

DEPARTMENT OF MECHANICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech. -- Instrumentation and Control Engineering		
Course Title	Thermodynamics and Fluid Mechanics Laboratory		
Course Code	ICLR10	No. of Credits	02
Course Code of Pre-requisite subject(s)	-NIL-		
Session	July 2022	Section (if, applicable)	B
Name of Faculty	Dr. Bishweshwar Babu	Department	Mechanical Engineering
Email	bishweshwar@nitt.edu	Telephone No.	+91 431 250 3428
Course Type	Essential Laboratory Requirement		
SYLLABUS (APPROVED IN BoS)			
<p>Thermodynamics</p> <ol style="list-style-type: none"> 1. Performance test on Petrol and Diesel Engines with Mechanical and Electrical Dynamometers 2. Morse test on multi-cylinder petrol engine 3. Determination of volumetric efficiency on Diesel engine and Two stage reciprocating Air compressor 4. COP in compression refrigerator cycle 5. Test on Air conditioning system 6. Viscosity index of lubricant 7. Study of steam power plant <p>Fluid Mechanics</p> <ol style="list-style-type: none"> 1. Determination of pipe friction 2. Calibration of flow meters – Venturi meter and Orifice meter 3. Determination of discharge coefficients for notches 4. Determination of minor losses 5. Centrifugal pump 6. Submersible pump 7. Jet pump 8. Gear pump 9. Screw pump 			

COURSE OBJECTIVES	
1. To familiarize with the principles of thermal energy and its transformation to mechanical energy. 2. To introduce about thermodynamics - concepts and properties, first and second law. 3. To provide a working knowledge of thermodynamics and fluid mechanics.	
COURSE OUTCOMES (CO)	
Course Outcomes	Aligned Programme Outcomes (PO)
At the end of the course, student will be able to	
1. Understand heat, work, internal energy, and 1st and 2nd law of thermodynamics.	1, 12
2. Carryout dimensional analysis, fluid statics and dynamics.	1, 3, 4, 9, 11, 12
3. Demonstrate fluid mechanics fundamentals, including concepts of mass and momentum conservation.	1, 12
4. Apply the Bernoulli equation and control volume analysis to solve problems in fluid mechanics.	1, 4, 9, 11, 12

COURSE PLAN – PART II			
COURSE OVERVIEW			
Thermodynamics is the study of the relations between heat, work, temperature, and energy. The laws of thermodynamics describe how the energy in a system changes and whether the system can perform useful work on its surroundings. Fluid mechanics is the study of fluid behavior at rest and in motion. This laboratory course provides an overview of the working knowledge of thermodynamics and fluid mechanics and their applications.			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week	Topic	Mode of Delivery
1	1 st Week	Introduction to the Fluid Mechanics and Thermal Laboratories. (Visit to both the laboratories and getting familiar with the instruments and experimental setups)	Demonstration

2	2 nd Week- 14 th Week	Fluid Mechanics <ol style="list-style-type: none"> 1. Performance study of centrifugal and reciprocating pumps. 2. Characteristic tests on gear oil pump at constant speed. 3. Coefficient of discharge of V-notch. 4. Losses due to pipe friction. 5. Minor losses in pipes. Thermodynamics <ol style="list-style-type: none"> 1. Performance test on single cylinder four stroke diesel engine. 2. Performance test on reciprocating air compressor. 3. Viscosity index of lubricant. 4. COP in compression refrigerator cycle. 5. Test on Air conditioning system. (Conduct of experiments and submission of lab record)	Practical Experiments
3	15 th Week	Compensation Lab.	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Continuous Assessment (based on report submission for each experiment & oral exam)	Every week	2 hours 30 mins	70
2	Final Assessment	16 th week	As per institute policy	30

Essential Readings (Textbooks, Reference Books, Journals, etc.)

1. Zemansky, Heat and Thermodynamics, McGraw Hill, New York, 7th Edition 1997.
2. Ojha C.S.P., Berndtsson R., Chandramouli P.N., Fluid Mechanics and Machinery, Oxford University Press, 2010.

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

1. Feedback from the students during class committee meeting.
2. End semester feedback on Course Outcomes.

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

1. Students can meet the faculty at any stage in the course duration in case he/she finds difficulty in understanding the concept. Student meeting hours: Monday to Friday 15:00 – 17:00 (OJAS-127).
2. Students can reach the course faculty by fixing appointment through E-mail (bishweshwar@nitt.edu) or phone (0451-250-3428).

COMPENSATION POLICY

Attending all the assessments is Mandatory for every student.

For those missed the practical classes due to genuine reasons, one extra practical class will be conducted during the last week. This extra class will not be considered for attendance.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- **At least 75% attendance in each course is mandatory.**
- **A maximum of 10% shall be allowed under On Duty (OD) category.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION

FOR APPROVAL

Course Faculty _____
(BISHWESHWAR BABU)

CC-Chairperson _____
(Dr. R. Periyasamy)

HOD _____

Guidelines:

- a) The number of assessments for a course shall range from 4 to 6.
- b) Every course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or class average/2 whichever is greater.		Peak/3 or class average/2 whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.