HYDRAULICS AND HYDRAULIC MACHINERY LABORATORY

IVSEMESTER: CE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACEC12	Core	0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36				Total Classes: 36		

Prerequisite: No prerequisites required

I. COURSEOVERVIEW

The Hydraulics Laboratory course is an indispensable supplement to the theory. It covers measuring devices and techniques, error analysis in experimental works and analysis of assumptions in the theory of fluid mechanics. Hydraulics and fluid mechanics, or the study of liquids, is an important area for civil engineers. Whether designing a steam engine, or working on a pump or turbine, civil engineers need to know how the water or liquid is going to move or operate. This allows them to create and maintain important machines that power our everyday world.

II. COURSE OBJECTIVES

The students will try to learn:

I. The concept of fluid mechanics and hydraulic machines.
II. The demonstration on the classical experiments in fluid mechanics and hydraulic machinery.
III. The mechanism flow measuring devices such as Venturi meter, orifice meter and notches etc.
IV. The performance characteristics of turbines and pumps.

III. COURSE SYLLABUS

Week-l: INTRODUCTION TO FLUID MECHANICS AND HYDRAULIC MACHINES LAB
Introduction to Fluid Mechanics and Hydraulic Machinery laboratory

Week-2: CALIBRATION OF VENTURIMETER AND ORIFICE METER
Determination of Co-efficient of discharge through Venturi meter and Orifice meter.

Week-3: VERIFICATION OF BERNOULLI'S EQUATION FOR HORIZONTAL AND INCLINED PIPE
Verification of Bernoulli 's equation for horizontal and inclined pipes

Week-4: DETERMINATION OF FRICTION FACTOR OF CIRCULAR AND NON – CIRCULAR PIPES
Determination of friction factor of pipe of circular and non – circular pipes

Week-5: DETERMINATION OF HEAD LOSS DUE TO MINOR LOSSES IN A PIPE
Determination of head losses in a pipe due to sudden contraction and sudden expansion

Week-6: CALIBRATION OF RECTANGULAR, TRIANGULAR AND TRAPEZOIDAL NOTCH
Determination of Co-efficient of discharge through rectangular, triangular and trapezoidal notches

Week-7: IMPACT OF JET ON VANES (FLAT, CURVED VANES)
Determination of Co-efficient of impact due to jet on flat, curved vanes.

Week-8: PERFORMANCE TEST ON PELTON TURBINE
Determination of the efficiency of Pelton Wheel turbine

Week-9: PERFORMANCE TEST ON REACTION TURBINE
Determination of the efficiency of either Francis or Kaplan turbine

Week-10: PERFORMANCE TEST ON SINGLE STAGE CENTRIFUGAL PUMP
Determination of the maximum efficiency of multi stage centrifugal pump

Week-11: PERFORMANCE TEST ON MULTI STAGE CENTRIFUGAL PUMP
Determination of the maximum efficiency of multi stage centrifugal pump

Week-12: PERFORMANCE TEST ON SINGLE ACTING RECIPROCATING PUMP
Determination of the maximum efficiency of single acting reciprocating pump

IV. TEXT BOOKS

1. C.S.P.Ojha, R. Berndtsson and P. N. Chadramouli, 'Fluid Mechanics and Machinery', Oxford University Press, 2010
2. P M Modi and S M Seth, 'Hydraulics and Fluid Mechanics', Standard Book House.
3. K. Subramanya, 'Theory and Applications of Fluid Mechanics', Tata McGraw Hill.
4. R.L. Daugherty, J.B. Franzini and E.J. Finnemore, 'Fluid Mechanics with Engineering Applications', International, Student Edition, Mc Graw Hill.

V. WEB REFERENCES

1. http://site.iugaza.edu.ps/mymousa/files/Fluid-Mechanics-and-Hydraulics-Lab-Manual-2015-.pdf
2. http://www.public.asu.edu/~lwmays/classes/cee341/manual.pdf
3. https://issuu.com/loisburchette4023/docs/fluid-mechanics-lab-manual-for-mech