INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

THERMAL AND FLUIDS ENGINEERING LABORATORY							
IV Semester: ME							
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
AMED16	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	0	2	1	40	60	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 45**				**Total Classes: 45**		
Prerequisite: Manufacturing Processes								

I. COURSE OVERVIEW:

This course is to reinforce and enhance your understanding of the fundamentals of fluid mechanics and heat transfer learned in Thermal-Fluids respectively. The experiments are relatively simple; they are designed to demonstrate the applications of the basic fluid and thermal science principles and to provide a more intuitive and physical understanding of these disciplines. The objective is also to introduce a variety of modern and classical experimental and diagnostic techniques, and the principles behind these techniques. This laboratory exercise also provides practice in making engineering judgments, estimates and assessing the reliability of your measurements, skills which are very important for any successful engineer.

II. COURSES OBJECTIVES:

The students will try to learn

I. The performance of Heat Engines in real-time applications by applying the various testing parameters of an engine.
II. The performance of Heat Engines in real-time applications by applying the various testing parameters of an engine.
III. Performance parameters of a given hydraulic turbine, centrifugal and reciprocating pump.

III. COURSE OUTCOMES:

At the end of the course students should be able to:

CO1 Apply the various components and mechanisms of I. C. Engines to Appreciate the Mechanism of ports / Valves functioning in 2-stroke petrol /Diesel engine
CO2 Evaluate the performance characteristics of single cylinder petrol engine at different loads and single cylinder diesel engine at different loads and draw the heat balance sheet
CO3 Determine the performance parameters of internal combustion engines under variable input conditions for optimum fuel consumption.
CO4 Apply the statement of Bernoulli’s equation in real fluids to demonstrate whether the total energy of flow is constant.
CO5 Utilize the concept of calibrating Orifice and Venturi meter to reduce the uncertainty in the discharge coefficient.
CO6 Determine the discharge, pressure head developed and hydraulic efficiency of a centrifugal pump. for minimum power input.

IV. COURSE CONTENT:

WEEK 1: TIMING DIAGRAM

To draw the Valve timing, port timing diagram of IC engine.

WEEK 2: 2 STROKE SI ENGINE PETROL ENGINE

To Conduct Performance for 2-strole petrol engine

WEEK 3: IC ENGINE MORSE AND MOTORING TESTS

To conduct Morse test on 4-stroke Multi cylinder SI engine

WEEK 4: VARIABLE COMPRESSION RATIO ENGINE
To conduct Performance for 4-stroke CI engine

WEEK 5: RECIPROCATING AIR COMPRESSOR
To determine volumetric efficiency of an air compressor

WEEK 6: 4-STROKE MULTI CYLINDER SI ENGINE
To prepare Heat balance sheet for 4-stroke Multi cylinder SI engine

WEEK 7: BOILER
Draw working of boilers from prototype models

WEEK 8: DETERMINATION OF FLOW THROUGH NOTCH
Determination of flow through notches and weirs

WEEK 9: TURBINES
To performance test on pelton, kaplan and francis turbine.

WEEK 10: BERNOULLI'S THEOREM
To verification of Bernoulli's theorem

WEEK 11: JET ON VANES
To impact on jet on vanes

WEEK 12: DETERMINATION OF FRICTION FACTOR
To determine of friction through square and circular pipe

WEEK 13: LOSS OF HEAD DUE TO SUDDEN CONTRACTION
To determine the loss of head due to sudden contraction

WEEK 14: MULTI STAGE CENTRIFUGAL PUMP
Performance test on multi-stage centrifugal pump

V. TEXT BOOKS:

1. D. S. Kumar, "Fluid Mechanics and Fluid Power Engineering", Kotaria & Sons, Reprint, 2021.
2. D. Rama Durgaiah, "Fluid Mechanics and Machinery", New Age International, 1st edition, 2021.

VI. REFERENCE BOOKS:

1. V. Ganesan, "I.C. Engines", Tata McGraw-Hill, 3rd edition, 2021.
2. K. Rajput, "Thermal Engineering", Lakshmi Publications, 1st edition, 2018.

VII. ELECTRONIC RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc23_me31/preview
2. https://akanksha.iare.ac.in/index?route=course/details&course_id=898
3. https://akanksha.iare.ac.in/index?route=course/details&course_id=1504

VIII. MATERIALS ONLINE:

1. Course Template.
2. Lab Manual.