

Lesson Plan & Work-done Diary for AY:2024-25, Odd Semester

Course with Code: Basic Thermodynamics-BME304				Faculty: Ravikumar S			Semester & Section: III Sem ME	
Class No.	Date planned (DD/MM)	Topics to be covered	TLP Planned	Class No.	Date of Conduction (DD/MM)	Topics Covered	TLP Executed	Remarks if any deviation
MODULE-1								
1		Introduction and Review of fundamental concepts: Thermodynamic definition and scope, Microscopic and Macroscopic approaches. Characteristics of system boundary and control surface. Thermodynamic properties; definition and units, intensive, extensive properties, specific properties, pressure, specific volume	Chalk and talk					Self-study part in the syllabus, Hence, explained briefly and study materials supplied.
2		Thermodynamic state, state point, state diagram, path and process, quasi-static process, cyclic and non-cyclic; processes; Thermodynamic equilibrium; definition, mechanical equilibrium; diathermic wall, thermal equilibrium, chemical equilibrium	Chalk and talk					Self-study part in the syllabus, Hence, explained briefly and study materials supplied.
3		Zerth law of thermodynamics, Temperature; concepts, scales, international fixed points and measurement of temperature.	Chalk and talk					
4		Constant volume gas thermometer, constant pressure gas thermometer, mercury in glass thermometer, thermocouples, electrical resistance thermometer	Chalk and talk					



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5		Numerical on Zeroth Law of TD	Chalk and talk					
6		Numerical on Zeroth Law of TD	Chalk and talk					
7		Work and Heat: Mechanics, definition of work and its limitations. Thermodynamic definition of work; examples, sign convention.	Chalk and talk					
8		Displacement work; as a part of a system boundary, of a system boundary, expressions for displacement work in various processes through p-v diagrams.	Chalk and talk					
9		Shaft work; Electrical work. Other types of work. Heat; definition, units and sign convention. Problems	Chalk and talk					
10		Numericals on Work and Heat	Chalk and talk					
11		Numericals on Work and Heat	Chalk and talk					
12		Numericals on Work and Heat	Chalk and talk					



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MODULE-2							
13		First Law of Thermodynamics: Joules experiments, equivalence of heat and work.	Chalk and talk				
14		Statement of the First law of thermodynamics, extension of the First law to non - cyclic processes,	Chalk and talk				
15		energy, energy as a property, modes of energy, Problems.	Chalk and talk				
16		Numericals on First law of TD for non-cyclic processes.	Chalk and talk				
17		Numericals on First law of TD for non-cyclic processes.	Chalk and talk				
18		Extension of the First law to control volume; steady flow energy equation (SFEE), Problems	Chalk and talk				
19		Numericals on SFEE	Chalk and talk				
20		Numericals on SFEE	Chalk and talk				



MODULE-3

MODULE-3							
21		Second Law of Thermodynamics: Limitations of first law of thermodynamics, Thermal reservoir, heat engine and heat pump:	Chalk and talk				
22		Schematic representation, efficiency and COP. Reversed heat engine. Kelvin - Planck statement of the Second law of Thermodynamics	Chalk and talk				
23		PMM I and PMM II, Clausius statement of Second law of Thermodynamics, Equivalence of the two statements	Chalk and talk				
24		Carnot cycle, Carnot principles. Problems	Chalk and talk				
25		Entropy: Clausius inequality, Statement- proof.	Chalk and talk				
26		Entropy- definition, a property, change of entropy	Chalk and talk				
27		entropy as a quantitative test for irreversibility, principle of increase in entropy	Chalk and talk				
28		entropy as a coordinate. Problems	Chalk and talk				

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MODULE-4							
29		Availability, Irreversibility and General Thermodynamic relations. Introduction, Availability (Exergy), Unavailable energy	Chalk and talk				
30		Relation between increase in unavailable energy and increase in entropy. Maximum work, maximum useful work for a system and control volume, irreversibility. Problems	Chalk and talk				
31		Pure Substances: P-T and P-V diagrams, triple point and critical points	PPT and Chal & Talk				
32		Sub-cooled liquid, saturated liquid, mixture of saturated liquid and vapor, saturated vapor and superheated vapor states of pure substance with water as example	PPT and Chal & Talk				
33		Enthalpy of change of phase (Latent heat). Dryness fraction (quality), T-S and H-S diagrams	PPT and Chal & Talk				
34		representation of various processes on these diagrams. Steam tables and its use. Throttling calorimeter, separating and throttling calorimeter	PPT and Chal & Talk				
35		Numericals on Steam	PPT and Chal & Talk				
36		Numericals on Steam	PPT and Chal & Talk				

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MODULE-5							
37		Ideal gases: Ideal gas mixtures, Daltons law of partial pressures, Amagat's law of additive volumes,	PPT and Chal & Talk				
38		evaluation of properties of perfect and ideal gases, Air- Water mixtures and related properties	PPT and Chal & Talk				
39		Real gases – Introduction, Van-der Waal's Equation of state, Van-der Waal's constants in terms of critical properties,	PPT and Chal & Talk				
40		Beattie-Bridgeman equation, Law of corresponding states, compressibility factor	PPT and Chal & Talk				
41		compressibility chart. Difference between Ideal and real gases	PPT and Chal & Talk				
42		Thermodynamic relations: Maxwell's equations, TdS equation.	Chalk and Talk				
43		Ratio of Heat capacities and Energy equation, Joule-Kelvin effect, Clausius-Clapeyron equation	Chalk and Talk				
44	on wards	Revision Classes	PPT and Chal & Talk				

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	Activity	Planned	Actual	Remarks
1	Theory Classes	46		
2	Assignments/ Quizzes/ Self-study	5		
3	Tutorials/ Extra classes	Will be decided on the need basis		
4	Internal Assessments	3		
5	ICT based Teaching (% of usage in Curriculum)	10 classes / 25%		
Planning			Execution	
Faculty Signature:			Faculty Signature:	
HoD Signature:			HoD Signature:	