SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH, KHORDHA

DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

THERMAL ENGINEERING-I (MEPC209)

Faculty Name	Er. S.R. Pradhan
Semester	3rd Semester
Academic Session	2026-27
Course Code	MEPC209 TH5
Subject	Thermal Engineering-I
Total Periods	45

Detailed Teaching Plan

Period No.	Topic to be Covered	Unit	Cumulative Period
1	Thermodynamic Systems (closed, open, isolated)	I	1
2	Thermodynamic properties of a system (pressure, volume, temperature, entropy	I	2
3	Intensive and extensive properties ; Define thermodynamic processes, path, cycle	I	3
4	thermodynamic state, path function, point function;	I	4
5	Thermodynamic Equilibrium ; Quasi-static Process	I	5
6	Laws of thermodynamics (statements only)	I	6
7	Brief description of energy Sources	I	7
8	Classification of energy sources: Renewable, Non-Renewable	I	8
9	Solar Energy: Flat plate and concentrating collectors & its applications	I	9
10	Geothermal Energy; Biogas, Biomass, Biodiesel; Hydraulic Energy, Nuclear Energy; Fuel cell.	I	10
11	Assumptions made in air standard cycle analysis; Brief description of Carnot cycles with P-V and T-S diagrams	II	11

12	Assumptions made in air standard cycle analysis; Brief description of Otto cycles with P-V and T-S diagrams	II	12
13	Brief description of Diesel cycles with P-V and T-S diagrams	II	13
14	classification of I.C. engines; neat sketch of I.C. engine indicating component parts; Function of each part and materials	II	14
15	IC Engines, cycles, engine parts, 2&4 stroke engines	II	15
16	Working of four-stroke and two stroke petrol engines	II	16
17	Working of four-stroke and two stroke diesel engines	II	17
18	Comparison of C.I. and S.I. engines	II	18
19	Valve timing and port timing diagrams for four stroke and two stroke engines.	II	19
20	Fuel system of Petrol engines; Principle of operation of simple and Zenith carburettors	III	20
21	Types of injectors and fuel pumps	III	21
22	cooling system with radiator and forced circulation (description with line diagram	III	22
23	Comparison of air cooling and water cooling system	III	23
24	Ignition systems – Battery coil ignition and magneto ignition	III	24
25	Types of lubricating systems used in I.C. engines with line diagram	III	25
26	Types of governing of I.C. engines	III	26
27	hit and miss method, quantitative method, qualitative method	III	27
28	combination methods of governing; their applications; Objective of super charging	III	28
29	Performance of I.C. Engines: Brake power; Indicated power; Frictional power	IV	29
30	Brake and Indicated mean effective pressures	IV	30
31	Brake and Indicated thermal efficiencies;	IV	31
32	Mechanical efficiency;Relative efficiency;	IV	32
33	Performance test; Morse test	IV	33

34	Heat balance sheet	IV	34
35	Methods of determination of B,P., I.P	IV	35
36	Simple numerical problems on performance of I.C. engines	IV	36
37	Simple numerical problems on performance of I.C. engines	IV	37
38	Refrigeration; Refrigerant; COP; Air Refrigeration system	V	38
39	Air Refrigeration system: components, working & applications	V	39
40	Vapour Compression system: components, working & applications	V	40
41	Air conditioning; Classification of Air conditioning systems	V	41
42	Comfort and Industrial Air-Conditioning	V	42
43	Window Air Conditioner	V	43
44	Summer Air-Conditioning system	V	44
45	Winter Air-Conditioning system, Year-round Air-Conditioning system	V	45

REFERENCES: 1 Introduction to Renewable Energy– Vaughn Nelson, CRC Press

2. Thermal Engineering – P. L. Ballaney, Khanna Publishers, 2002

3. A Course in Thermal Engineering – S. Domkundwar & C.P. Kothandaraman, Dhanpat Rai.
4. Thermal Engineering – R. S. Khurmi and J.K. Gupta, 18th Edition, S. Chand & Co, New Delhi.

5. Thermal Engineering – R. K. Rajput, 8th Edition, Laxmi publications Pvt Ltd, New Delhi.

Faculty Signature: _____

HOD, Mechanical Engineering: _____