GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 4

Industrial Engineering

Subject Code 142501
Subject Name HEAT POWER

Sr.No	Course content
1.	Introduction: Definition of the system, surrounding thermal equilibrium, expansion work, internal energy, flow and non-flow processes, general energy equation for steady flow non flow energy equation & their application in various process.
2.	2^{nd} law of thermodynamics: Limitations of First law, Concept of Reversibility, Different statements, 2^{nd} law limitations.
3.	3^{rd} law of thermodynamics: Concept of Entropy, Clauses inequality, entropy change, 3^{rd} law of thermodynamics
4.	Thermodynamic cycles: Power producing cycles like, Diesel, auto, dual, Carnot, joule, sterling and Ericsson
5.	Steam Turbine: One dimensional steady flow in nozzle, effect of friction on nozzle, super saturation phenomena in steam nozzle. Principle of operation of steam turbine, comparison with steam engines, types, Simple impulse turbines, compounding of impulse turbine , impulse – reaction & Pure reaction turbine, difference between impulse & reaction turbine.
6.	Gas turbines and Jet Propulsion: Classification of Gas turbine, Open cycle turbine, means of improving the efficiency, closed cycle gas turbine, advantages, Jet propulsion.
7.	Reciprocating Compressor: Types, construction and working of reciprocating compressor, single stage Compression with and without clearance, multi state reciprocating air compressor, minimum work input effect of inter-cooling and after cooling, Air compressor terminology.

8.	Refrigerating & air-conditioning : Introduction & application of refrigeration, Air refrigeration system , reversed Carnot cycle, Bell Coleman air cycle, vapour compression refrigeration cycle, Factor effecting , Refrigerants – properties & types. Terms in air-conditioning, Psychometric & Psychometric processes, Application.
9.	Heat & Mass Transfer: Basic equation for conduction, convection & radiation; their application to simple problems. Mode of heat transfer, basics in heat & mass transfer, laws governing Heat Transfer, concept of black body, application heat transfer in heat exchanger.

Reference Books:

1. Thermal Engineering By Domkundwar
2. Heat Engine By Pandya & Shah
3. Heat Engineering By Ballaney
4. Thermal Engineering By Sarao
5. Heat Engines By R. C. Patel & Karamchandani
6. Engineering Thermodynamics & Heat By Gupta & Prakash
7. Thermodynamics & Heat Power Engg. Vol- I By Mathur & Mehta