COURSE TITLE : HYDRAULICS LABORATORY
COURSE CODE : 3059
COURSE CATEGORY : B
PERIODS/WEEK : 3
PERIODS/SEMESTER : 45
CREDITS : 2

TIME SCHEDULE

Module	Topic	Periods
1	Use Bernoulli's theorem apparatus	10
2	Calculate the co efficient of discharge(Cd) using venturimeter and plot the curve between Cd &Head(H)	13
3	Study the various turbines	10
4	Conduct experiment and find out hydraulic efficiency and overall efficiency of centrifugal pump & reciprocating pump	12
TOTAL		**45**

GENERAL COURSE OUTCOME

SL.NO.	SUB	STUDENT WILL BE ABLE TO
1	1	Understand the pipe friction apparatus.
	2	Understand the Orifice apparatus
	3	Appreciate the Notch apparatus (Rectangular, triangular & trapezoidal)
	4	Appreciate the Bernoullis theorem
	5	Appreciate the venturimeter
	6	Understand the minor losses in pipes.
	7	Understand the working of centrifugal pump & reciprocating pump

SPECIFIC COURSE OUTCOME

MODULE I

1.1.1 Use Bernoulli's theorem apparatus.
1.1.2 Apply and verify Bernoulli's Theorem
1.1.3 Determine the discharge measurement through orifice and notches and to plot the curve between Co efficient of Discharge (Cd) and Discharge (Q).

MODULE II

2.1.1 Calculate the co efficient of discharge(Cd) using venturimeter and plot the curve between Cd and Head(H)
2.1.2 Use the pipe friction apparatus to determine the coefficient of friction

MODULE III

3.1.1 Study the various turbines
3.1.2 Find the efficiency of various turbines
3.1.3 Plot the characteristic curves

MODULE IV

4.1.1 Conduct experiment and find out hydraulic efficiency and overall efficiency of centrifugal pump and reciprocating pump
4.1.2 Plot the characteristic curves

CONTENT DETAILS

MODULE I

1. Verify the Bernoulli's theorem using the apparatus
2.Conduct the tests on orifice and notches
   (i) Determine the coefficient of discharge of different orifices and notches
   (ii) Calibrate the notches and orifices.

MODULE II

1. Conduct the test on Venturimeter.
   (i) Determine the coefficient of discharge of the Venturimeter.
2. Conduct the test on pipe friction apparatus.
   (i) Determine the friction factor using Darcy's formulae of pipes of varying cross section .
   (ii) Plot TEL and HEL.

MODULE III

1. Conduct the tests on Pelton turbine, Francis turbine and Kaplan turbine.
   (i) Operate the turbines.
   (ii) Calculate the brake power and overall efficiency.
   (iii) Plot the various characteristic curves.

MODULE IV

1. Conduct the tests on centrifugal pump and reciprocating pumps.
   (i) Operate the pumps
   (ii) Caculate the various efficiency of the pumps
   (iii) Plot the various characteristics curves

REFERENCE:

K C John - Fluid mechanic laboratory experiments - PHI Learning Pvt. Ltd
T.S. Desmukh - Fluid Mechanics and Hydraulic Machines (A Lab Manual) - Laxmi Publications Pvt Limited
S.K.Likhi – Hydraulics Laboratory Manual – New age imternational