Kaleem Khan, “Fluid Mechanics and Machinery”, Oxford University Press

Reference Books:

1. Hydraulics and Fluid Mechanics’ – Dr. P.N. Modi & Dr S.M. Seth, Standard Book House- New Delhi. 2009 Edition