UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING

LESSON PLAN

Discipline: Mechanical	**Semester: 3RD**	**Name of the Teaching faculty: MONALISHA SWAIN**
Subject: Thermal Engineering-I (Th-4)	**No of Days/ Week class alloted: 4**	**Semester from Date: 01. 08. 2023 To Date: 30.11.2023** **No of weeks: 15**
Week	Class	Topics
1st	1st	Introduction
	2nd	**1. Thermodynamic concept & Terminology** 1.1 Thermodynamic Systems (closed, open, isolated) 1.2 Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement). 1.3 Intensive and extensive properties.
	3rd	1.4 Define thermodynamic processes, path, cycle , state, path function, point function.
	4th	1.5 Thermodynamic Equilibrium. 1.6 Quasi-static Process.
2nd	1st	1. 7 Conceptual explanation of energy and its sources 1.8 Work , heat and comparison between the two.
	2nd	1.9 Mechanical Equivalent of Heat. 1.10Work transfer, Displacement work
	3rd	**3. Properties Processes of perfect gas** 3.1 Laws of perfect gas: Boyle's law, Charle's law, Avogadro's law,
	4th	General gas equation, characteristic gas constant With numericals
3rd	1st	Universal gas constant. 3.2 Explain specific heat of gas (Cp and Cv) 3.3 Relation between Cp & Cv. 3.4 Enthalpy of a gas With numericals
	2nd	Dalton's law of partial pressure, Guy lussac law
	3rd	**2. Laws of Thermodynamics** 2.1 State & explain Zeroth law of thermodynamics. 2.2 State & explain First law of thermodynamics
	4th	3.5 Work done during a non- flow process. 3.6 Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric,)
4th	1st	Application of first law of thermodynamics to various non flow process(Isentropic and polytrophic process)
	2nd	Application of first law of thermodynamics to various non flow process(polytrophic process)
	3rd	Numerical problems on above processes
	4th	3.7 Free expansion
5th	1st	3.7 Throttling process
	2nd	**2. Laws of Thermodynamics**

		2.3 Limitations of First law of thermodynamics
	3rd	2.4Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)
	4th	2.4Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)
6th	1st	Problems on SFEE
	2nd	Problems on SFEE
	3rd	2.4 Second law of thermodynamics (Claucius& Kelvin Plank statements).
	4th	2.4 Second law of thermodynamics (Claucius& Kelvin Plank statements).
7th	1st	Application of second law in heat engine,its efficiency with numericals
	2nd	Application of second law in heat engine,its efficiency with numericals
	3rd	Application of second law in heat pump,itsefficiency,COP with numericals
	4th	Application of second law in heat pump,itsefficiency,COP with numericals
8th	1st	Application of second law in refrigerator,itsefficiency,COP with numericals,
	2nd	Application of second law in refrigerator,itsefficiency,COP with numericals,
	3rd	Revision
	4th	Internal assessment
9th	1st	Internal assessment
	2nd	**4. Internal combustion engine** 4.1 Explain & classify I.C engine.
	3rd	4.2 Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM
	4th	4.2 Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM
10th	1st	4.3 Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine
	2nd	4.3 Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine
	3rd	4.3 Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine
	4th	4.4 Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine.
11th	1st	**5. Gas Power Cycle** 5.1 Carnot cycle
	2nd	5.1 Carnot cycle
	3rd	5.1 Carnot cycle with numericals
	4th	5.2 Otto cycle
12th	1st	5.2 Otto cycle
	2nd	5.2 Otto cycle with numericals

	3rd	5.3 Diesel cycle
	4th	5.3 Diesel cycle
13th	1st	5.3 Diesel cycle with numericals
	2nd	5.4 Dual cycle
	3rd	5.4 Dual cycle.
	4th	5.4 Dual cycle with numericals
14th	1st	Comparison of all cycles
	2nd	**6. Fuels and Combustion** 6.1 Define Fuel. 6.2 Types of fuel.
	3rd	6.3 Application of different types of fuel.
	4th	6.4 Heating values of fuel.
15th	1st	6.5 Quality of I.C engine fuels Octane number, Cetane number.
	2nd	6.5 Quality of I.C engine fuels Octane number, Cetane number.
	3rd	Previous year question discussion
	4th	Previous year question discussion

Lect.(Mech)