

Branch Name:	Mechanical Engineering
Program Code:	ET101
Course Name:	Mechanical Engineering Laboratory -I (Thermal and Fluid)
Course Code:	2ET1010406P
Pre-requisite Course:	Fluid Mechanics, Elements of Mechanical Engineering, Engineering Thermodynamics

Course Objectives:

1. To understand the principles and performance characteristics of flow and thermal devices
2. To know about the measurement of the fluid properties

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
02	-	01	02	03	-	-	-	-	10	25	10	25	50

Course Contents:

Sr. No	Detail of Practical	Contact Hours
1.	Measurement of Coefficient of Discharge of given Orifice and Venturi meters	02
2.	Determination of the density & viscosity of an oil and friction factor of oil flow in a pipe	02
3.	Determination of the performance characteristics of a centrifugal pump.	02
4.	Determination of the performance characteristics of Pelton Wheel.	02
5.	Determination of Reynolds Number.	02
6.	Determination of performance characteristics of Gear Pump.	02
7.	Determination of Impact of Jet on Vanes.	02
8.	Performance of Bernoulli's Theorem.	
9.	Determination of the performance characteristics of a Kaplan Turbine.	02
10.	To determine the thermal conductivity of given insulating powder.	02
11.	To determine emissivity of a test plate by emissivity measurement apparatus.	02
12.	To determine heat transfer rate and effectiveness of fin during natural convection.	02
13.	To understand different components of the VCR system and to determine its COP.	02
14.	Performance of Air Conditioning System.	02
15.	Determination of the performance characteristics of a vapour compression system	02

Note: At least ten practical should be performed during semester.

List of Reference Books:

1. Patel, R.N. and Patel, V.L. "Fluid Power Engineering." Mahajan Publication
2. Bansal, R. K. "A Text Book of Fluid Mechanics and Hydraulic Machines: In MKS and SI Units." Laxmi publications, 1989
3. Rajput, R. K. "Fluid Mechanics and Hydraulic Machines, Part-2." by S. Chand Publication (1998).
4. Yahya, S. M. "Turbines compressors and fans." Tata McGraw-Hill Education, 2010.
5. Kumar, D.S, "Fluid Mechanics and Fluid Power Engineering." S K Kataria and Pub.
6. Ganesan, V. Internal combustion engines. McGraw Hill Education (India) Pvt Ltd, 2012.
7. Domkundwar, V. M. "Internal combustion engines." Dhanpat Rai & Co (2001).
8. Mathur, M. L., and R. P. Sharma. A course in internal combustion engines. Dhanpat Rai, 1981.
9. Heywood, John B. "Internal Combustion Engine Fundamental" publication Tata McGraw Hill Education Private Limited." New delhi, Edition (1988).
10. Gupta, Hari N. Fundamentals of internal combustion engines. PHI Learning Pvt. Ltd., 2012.

E-Resources:

1. nptel.ac.in/courses/112106175/

Course Learning Outcomes (CLO): On completion of this course, the students will be able to

CLO	Description	Bloom's Taxonomy Level
CLO1	Acquire fundamentals of the hydroelectric power plant and functions of its various components	2 Understanding
CLO2	Understand about working of Turbo – Machinery	1 Remembering
CLO3	Predict the complete performance of the turbines theoretically and experimentally	3 Applying 4 Analyze
CLO4	Understand combustion phenomena of SI and CI Engines.	2 Understanding
CLO5	Analyze fuel supply systems, ignition and governing systems of IC Engines.	4 Analyze
CLO6	To brief the latest development of unconventional engines.	2 Understanding 6 Creating

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1	H	M	L			M	L				L		H	
CLO2		H	M	M	L	L							L	
CLO3		L	M		H			L	M	M			M	
CLO4		H	H	H	H			L	M	M				H
CLO5		H	H	M	L		L			M				M
CLO6								M		M	L	L		M

H: High, M: Medium, L: Low