

KIIT POLYTECHNIC
Department of Mechanical Engineering

LESSON PLAN

Session	::	Winter – 2022
Course Type	::	Theory
Semester/Branch	::	3 rd Semester, Mechanical Engineering
Subject (with code)	::	Thermal Engineering (I) (Th.4)
Contact hours/week	::	4
Name of Faculty	::	Abhijit Samant

SL. NO	CLAS S ID	COURSE CONTENT	MODE OF DELIVERY	EXHIBIT/ REFERENCE
1	1	Define Thermodynamics. Define System, surroundings and boundary. Explain open closed and isolated system.	Video Content	https://youtu.be/iUEjQQtrT50
2	2	Define Intensive and extensive properties. Differentiate between homogeneous and heterogeneous system.	Lecture (Explanation)	Study Material
3	3	Define Microscopic and macroscopic approach of thermodynamics. Explain Continuum Approach, Quasi-static process	Lecture (Explanation)	1.Study Material 2.Thermal Engineering by Mahesh.M Rathore(Book)
4	4	Thermodynamic properties of a system (Pressure, volume, temperature and units of measurement).	Flipped Class	
5	5	Define thermodynamic State, path, process and Cycle.	Video Content	https://youtu.be/v0IdjFPGeQI
6	6	Explain Thermodynamic equilibrium i.e. thermal mechanical and chemical equilibrium.	Lecture (Elaboration)	Study Material
7	7	Conceptual explanation of energy and its sources.	Student Presentation	
8	8	Explain work and heat, their relation, units and Work transfer,	Lecture (Explanation)	Study Material
9	9	Derive the formula for the work done in a closed system.	Lecture (Explanation)	Study Material
10	10	Explain Mechanical equivalence of heat and Differentiate between heat and work.	Lecture (Explanation)	Study Material
11	11	<i>Assignment Evaluation & Class Test</i>		
12	12	State and explain Zeroth law and First law of thermodynamics. Limitation of First law..	Lecture (Explanation)	Study Material
13	13	Application of first law for flow process. Derivation of steady flow energy equation.	Lecture (Explanation)	Study Material
14	14	Application of SFEE in Nozzle Turbine and Compressor.	Video Content	https://youtu.be/9aAZQ9-jcuY

15	15	Define Thermal reservoir. Concept of heat engine, heat pump and refrigerator.	Lecture (Explanation)	Thermal Engineering by Mahesh.M Rathore(Book)
16	16	Statement of Second law of thermodynamics (Clausius and Kelvin Planck Statement)	Lecture (Elaboration)	Study Material
17	17	Application of second law in heat engine, Refrigerator, and Heat Pump determination of efficiency.	Lecture (Explanation)	Study Material
18	18	<i>Assignment Evaluation & Class Test</i>		
19	19	Solve the problem using Second law of Thermodynamics.	Problem based learning	
20	20	Solve problem in Heat engine, heat pump and Refrigerator.	Problem based learning	
21	21	Explain Laws of Perfect gas, Boyle's law, Charle's law, Avogadro's law.	Lecture (Explanation)	Study Material
22	22	Dalton's law of Partial pressure, Gay-Lussac law, General gas equation	Lecture (Explanation)	Study Material
23	23	Explain Characteristic gas constant, Universal gas constant and define the relation between them.	Lecture (Explanation)	Thermal Engineering by Mahesh.M Rathore (Book)
24	24	Define Enthalpy, Entropy, and Internal Energy of a Thermodynamic system.	Lecture (Explanation)	Study Material
25	25	Explain specific heat of gas (Cp and Cv) Relation between Cp & Cv	Problem based learning	Study Material
26	26	Derive the work done during a non- flow process i.e. Isochoric, Isobaric.	Lecture (Explanation)	Study Material
27	27	Application of first law in Isothermal, Isentropic and Polytropic Process.	Lecture (Explanation)	Thermal Engineering by Mahesh.M Rathore (Book)
28	28	<i>Assignment Evaluation & Class Test</i>		
29	29	Classroom Problems	Problem based learning	
30	30	Define & classify I.C engine	Video Content	https://youtu.be/vIJ50aUiBgM
31	31	Terminology of I.C Engine	Hybrid	Study Material https://youtu.be/fw8Jfoif1BM
32	32	Explain the working principle of 4-stroke S.I engine and C.I engine.	Video Content	https://youtu.be/Pu7g3uIG6Zo
33	33	Explain the working principle of 2-stroke S.I and C.I engine.	Video Content	https://youtu.be/OiX9oXvxZWs
34	34	Differentiate between S.I and C.I engine.	Video Content	https://youtu.be/FEyXPIQvuyY
35	35	Differentiate between 2-stroke & 4- stroke engine.	Lecture (Explanation)	Study Material
36	36	<i>Assignment Evaluation & Class Test</i>		
37	37	Explain the Carnot cycle with P-V and T-S diagram and derive the process involved in Carnot cycle.	Lecture (Explanation)	Thermal Engineering by Mahesh.M Rathore
38	38	Derive the efficiency of Carnot cycle.	Lecture (Explanation)	Study Material
39	39	Explain the Otto cycle with P-V and T-S diagram and derive the process involved.	Lecture (Explanation)	Study Material
40	40	Derive the efficiency of Diesel cycle.	Lecture (Explanation)	Study Material

41	41	Explain the Dual cycle with P-V and T-S diagram and derive the process involved in Dual cycle.	Lecture (Explanation)	Study Material
42	42	Derive the efficiency of Dual cycle.	Lecture (Explanation)	Study Material
43	43	Define Fuel and its types. Explain application of fuel.	Lecture (Explanation)	Thermal Engineering by Mahesh.M Rathore (Book)
44	44	Define Heating value of fuel.	Lecture (Explanation)	
45	45	Explain Calorific value and Quality of I C engine fuel.	Lecture (Explanation)	
46	46	<i>Discussion on Previous year question paper</i>		
47	47	<i>Discussion on Previous year question paper</i>		
48	48	<i>Discussion on Previous year question paper</i>		

Signature of Concern Teacher