LESSON PLAN SESSION JUL – DEC 2024

SUBJECT: **THERMAL ENGINEERING**   SEMESTER: **3**RD   BRANCH: - **MECHANICAL ENGINEERING**

UNIT NUMBER	NAME OF THE TOPIC	NO OF CLASS REQUIRED	REMARK
UNIT 01: Basics Concepts of Thermodynamics	1.1 Definition Thermodynamics, systems, properties, Work, heat and energy, Thermodynamic equilibrium, Quasi-static process, work done during Quasi- static process, Zeroth law of Thermodynamics	02	
	1.2 First law of thermodynamics and its applications, Steady flow energy equation and its applications to boiler, engine, turbine, compressor and nozzle	02	
	1.3 Thermodynamic processes and representation on P-V and T-S diagram, Simple Numerical problem on first law of thermodynamics	01	
	1.4 Second Law of Thermodynamics, Kelvin Planck's and Clausius Statements. 1.5 Heat reservoir, Heat source and Heat sink, Concept. Of heat engine, heat pump and refrigerator.	02	
	1.6 Carnot cycle Thermal Efficiency, Coefficient of performance, Parameters affecting efficiency, Means of increasing Efficiency, Reversible and irreversible processes. Factors that makes a process irreversible.	02	
	1.7 Entropy- Clausius inequality, concept of Entropy, Principle of increase of entropy, T-S and H-S diagrams computation of change in entropy	01	
Unit 02: Air Standard Cycles and internal combustion Engine.	2.1 Air standard cycles definition and its purpose, Otto, Diesel Cycles, their representation on PV & TS diagrams, Derivation of air standard efficiency and their comparison and limitation.	03	
	2.2 Internal Combustion engines Introduction and classification of IC engine, I.C. engine components and their function, Working of Two-stroke and four stroke cycle engines and their comparison.	03	
	2.4.2 Indicator diagram, calculation of IP, BP, FP, Thermal Efficiency, Mechanical efficiency and relative efficiency, Pollution from IC engines and emission norms	02	
Unit 03: Pure substances	3.1 Pure substance, phase changes, steam as a two phase system, steam formation and its representation on the enthalpy plane	02	
	3.2 Representation of wet, dry, saturated and superheated steam on P-V,T-S and H-S planes, Dryness fraction of steam	03	
	3.4 Simple calculations on quality of steam using Steam table 3.5 Safety precautions in handling steam	03	
Unit 04: Ideal Gases and Ideal Gas	4.1 Avogadro's law, Derivation of characteristic gas equation using Boyle's and Charle's law, characteristic gas Constant and universal gas constant.	02	

	4.3 Ideal gas processes – Isobaric, Isochoric, Isothermal, Isentropic, Polytrophic, Throttling and their representation on P-V and T-S diagrams.	02	
	4.4 Determination of work, heat, internal energy, enthalpy change and entropy change.	02	
Unit 05: Air Compressors	5.1 Basics of compression, industrial uses of compressed air	01	
	5.2 Classification of compressors, Description of reciprocating Compressor and Centrifugal compressor.	02	
	5.3 Work done in single stage reciprocating compressor, Volumetric, Isothermal and Isentropic efficiencies of reciprocating air compressor,	02	
	5.4 Multistage compression and inter cooling and advantages. 5.5 Safety precautions in handling compressed air.	02	
	Total Class Required	41	

PANKAJ KUMAR PAINKRA
LECTURER, MECH, GPJ

HOD MECH
Head of Department
Mechanical Engineering
Govt.Polytechnic Jashpur (C.G.)