

LESSON PLAN

Name of Faculty : **Sh. Parveen Kumar**

Discipline: **Mechanical Engineering**

Semester : **3rd Semester**

Subject : **THERMODYNAMICS -I**

Lesson Plan Duration: : **15 Weeks**

Week	Theory		Practical	
	Lecture Day	Topic(Including Assignment/Test)	Practical Day	Topic
1	1	Fundamental Concepts Thermodynamic state and system, boundary, surrounding, universe, thermodynamic systems – closed, open, isolated, adiabatic, homogeneous and heterogeneous, macroscopic and microscopic		Determination of temperature by thermocouple pyrometer Infrared thermometer
	2	properties of system – intensive and extensive, thermodynamic equilibrium, quasi – static process, reversible and irreversible processes		
	3	Zeroth law of thermodynamics		
2	4	definition of properties like pressure, volume, temperature, enthalpy and internal energy		Practical conduct
	5	Laws of Perfect Gases Definition of gases, explanation of perfect gas laws – Boyle’s law, Charle’s law, Avagadro’s law, Regnault’s law		
	6	Universal gas constant, Characteristic gas constants and its derivation.		
3	7	Specific heat at constant pressure, specific heat at constant volume of a gas, derivation of an expression for specific heats with characteristics		Study the working of Nestler boiler.
	8	simple numerical problems on gas equation		
	9	Thermodynamic Processes Types of thermodynamic processes		
4	10	isochoric, isobaric, isothermal		Practical conduct
	11	adiabatic, isentropic, polytropic		
	12	throttling processes, equations representing the processes		
5	13	Derivation of work done, change in internal energy, change in entropy,		Study of working of high pressure boiler.

	14	Rate of heat transfer for the above process.		
	15	1 st sessional test		
6	16	Laws of Thermodynamics Laws of conservation of energy, first law of thermodynamics (Joule's experiment) and its limitations		Practical conduct
	17	Application of first law of thermodynamics to Non-flow systems – Constant volume, Constant pressure, Adiabatic and polytropic processes		
	18	steady flow energy equation, Application of steady flow energy equation for turbines, pump, boilers, compressors, nozzles, and evaporators.		
7	19	Heat source and sink, statements of second laws of thermodynamics: Kelvin Planck's statement, Clausius statement		Demonstration of mountings and accessories on a boiler.
	20	Equivalency of statements		
	21	Perpetual motion Machine of first kind, second kind		
8	22	Carnot engine		Practical conduct
	23	Introduction of third law of thermodynamics		
	24	concept of irreversibility and concept of entropy.		
9	25	Uses of steam, classification of boilers, function of various boiler mounting and accessories		Revision
	26	comparison of fire tube and water tube boilers		
	27	Construction and working of Nestler boiler		
10	28	Babcock & Wilcox Boiler		VIVA
	29	Introduction to modern boilers- Benson Boiler		
	30	2 nd sessional test		
11	31	Formation of steam and related terms, thermodynamic properties of steam, steam tables		Determination of dryness fraction of steam using calorimeter.

	32	sensible heat, latent heat, internal energy of steam, entropy of water, entropy of steam.		
	33	T- S diagrams, Mollier diagram (H – S Chart)		
12	34	Expansion of steam, Hyperbolic, reversible adiabatic and throttling processes		Practical conduct
	35	determination of quality of steam (dryness fraction)		
	36	Concept of ideal gas, enthalpy and specific heat capacities of an ideal gas,		
13	37	P – V – T surface of an ideal gas		Demonstrate the working of air compressor.
	38	triple point, real gases, Vander-Wall's equation		
	39	Functions of air compressor – uses of compressed air, type of air compressors		
14	40	Single stage reciprocating air compressor, its construction and working		Practical conduct
	41	representation of processes involved on P – V diagram, calculation of work done		
	42	Multistage compressors – advantages over single stage compressors, use of air cooler, condition of minimum work in two stage compressor (without proof)		
15	43	Simple problems Multistage compressors		VIVA
	44	Rotary compressors – types, working and construction of centrifugal compressor, axial flow compressor, vane type compressor		
	45	3rd sessional test		