DEPARTMENT OF CIVIL ENGINEERING
SCHEME OF COURSE WORK

Course Details:

Course Title:	**Fluid Mechanics and Hydraulic Machines Lab**
Course Code:	**20CE1114**
L T P C:	**0 0 3 1.5**
Program:	**B. Tech.**
Branch:	**Civil Engineering**
Semester:	**IV**
Prerequisites:	**Fluid Mechanics**
Courses to which it is a prerequisite:	**---**

COURSE OUTCOMES (COs):

After completion of this course the student would be able to

CO	Course Outcomes
1	Determine the discharge using flow measuring devices in pipe and open channel flows.
2	Demonstrate the application of Bernoulli's Theorem.
3	Illustrate different types of flow patterns.
4	Calculate the loss of energy in pipes.
5	Determine the performance of turbines and pumps under varying operating conditions.

PROGRAMME OUTCOMES (POs)

1. Graduates will be able to apply the knowledge of mathematics, science, engineering fundamentals to solve complex civil engineering problems.
2. Graduates will attain the capability to identify, formulate and analyse problems related to civil engineering and substantiate the conclusions
3. Graduates will be in a position to design solutions for civil engineering problems and design system components and processes that meet the specified needs with appropriate consideration to public health and safety.
4. Graduates will be able to perform analysis and interpretation of data by using research methods such as design of experiments to synthesize the information and to provide valid conclusions.
5. Graduates will be able to select and apply appropriate techniques from the available resources and modern civil engineering and software tools, and will be able to predict and model complex engineering activities with an understanding of the practical limitations.
6. Graduates will be able to carry out their professional practice in civil engineering by appropriately considering and weighing the issues related to society and culture and the consequent responsibilities.
7. Graduates will be able to understand the impact of the professional engineering solutions on

environmental safety and legal issues.

8. Graduates will transform into responsible citizens by resorting to professional ethics and norms of the engineering practice.
9. Graduates will be able to function effectively in individual capacity as well as a member in diverse teams and in multidisciplinary streams.
10. Graduates will be able to communicate fluently on complex engineering activities with the engineering community and society, and will be able to prepare reports and make presentations effectively.
11. Graduates will be able to demonstrate knowledge and understanding of the engineering and management principles and apply the same while managing projects in multidisciplinary environments.
12. Graduates will engage themselves in independent and life-long learning in the broadest context of technological change while continuing professional practice in their specialized areas of civil engineering.

PROGRAMME SPECIFIC OUTCOMES(PSOs):

1. Collect, process and analyse the data from topographic surveys, remote sensing, hydrogeological investigations, geotechnical explorations, and integrate the data for planning of civil engineering infrastructure.

2. Analyse and design of substructures and superstructure for buildings, bridges, irrigation structures and pavements.

3. Estimate, cost evaluation, execution and management of civil engineering projects.

Course Outcome Vs Program Outcomes:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	2	2	-	-	-	-	1
CO2	3	3	3	1	-	-	-	-	-	-	-	1
CO3	2	2	1	1	1	-	-	-	-	-	-	1
CO4	3	3	3	2	1	1	1	-	-	-	-	1
CO5	3	3	3	1	1	1	1	-	-	-	-	1

Course Outcome Vs Programme Specific Outcomes:

CO	PSO1	PSO2	PSO3
CO1	2	2	-
CO2	1	1	-
CO3	1	1	-

CO4	1	1	-
CO5	1	1	-

Mapping Levels:
1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), put

Assessment Methods:	Day-wise assessment / Mid-Test / End Exam

Teaching-Learning and Evaluation:

Week No.	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Introduction to Laboratory	CO's-1 to 5		Lecture	
2-8	1. Verification of Bernoulli's theorem. 2. Calibration of Venturimeter / Orifice meter. 3. Calibration of contracted Triangular Notch / Rectangular Notch. 4. Calibration of Broad crested / Narrow crested weirs. 5. Determination of coefficient of discharge for a Small Orifice / External Mouthpiece by constant head method. 6. Determination of coefficient of discharge for a Small Orifice / External Mouthpiece by variable head method. 7. Determination of coefficient of discharge for an Ogee Spillway / Hump / Venturi flume.	CO-1 & CO-2	1. Verify the Bernoullis theorem? 2. Compute the coefficient of discharge of Venturimeter? 3. Compute the coefficient of discharge of V-notch? 4. Compute the coefficient of discharge of broad crested weir? 5. Compute the coefficient of discharge of Mouthpiece? 6. Compute the coefficient of discharge of small orifice? 7. Compute the coefficient of discharge of Ogee spillwayr?	Practical Experiment and Performing the calculations	Observation, Record correction and Viva
9	**MID TEST – I**				
10-16	8. Determination of friction factor in a given pipeline. 9. Determination of coefficient of loss of head due to pipe fittings in a given pipeline. 10. Reynolds's Experiment-Demonstration of types of flows. 11. Impact of jet on vanes. 12. Performance test on Pelton Wheel.	CO-3, CO-4 & CO-5	1. Determine friction factor for a given pipe line? 2. Determine loss coefficient for an elbow? 3. Demonstrate the types of flows. 4. Determine coefficient of impact for flat plate? 5. Compute the overall	Practical Experiment and Performing the calculations	Observation, Record

	13. Performance test on Francis Turbine / Kaplan Turbine. 14. Performance test on Single Stage / Multi Stage Centrifugal Pump. 15. Performance test on Reciprocating Pump. 16. Study of hydraulic jump.		efficiency of Pelton wheel. 6. Compute the overall efficiency of Francis turbine. 7. Compute the overall efficiency of Single-stage Centrifugal pump. 8. Compute the overall efficiency of reciprocating pump. 9. Determine the loss of head in the hydraulic jump?		correction and Viva
17	**MID TEST – I**				
18	**END EXAM**				