Discipline: Mechanical Engineering	Semester : 3rd Semester	Name of the Teaching Faculty: Shri SHEKHAR KUMAR SAHU, PTGF in Mechanical Engineering
Subject: Thermal Engineering 1	No. of Days/week Class Allotted:60	No of weeks: 18
week	**Class Day**	**Theory Topics**
1st	1st	Thermodynamic Systems (closed, open, isolated)
	2nd	Thermodynamic properties of a system (pressure, volume, temperature)
	3rd	Thermodynamic properties of a system (enthalpy, Internal energy and units of measurement).
	4th	Intensive and extensive properties
2nd	1st	Define thermodynamic processes, path, cycle, state, path function, point function.
	2nd	Thermodynamic Equilibrium.
	3rd	Quasi-static Process.
	4th	Conceptual explanation of energy and its sources
3rd	1st	Work, heat and comparison between the two.
	2nd	Mechanical Equivalent of Heat.
	3rd	Work transfer, Displacement work
	4th	State & explain Zeroth law of thermodynamics.
4th	1st	State & explain First law of thermodynamics.
	2nd	Limitations of First law of thermodynamics
	3rd	Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)
	4th	Second law of thermodynamics (Claucius & Kelvin Plank statements).
5th	1st	Application of second law in heat engine, heat pump refrigerator
	2nd	Determination of efficiencies of heat engine
	3rd	Determination of C.O.P of Heat pump
	4th	Determination C.O.P of Refrigerator (solve simple numerical)
6th	1st	Laws of perfect gas: Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure
	2nd	Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant.
	3rd	Explain specific heat of gas (Cp and Cv)
	4th	Relation between Cp & Cv.
7th	1st	Enthalpy of a gas.
	2nd	Work done during a non- flow process.
	3rd	Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process).

	4th	Solve simple problems on work done in Isothermal process	
8th	1st	Solve simple problems on work done in Isobaric prcoess	
	2nd	Solve simple problems on work done in Isentropic process	
	3rd	Solve simple problems on work done in polytrophic process	
	4th	Free expansion & throttling process.	
9th	1st	Explain & classify I.C engine.	
	2nd	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM.	
	3rd	Explain the working principle of 2-stroke engine.	
	4th	Explain the working principle of 4-stroke engine.	
10th	1st	Differentiate between 2-stroke & 4- stroke engine	
	2nd	Explain the working principle of CI engine.	
	3rd	Explain the working principle of SI engine.	
	4th	Differentiate between 2-stroke & 4- stroke engine	
11th	1st	Carnot cycle	
	2nd	Otto cycle	
	3rd	Simple problems on Otto cycle	
	4th	Diesel Cycle	
12th	1st	Simple problem on Diesel Cycle	
	2nd	Dual cycle	
	3rd	Simple problems on dual cycle	
	4th	Comparison between Otto , Diesle and Dual cycle	
13th	1st	Defination of Fuel	
	2nd	Types of fuel	
	3rd	Application of different types of fuel.	
	4th	Heating values of fuel.	
14th	1st		
	2nd		
	3rd		
	4th		
15th	1st		
	2nd		
	3rd		
	4th		
16th	1st		

17th	1st		
	2nd		
	3rd		
	4th		
18th	1st		
	2nd		
	3rd		
	4th		