SREE VIDYANIKETHAN ENGINEERING COLLEGE

(Autonomous)
Sree Sainath Nagar, A. Rangampet-517 102

Department of Mechanical Engineering

Lesson Plan

Name of the Subject : **THERMODYNAMICS(14BT30303)**

Class & Semester : B.Tech. II Year – I -Sem

Name of the faculty Member : Mr.R.L.Krupakaran

S. No.	Topic	No. of periods	Book(s) followed	Topics for self-study
UNIT – I: BASIC CONCEPTS				
1	System, Control volume, Surrounding, Boundaries, Universe, Types of systems	1	T1	1. Application of reversible and irreversible process. 2. Calculation of work and heat transfer for different applied process
2	Thermodynamic equilibrium, State, Property, Process, Cycle;	1	T1	
3	Reversibility	1	T1 & T2	
4	Quasi – static process, Point and path function ,	1	T1 & T2	
5	Irreversible process, Zeroth law of thermodynamics	1	T1 &R1	
6	Work transfer and Heat transfer	1	T1 , R1,R3	
7	Simple problems on pdv work,heat transfer	1	T1, R1, & R3	
	Total periods required:	**7**		
UNIT–II: FIRST LAW OF THERMODYNAMICS AND SECOND LAW OF THERMODYNAMICS:				
9	First Law Of Thermodynamics; perpetual motion machine (PMM) of first kind	1	T1	1. Apply SFEE for diffuser, condenser, evaporators. 2. Heat engine problem for parallel and series condition, 3. Application of carnot cycle.
10	Limitations of first Law; First law for a closed system	1	T1	
11	Energy a property of system;	1	T1	
12	First law applied to a flow process: steady flow energy equation.	1	T1 & T2	
13	Simple problems on SFEE for turbine, compressor, boiler, heat exchanger, nozzle.	1	T1, R1 &R3	
14	Kelvin-Planck and Clausius statements of second law and their equivalence;	1	T1 , R1,R3	
15	Thermal reservoir: Heat engine, Refrigerator, Heat pump; PMM of second kind:	1	T1, R1, & R3	
16	Simple problems on Heat engine and refrigerator, heat pump	1	T1,T2 R1, & R2	
17	Carnot cycle; Carnot's theorem.	1	T1,T2	
	Total periods required:	**9**		
UNIT – III: ENYTROPY AND AVAILABILITY:				
18	Clausius theorem and Clausius inequality: Entropy as a property	1	T1, T2 & R3	1. Development of

19	Principle of entropy increase, and applications; Third law of thermodynamics.	1	T1, T2 & R1	entropy concepts for different applications.
20	Availability and irreversibility,	1	T1, T2 & R1	
21	Available Energy: Maximum Work in A Reversible Process;	1	T1, R1 & R3	
22	Simple problems on Available Energy: Maximum Work in A Reversible Process;	1	T1, T2 & R1,R2	
23	Availability in Non - Flow and Flow Processes.	1	T1, T2 & R1,R2	
24	Simple problems on availability in nlow and non flow process	1	T1, T2 & R1	
	Total periods required:	**7**		
UNIT – IV: PURE SUBSTANCES AND PROPERTIES OF GASES AND GAS MIXTURES:				
26	Introduction: P-V, P-T and T-S Diagrams for a Pure Substances;	1	T1 & T2	1. Application of steam properties in power plant. 2. Estimation of mass of steam required for power plant. 3. Apply the ideal gas equation for real time projects.
27	Mollier Diagram, Quality and Dryness Fraction, use of Steam Tables for thermodynamic properties;	2	T1 & T2	
28	Problem on finding steam properties using steam table and mollier chart	1	T1, T2 & R1,R2,R3	
29	Thermodynamic relations: Gibbs and Helmholtz Functions, Maxwells relation and TDS equations.	2	T1 & T2&R1	
30	Ideal gas: equation of state: Mole Fraction, Mass friction Gravimetric and volumetric Analysis;	1	T1 & T2,R1&R3	
31	Dalton's Law of partial pressure: Mole fraction, Volume fraction and partial pressure,	1	T1 & T2&R1	
32	Equivalent Gas constant and Molecular Internal Energy, Enthalpy, specific Heats and Entropy of Mixture of perfect Gases and Vapour.	1	T1 & T2&R1	
33	Simple problems on mixture of gases for finding volumetric analysis, and mixture properties.	2	T1, T2 & R1,R2,R3	
	Total periods required:	**11**		
UNIT–V: GAS POWER CYCLES:				
34	Air standard cycles: Stirling cycle;	1	T1, R1, & R2	1. Estimate the mean effective pressure for otto
35	Ericsson cycle; Joule cycle;	1	T1, R1, & R2	

36	Atkinson cycle; Lenior cycle :	1	T1, R1, & R2	cycle, diesel cycle, and dual cycle. 2. Simple design and analysis of otto, diesl and dual cyale.
37	Derivation for Otto cycle,;	1	T1, R1, & R2,R3	
38	Problems on otto cycle	1	T1, T2 & R1,R2,R3	
39	Derivation for Diesel cycle	1	T1,R3	
40	Problems on diesel cycle	1	T1, T2 & R1,R2,R3	
41	Derivation for Dual cycle;	1	T1,R3	
42	Problems on dual cycle.	2	T1, T2 & R1,R2,R3	
43	Comparison of Otto, Diesel and Dual cycles.	1	T1,T2,R1,R3	
Total periods required:		**11**		
Grand total periods required:		**45**		

TEXT BOOKS:

T1. P. K. Nag, *Engineering Thermodynamics*, TMH, 5th Edition, 2013
T2. Chatttopadhyay, *Engineering Thermodynamics* Oxford 1st revised, 2011

REFERENCE BOOKS:

R1. Yunus Cengel & Boles, *Thermodynamics–An Engineering Approach,* TMH , 8th Edition, 2015
R2. J.P.Holman,*Thermodynamics*, , McGrawHill , 2nd Edition 2004.
R3. R.S.Khurmi , *Thermal engineering* , S.Chand publications, 15th Edition, 2015.

Note: Steam Tables with mollier diagram should be supplied during examination.