

## LESSON PLAN

Subject Name – Thermodynamics	Branch – Production Engineering
Subject Code – BPE03001	Semester – 3rd

Sl no.	Module	Topic(s)	Period/Hours
1.	I	Basic Concepts: Thermodynamic systems and surrounding, state properties, processes and cycles.	1-2
2.	I	Thermodynamic equilibrium, heat and work transfer across boundaries, Quasi-static processes.	3-4
3.	I	First Law of Thermodynamics: First law for a closed system undergoing a cycle and undergoing a change of state.	5-6
4.	I	Internal energy as a system properties. Application of first law to different thermodynamic processes.	7-8
5.	I	Tutorial	9
6.	II	Second Law of Thermodynamics: Reversible and irreversible processes.	10
7.	II	Refrigerator and heat pump. Equivalence of Kelvin-Plank and Clausius statements,	11-13
8.	II	Carnot theorem and its efficiency	14
9.	II	Inequality of Clausius and entropy concept. Change of entropy for various thermodynamic processes.	15-17
10.	II	Tutorial	18
11.	II	Air Standard Cycle & Introduction to I.C. Engine: Otto, diesel and dual cycles,	19-20
12.	II	description and operation of four and two stroke cycle engine,	21-22
13.	II	comparison of SI and CI engines, valve timing diagram, power output and efficiency calculation	23
14.	II	Tutorial	24
15.	III	Steam And Steam Generator: Properties of steam, measurement of dryness fraction, use of steam table. T-S and H-S diagrams for representing thermodynamic processes.	25-27
16.	III	Boiler, Classification of boiler, comparison between water tube boiler and fire tube boiler. Boiler mountings and accessories. Description of Cochran & Babcock -Wilcox boiler.	28-29
17.	III	Steam Nozzles: Types of nozzles, isentropic flow through nozzles, Effect of friction on nozzle efficiency. Critical pressure ratio and maximum discharge, throat and exit area.	30
18.	III	Tutorial	31
19.	IV	Steam Turbines: Turbine type and applications. Impulse turbine, pressure and velocity compounding, velocity diagram, work output, losses and efficiency	32-33
20.	IV	Impulse reaction turbine, velocity diagram, degree of reaction, work output, losses and efficiency	34
21.	IV	Condensers: Jet and surface condensers. Condenser vacuum and vacuum efficiency.	35
22.	IV	Tutorial	36
23.	V	Heat Transfer: Basic modes of heat transfer, one dimensional steady state,	37
24.	V	conduction through slab, cylinder and sphere;	38
25.	V	basic theory of radiant heat transfer, black body & mono chromatic radiation, total emissive power.	39
26.	V	Tutorial	40