B.Tech 3rd Semester (Mechanical Engineering)

Lesson Plan: Thermodynamics (PCC-ME-301/21)

S.N.	Content to be Covered	Lect. No.
	UNIT-1	
1	Introduction, System & Control volume; Property, State & Process	1
2	Concept of Thermodynamic Equilibrium, Quasistatic Process; examples;	2
3	Exact & Inexact differentials, Work - Thermodynamic definition of work	3
4	Displacement work	4
5	Numerical Problems related to Work	5
6	Definition of heat; examples of heat/ work interaction in systems	6
7	Numerical Problems related to Heat	7
	UNIT-2	
8	Temperature, Definition of thermal equilibrium and Zeroth law	8
9	Temperature scales; Various Thermometers	9
10	Numerical Problems related to Temperature	10
11	First Law for Cyclic & Non-cyclic processes	11
12	Concept of total energy E ; Demonstration that E is a property	12
13	Various modes of energy, Internal energy and Enthalpy	13
14	Numerical Problems based on first law of thermodynamics	14
	UNIT-3	
15	Derivation of general energy equation for a control volume	15
16	Steady state steady flow processes	16
17	Examples of steady flow devices like nozzles, turbines, compressors and heat exchangers, Throttling and Free expansion processes	17
18	Numerical Problems based on SFEE	18
19	Unsteady processes; examples of steady and unsteady Ist law applications for system and control volume	19
20	Numerical Problems based on Unsteady processes	20
	UNIT-4	
21	Introduction to 2nd law of Thermodynamics	21
22	Definitions of direct and reverse heat engines; Definitions of thermal efficiency and COP	22
23	Kelvin-Planck and Clausius statements and their equivalence	23

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24	Application of Kelvin Planck Statement and Clausius Statement	24
25	Definition of reversible process; Internal and external irreversibility	25
26	Carnot cycle;	26
27	Carnot theorem;	27
28	Absolute temperature scale, Numerical Problems	28
29	Clausius inequality; Definition of entropy S Demonstration that entropy S is a property	29
30	Principle of increase of entropy and its applications; Illustration of processes in T-s coordinates;	30
31	Irreversibility and Availability	31
32	Availability function for systems and Control volumes undergoing different processes, Lost work	32
33	Numerical problem based on Availability and Irreversibility	33
	UNIT-5	
34	Definition of Pure substance , Properties of two phase systems - Constant temperature and Constant pressure heating of water	34
35	Definitions of saturated states; P-v-T surface; Use of steam tables and Mollier's chart	35
36	Identification of states & determination of properties	36
37	Numerical based on steam	37
38	Ideal Gases and ideal gas mixtures, Real gases	38
	UNIT-5	
39	Air Standard Otto cycle	39
40	Air Standard Diesel cycle	40
41	Dual cycles; comparison of Otto, Diesel, Dual cycles	41
42	Brayton cycle	42

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