

## FLUID MECHANICS LABORATORY

<b>IV Semester: CE</b>								
Course Code	Category	Hours / Week			Credit	Maximum Marks		
<b>ACEB10</b>	<b>Core</b>	L	T	P	C	CIA	SEE	Total
		-	-	2	1	30	70	100
<b>Contact Classes: Nil</b>	<b>Tutorial Classes: Nil</b>	<b>Practical Classes: 24</b>			<b>Total Classes: 24</b>			
<b>I. COURSE OVERVIEW:</b>								
<p>The primary objective of Fluid Mechanics Laboratory is to develop the analytical ability of the students by better understanding the concepts of flow studies. The experiments carried out like Calibration of flow measuring devices, determination of Co-efficient of discharge, Co-efficient of velocity for flow measuring devices, estimation of both major and minor losses, verification of Bernoulli's equation, determination of impact of jet on vanes for the blades of the turbine, determination of efficiencies of various types of turbines etc.</p>								
<b>II. OBJECTIVES:</b>								
<b>The course should enable the students to:</b>								
<ol style="list-style-type: none"> <li>I. Enrich the concept of fluid mechanics and hydraulic machines.</li> <li>II. Demonstrate the classical experiments in fluid mechanics and hydraulic machinery.</li> <li>III. Correlate various flow measuring devices such as venturimeter, orifice meter and notches etc.</li> <li>IV. Discuss the performance characteristics of turbines and pumps.</li> </ol>								
<b>III. COURSE OUTCOMES:</b>								
<b>After successful completion of the course, students should be able to:</b>								
CO 1	Recall the basic principle of fluid mechanics for determining their properties through various laboratory tests.			Remember				
CO 2	Determine coefficient of discharge for measuring actual discharge using different discharge measuring device.			Evaluate				
CO 3	Measure friction factor of pipe for calibration of losses in pipes.			Evaluate				
CO 4	Examine coefficient of minor losses for verifying Bernoulli's equation.			Analyze				
CO 5	Determine impact of jet on vanes and study of hydraulic jump for finding the impact on both flat and curved surfaces and analyzing hydraulic jump in open channel flow.			Evaluate				
CO 6	Determine performance test of various turbines and pumps for evaluating the speed and energy required in running any hydro-electric scheme.			Evaluate				
<b>IV. SYLLABUS:</b>								
<b>LIST OF EXPERIMENTS</b>								
<b>Week - 1</b>	<b>INTRODUCTION TO FLUID MECHANICS</b>							
Introduction to Fluid Mechanics, Do's and Don'ts in Fluid Mechanics Laboratory								
<b>Week - 2</b>	<b>CALIBRATION OF VENTURIMETER &amp; ORIFICEMETER</b>							
Batch I: Calibration of Venturimeter Batch II: Orificemeter								
<b>Week - 3</b>	<b>CALIBRATION OF VENTURIMETER &amp; ORIFICEMETER</b>							
Batch I: Orificemeter Batch II: Calibration of Venturimeter								
<b>Week - 4</b>	<b>DETERMINATION OF COEFFICIENT OF DISCHARGE FOR A SMALL ORIFICE / MOUTH PIECE BY CONSTANT HEAD METHOD</b>							
Batch I: Determination of coefficient of discharge for a small orifice Batch II: Determination of coefficient of discharge by constant head method								

<b>Week - 5</b>	<b>DETERMINATION OF COEFFICIENT OF DISCHARGE FOR A SMALL ORIFICE / MOUTH PIECE BY CONSTANT HEAD METHOD</b>
Batch I:	Determination of coefficient of discharge by constant head method
Batch II:	Determination of coefficient of discharge for a small orifice
<b>Week - 6</b>	<b>CALIBRATION OF CONTRACTED RECTANGULAR NOTCH / TRIANGULAR NOTCH AND DETERMINATION OF FRICTION FACTOR OF PIPE</b>
Batch I:	Calibration of contracted rectangular notch/ triangular notch
Batch II:	Determination of friction factor of pipe
<b>Week - 7</b>	<b>CALIBRATION OF CONTRACTED RECTANGULAR NOTCH / TRIANGULAR NOTCH AND DETERMINATION OF FRICTION FACTOR OF PIPE</b>
Batch I:	Determination of friction factor of pipe
Batch II:	Calibration of contracted rectangular notch/ triangular notch
<b>Week - 8</b>	<b>DETERMINATION OF COEFFICIENT FOR MINOR LOSSES AND VERIFICATION OF BERNOULLI'S EQUATION</b>
Batch I:	Determination of coefficient for minor losses
Batch II:	Verification of Bernoulli's equation
<b>Week - 9</b>	<b>DETERMINATION OF COEFFICIENT FOR MINOR LOSSES AND VERIFICATION OF BERNOULLI'S EQUATION</b>
Batch I:	Verification of Bernoulli's equation
Batch II:	Determination of coefficient for minor losses
<b>Week - 10</b>	<b>IMPACT OF JET ON VANES AND STUDY OF HYDRAULIC JUMP</b>
Batch I:	Impact of jet on vanes
Batch II:	Study of hydraulic jump
<b>Week - 11</b>	<b>IMPACT OF JET ON VANES AND STUDY OF HYDRAULIC JUMP</b>
Batch I:	Study of hydraulic jump
Batch II:	Impact of jet on vanes
<b>Week - 12</b>	<b>PERFORMANCE TEST ON PELTON WHEEL TURBINE AND PERFORMANCE TEST ON FRANCIS TURBINE</b>
Batch I:	Performance test on Pelton wheel turbine
Batch II:	Performance test on Francis wheel turbine
<b>Week - 13</b>	<b>PERFORMANCE CHARACTERISTICS OF A SINGLE/ MULTI- STAGE CENTRIFUGAL PUMP AND PERFORMANCE CHARACTERISTICS OF A RECIPROCATING PUMP</b>
Batch I:	Performance characteristics of a single/ multi-stage centrifugal pump
Batch II:	Performance characteristics of a reciprocating pump
<b>Week - 14</b>	<b>PERFORMANCE CHARACTERISTICS OF A SINGLE/ MULTI- STAGE CENTRIFUGAL PUMP AND PERFORMANCE CHARACTERISTICS OF A RECIPROCATING PUMP</b>
Batch I:	Performance characteristics of a reciprocating pump
Batch II:	Performance characteristics of a single/ multi-stage centrifugal pump
<b>Week - 15</b>	<b>REVISION</b>
Revision	
<b>Reference Books:</b>	
<ol style="list-style-type: none"> <li>1. Fluid Mechanics and Machinery, C.S.P.Ojha, R. Berndtsson and P. N. Chadramouli, Oxford University Press, 2010 .</li> <li>2. Hydraulics and Fluid Mechanics, P M Modi and S M Seth, Standard Book House .</li> <li>3. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill .</li> <li>4. Fluid Mechanics with Engineering Applications, R.L. Daugherty, J.B. Franzini and E.J. Finnemore, International Student Edition, Mc Graw Hill.</li> </ol>	
<b>Web References:</b>	
<ol style="list-style-type: none"> <li>1. <a href="http://site.iugaza.edu.ps/mymousa/files/Fluid-Mechanics-and-Hydraulics-Lab-Manual-2015-.pdf">http://site.iugaza.edu.ps/mymousa/files/Fluid-Mechanics-and-Hydraulics-Lab-Manual-2015-.pdf</a></li> <li>2. <a href="http://www.public.asu.edu/~lwadays/classes/cee341/manual.pdf">http://www.public.asu.edu/~lwadays/classes/cee341/manual.pdf</a></li> <li>3. <a href="https://issuu.com/loisburchette4023/docs/fluid-mechanics-lab-manual-for-mech">https://issuu.com/loisburchette4023/docs/fluid-mechanics-lab-manual-for-mech</a></li> </ol>	