DEPARTMENT OF PRODUCTION TECHNOLOGY
MIT CAMPUS
ANNA UNIVERSITY :: CHENNAI – 600 044.

COURSE PLAN

COURSE DETAILS:

Degree	B.E		
Programme Name	ROBOTICS AND AUTOMATION		
Course Code &Title	RO5411 – THERMAL AND FLUID MECHANICS LABORATORY		
Credits	3	**Session**	JAN– JUNE 2024
Course Type	LAB	**Section**	1
Name of the Faculty	Mr.A.Visagan, Teaching Fellow, Department of Production Technology, MIT Campus, Anna University, Chennai -44		

COURSE CONTENT:

Syllabus: (Approved Syllabus as per Regulation 2019)

LIST OF EXPERIMENTS

FLUID MECHANICS

1. Determine the coefficient of discharge using Flow through Venturimeter/ Orifice/ rotameter
2. Conduct the performance test and plot the Characteristics curves for Centrifugal pumps
3. Conduct the performance test and plot the Characteristics curves for Gear pump
4. Conduct the performance test and plot the Characteristics curves for Reciprocating pump
5. Conduct the performance test and plot the Characteristics curves for Francis turbine
6. Determination the major and minor losses in flow through pipes
7. Pressure distribution around a circular cylinder in high Reynolds number flow

THERMAL

1. Determine the viscosity of the oil using Redwood /Saybolt viscometer
2. Determination of Flash and Fire point of the oil
3. Draw the valve timing and port timing diagram for the 4S and 2S engines
4. Conduct the performance test and plot the Characteristics curves for Reciprocating air compressor
5. Conduct the performance test on Vapor compression Refrigeration system
6. Conduct the performance test on Air-conditioning system
7. Composite plane wall apparatus.
8. Convective heat transfer coefficient by natural convection

TOTAL = 60 PERIODS

COURSE LEARNING OBJECTIVES

The main learning objective of this course is to prepare the students for:

1. To learn to conduct performance test on various pumps
2. To determine the loses in compressors, and various pipes
3. To learn to conduct the performance test on various thermal systems

COURSE OUTCOME (CO)

Upon completion of this course, the students will be able to:

CO1: Conduct performance test on various pumps

CO2: Determine the loses in compressors, and various pipes

CO3: Conduct the performance test on various thermal systems

COURSE ARTICULATION MATRIX

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1								1			3
2	3	2	1	1								1			3
3	3	2	1	1								1			3

The correlation levels:0.3: Low;0.6: Medium;0.9: High.

COURSE ALIGNED PROGRAMME OUTCOMES (PO) & PROGRAMME SPECIFIC OUTCOMES (PSO)

PO	Graduate Attribute	Programme Outcome
1	Engineering knowledge	Apply knowledge of mathematics, basic science and engineering science.
2	Problem analysis	Identify, formulate and solve engineering problems.
3	Design/development of solutions	Design a system or process to improve its performance, satisfying its constraints.
4	Conduct investigations of complex problems	Conduct experiments & collect, analyze and interpret the data.
5	Modern tool usage	Apply various tools and techniques to improve the efficiency of the system.
6	The Engineer and society	Conduct selves to uphold the professional and social obligations.
7	Environment and sustainability	Design the system with environment consciousness and sustainable development.
8	Ethics	Interacting industry, business and society in a professional and ethical manner.
9	Individual and team work	Function in a multidisciplinary team.
10	Communication	Proficiency in oral and written Communication.
11	Project management and finance	Implement cost effective and improved system.
12	Life-long learning	Continue professional development and learning as a life-long activity.

PSO	Graduates demonstrate
1	Apply the knowledge gained in Mechanical Engineering for design and development and manufacture of engineering systems.
2	Apply the knowledge acquired to investigate research oriented problems in mechanical engineering with due consideration for environmental and social impacts.

3	Use the engineering analysis and data management tools for effective management of multidisciplinary projects.

COURSE TENTATIVE SCHEDULE / PLAN

Week	Day	Date	Hrs	Topics
				CYCLE I
1	TU	06/02/2024	4	Determine the coefficient of discharge using Flow through Venturimeter
2	TU	13/02/2024	4	Conduct the performance test and plot the Characteristics curves for Centrifugal pumps
3	TU	20/02/2024	4	Conduct the performance test and plot the Characteristics curves for Reciprocating pump
4	TU	27/02/2024	4	Conduct the performance test and plot the Characteristics curves for Gear pump
5	TU	05/03/2024	4	Conduct the performance test and plot the Characteristics curves for Francis turbine
				CYCLE II
6	TU	12/03/2024	4	Determine the viscosity of the oil using Redwood /Saybolt viscometer
7	TU	19/03/2024	4	Determination of Flash and Fire point of the oil
8	TU	26/03/2024	4	Draw the valve timing and port timing diagram for the 4S and 2S engine
9	TU	02/04/2024	4	Conduct the performance test and plot the Characteristics curves for Reciprocating air,compressor
10	TU	09/04/2024	4	Conduct the performance test on Vapor compression Refrigeration system
11	TU	16/04/2024	4	Conduct the performance test on Air-conditioning system
12	TU	23/04/2024	4	Composite plane wall apparatus
13	TU	30/04/2024	4	Convective heat transfer coefficient by natural convection
14	TU	07/05/2024	4	Repeat lab
15	TU	14/05/2024	4	MODEL EXAMINATION
16	TU	21/05/2024	4	END SEMESTER EXAMINATION

COURSE DELIVERY/INSTRUCTIONAL METHODOLOGIES:

✓Chalk & Talk	~~✓Stud. Assignments~~	~~✓Web Resources~~
✓ LCD/~~Smartboards~~	~~✓ Stud. Seminars~~	~~☐ Add-On Courses~~

COURSE ASSESSMENT METHODOLOGIES-DIRECT

✓ University (End Semester) Examination		✓Internal Assessment Tests	
~~Assignments~~	☐ Laboratory Practices	~~☐ Mini/Major Projects~~	✓Stud. Seminars
☐ Viva Voce	~~☐ Certifications~~	~~☐ Add-On Courses~~	☐ Others

COURSE ASSESSMENT METHODS

S.N.	Mode of Assessment	Date	Duration	% Weight
1	Internal Assessment Tests1		4 hr	75 %
2	Internal Assessment Tests2		1½ hr	25 %

COURSE ASSESSMENT METHODOLOGIES-INDIRECT

✓ Assessment of CO (By Feedback, Once)	✓ Student Feedback On Faculty (Once)
☐ Assessment of Mini/Major projects by Ext. Experts	☐ Others

COURSE (EXTRA) ESSENTIAL READINGS:

NIL

COURSE EXIT SURVEY (will be collected at end of the course)

The purpose of this survey is to find out from students about their learning experiences and their thoughts about the course.

Rating:	1: Slight (Low)	2: Moderate (Medium)	3: Substantial (High)
CO1:			
CO2:			
CO3:			

COURSE POLICY (Compensation Assessment)

1. Attending all the assessment is mandatory for every student
2. Course policy will be followed as per the academic course regulation

COURSE ACADEMIC DISHONESTY AND PLAGIARISM

1. All rules and regulation prescribed by the ACOE, University Departments, are applicable in the Internal Assessment Tests and University (End Semester) Examinations.
   (https://acoe.annauniv.edu/download_forms/student_forms/Guidelines.pdf)
2. In general, possessing a mobile phone, carrying bits of paper with materials, talking to other students, copying from other students during Internal Assessment Testsand University (End Semester) Examinations will be treated as Malpractice and punishable as per the rules and regulations. The misuse of Assignment / Project / Seminar works from others is considered as academic dishonesty and will be treated with the rules and regulations of the University.

COURSE ADDITIONAL INFORMATION

Queries / clarifications / discussion (if required) may be e-mailed to / contact the course instructors during their Office Hours.

For Approval		
Course Faculty	Course Coordinator	Professor in charge
	HOD (PT/MIT)	