

PME3I103 ENGINEERING THERMODYNAMICS

Theory L/T (Hours per week): 3/0, Credit: 3

Module-I (10 Lectures)

1. Review of First and Second laws:

First law analysis of unsteady flow control volumes, Entropy generation, Entropy balance for closed systems and steady flow systems, Available energy, Quality of energy, Availability for non flow and flow process, Irreversibility, Exergy balance, Second law efficiency.

Module- II (12 Lectures)

2. Vapour Power Cycles:

The Carnot vapor cycle and its limitations, The Rankine cycle, Means of increasing the Rankine cycle efficiency, The reheat cycle, The regenerative feed heating cycle, Cogeneration (Back pressure and Pass-out turbines), Combined-cycle power generation systems, Binary vapour cycles.

3. Gas Power Cycles:

Air standard cycles- Otto, Diesel, Dual Combustion and Brayton cycles, The Brayton cycle with non-isentropic flow in compressors and turbines, The Brayton cycle with regeneration, reheating and intercooling, Ideal jet propulsion cycles.

Module- III (12 Lectures)

4. Refrigeration cycles:

Reversed Carnot cycle, Reversed Brayton cycle (Gas refrigeration system), The vapor compression cycle, The vapor absorption cycle.

5. General Thermodynamic property relations:

The Maxwell relations, The Clapeyron equation, The TdS relations, Isothermal compressibility and volume expansivity, The Joule-Thomson coefficient.

Module- IV (06 Lectures)

6. Reciprocating Air Compressors:

Introduction (Uses of compressed air), The reciprocating cycle neglecting and considering clearance volume, Volumetric efficiency and its effect on compressor performance, Limitations of single stage compression, Multistage compression and intercooling, Optimum intercooler pressure, Performance and design calculations of reciprocating compressors, Air motors.

Text Books

1. Engineering Thermodynamics by P. K. Nag, Publisher:TMH
2. Engineering Thermodynamics by P. Chattopadhyay, OXFORD
3. Fundamentals of Thermodynamics by Sonntag, Borgnakke, Van Wylen, John Wiley & Sons
4. Fundamentals of Engineering Thermodynamics by E. Rathakrishnan, PHI

Reference

1. Engineering Thermodynamics by M.Achyuthan, PHI
2. Engineering Thermodynamics by Y.V.C. Rao, University Press
3. Thermodynamics and Thermal Engineering by Kothandaraman & Domkundwar, Dhanpat Rai
4. Applied Thermodynamics by P.L.Ballaney, Khanna Publishers
5. Steam Tables in SI Units by Ramalingam, Scitech
6. Steam Tables by C.P.Kothandaraman, New Age International

TENTATIVE
Likely to be Modified