

**NM INSTITUTE OF ENGINEERING & TECHNOLOGY
BHUBANESWAR**

Mechanical Engineering Department



Education for a World Stage

**LESSON PLAN
Session 2022-2023**

Semester: 3rd

Subject: THERMAL ENGINEERING-1

Faculty Name: SUSHREE SUCHARITA KAR

Subject: TE-1

No of Days/per week class allotted: 4

Semester from date: 15/09/2022 to date: 21/01/2023

No. of Weeks: 15

Week	Class Day	Theory topics
1	1	Thermodynamic Systems (closed, open, isolated)
	2	Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement).
	3	Intensive and extensive properties
	4	Define thermodynamic processes, path, cycle , state
2	1	Path function, point function.
	2	Thermodynamic Equilibrium
	3	Quasi-static Process
	4	Conceptual explanation of energy and its sources
3	1	Work, heat and comparison between the two.
	2	Mechanical Equivalent of Heat.
	3	Work transfer, Displacement work
	4	State & explain Zeroth law of thermodynamics.
4	1	State & explain First law of thermodynamics.
	2	Limitations of First law of thermodynamics.
	3	Application of First law of Thermodynamics.
	4	Steady flow energy equation and its application to turbine and compressor.
5	1	Second law of thermodynamics (Clausius & Kelvin Plank statements).
	2	Application of second law in heat engine, heat pump, refrigerator
	3	Determination of efficiencies & C.O.P (solve simple numerical).
	4	Introduction to Laws of perfect gas
6	1	Boyle's law, Charle's law
	2	Avogadro's law
	3	Dalton's law of partial pressure
	4	Guy lussac law,
7	1	General gas equation, characteristic gas constant.
	2	Universal gas constant.
	3	Explain specific heat of gas (C_p and C_v)
	4	Relation between C_p & C_v .

Surbhi Suchavita Kar
Signature of Faculty

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Week	Class Day	Theory topics
8	1	Enthalpy of a gas.
	2	Work done during a non- flow process.
	3	Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric)
	4	Isentropic and polytropic process
9	1	Solve simple problems on above.
	2	Solve simple problems on above.
	3	Free expansion & throttling process
	4	Introduction to IC engine
10	1	Explain I.C engine.
	2	Classify I.C engine.
	3	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed & RPM.
	4	Explain the working principle of 2-stroke C.I & S.I engine.
11	1	Explain the working principle of 4- stroke engine C.I & S.I engine.
	2	Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine.
	3	Differentiate external & internal engine.
	4	Introduction to gas power cycle.
12	1	Uses of gas power cycle.
	2	Carnot cycle.
	3	Otto cycle.
	4	Diesel cycle.
13	1	Dual cycle.
	2	P-h & T-s diagram.
	3	Solve simple numerical.
	4	Solve simple numerical.
14	1	Introduction to Fuels and Combustion
	2	Define Fuel.
	3	Uses of fuels.
	4	Types of fuel.
15	1	Application of different types of fuel.
	2	Heating values of fuel.
	3	Quality of I.C engine fuels Octane number,
	4	I.C engine fuels Cetane number.

Sushree Sushanta Kar
Signature of Faculty