LESSON PLAN

DEPARTMENT OF MECHANICAL ENGINEERING, ITT, CHOUDWAR

SUBJECT: THERMAL ENGINEERING-I **Periods:** 4 per week

NAME OF FACULTY: SRIKANTA KUMAR PANIGRAHI, LECT (MECH)

SEMESTER: 3rd **No. of weeks:** 15

Week	Class Day	Theory / Practical Topics
1st	1st	**1.Thermodynamic Concept & Terminology:** System, Various types of thermodynamic Systems (closed, open, isolated), definition and explanation with examples from each.
	2nd	Distinguish between Open & Closed System, Adiabatic & Isolated System
	3rd	Thermodynamic properties of a system (pressure, volume, temperature, entropy, Enthalpy, Internal energy and units of measurement). Intensive & Extensive Property, Intrinsic & Extrinsic Property explanation with examples from each
	4th	Definition and explanation regarding thermodynamic state, path , processes, cycle,
2nd	1st	Thermodynamic Equilibrium definition and its explanation
	2nd	Quasi-static Process explanation
	3rd	Conceptual explanation of energy and its sources
	4th	Work, Various types of Work transfer like Displacement work, Electrical work
3rd	1st	Shaft work, Paddle wheel work
	2nd	Heat, Specific heat, Heat Capacity, Sensible Heat, Latent Heat, Comparison between Work & Heat
	3rd	Mechanical Equivalent of Heat
	4th	Path function, Point function
4th	1st	**2.Laws of Thermodynamics:** State & explain Zeroth law of thermodynamics
	2nd	State & explain First law of thermodynamics in closed system for cycle and change of state
	3rd	Limitations of First law of thermodynamics
	4th	First law of thermodynamics for open system, Control Volume, Steady flow
5th	1st	Derivation of Steady Flow Energy Equation (S.F.E.E.) for Single stream in and single stream out
	2nd	S.F.E.E. for multiple stream in and multiple stream out
	3rd	Solving problems relating to S.F.E.E.
	4th	Application of First law of Thermodynamics for open system like Turbine, Compressor, Throttle valve, Heat Exchanger
6th	1st	Second law of thermodynamics (Clausius & Kelvin Plank statements), PMM 2
	2nd	Application of second law in heat engine, heat pump, Refrigerator & determination of efficiencies & C.O.P.
	3rd	Reversibility & Irreversibility. Formulae in Reversible engine, heat pump and refrigerator
	4th	Solving numerical problems on above
7th	1st	**3.Properties of Perfect Gases:** Perfect Gas, Laws of Perfect gas such as Boyle's law, Charle's law, Guy lussac law, General gas equation
	2nd	Characteristic equation of gas, Characteristic gas constant, Universal gas constant, Avogadro's law, Dalton's law of partial pressure
	3rd	Solving problems by applying various laws and the equation of gas.
	4th	Explaining the specific heats of gas (C_p and C_v)
8th	1st	Relation between C_p and C_v.
	2nd	Enthalpy of a gas, Work done during a non- flow process
	3rd	Application of first law of thermodynamics to various non flow processessuch

		as Isothermal, Isobaric processes
	4th	Isentropic and polytrophic process
9th	1st	Solving numerical problems on above processes
	2nd	Free expansion & throttling process
	3rd	**4.Internal Combustion Engine:** Explain & classify I.C engine.
	4th	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM
10th	1st	Explain the working principle of 4- stroke S.I engine
	2nd	Explain the working principle of 4- stroke C.I engine
	3rd	Explain the working principle of 2-stroke S.I engine
	4th	Explain the working principle of 2-stroke C.I engine
11th	1st	Differentiate between 2-stroke & 4- stroke engine
	2nd	Differentiate between C.I & S.I engine
	3rd	**5. Gas Power Cycle:** Carnot cycle
	4th	Solving numerical problems on Carnot Cycle
12th	1st	Otto cycle.
	2nd	Solving numerical problems on Otto Cycle
	3rd	Diesel cycle.
	4th	Solving numerical problems on Diesel Cycle
13th	1st	Solving numerical problems on Diesel Cycle
	2nd	Dual cycle.
	3rd	Solving numerical problems on Dual Cycle
	4th	Solving numerical problems on Dual Cycle
14th	1st	**6. Fuels and Combustion:** Define Fuel.
	2nd	Types of fuel.
	3rd	Application of different types of fuel.
	4th	Extension of application of different types of fuel.
15th	1st	Heating values of fuel.
	2nd	Quality of I.C engine fuels Octane number
	3rd	Cetane number
	4th	Remedial class
		Remedial class
		Remedial class

Sign. of Faculty