

PCME4205 Engineering Thermodynamics

Module-I (13 Lectures)

1. Review of First and Second laws:
First law analysis of unsteady flow control volumes, Entropy generation, Reversible work, Availability, and Irreversibility.
2. General Thermodynamic property relations:
The Maxwell relations, The Clapeyron equation, The TdS relations, Isothermal compressibility and volume expansivity, The Joule-Thomson coefficient.
3. 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.

Module- II (10 Lectures)

4. Vapor 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, The binary vapor cycle, The gas-vapor coupled cycles, Cogeneration (Back pressure and Pass-out turbines).

Module- III (12 Lectures)

4. 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 cycle.
5. Refrigeration cycles:
Reversed Carnot cycle, Reversed Brayton cycle (Gas refrigeration system), The vapor compression cycle, The vapor absorption cycle.

Text Books

1. Engineering Thermodynamics by P. K. Nag, Publisher:TMH
2. Fundamentals of Thermodynamics by Sonntag, Borgnakke, Van Wylen, John Wiley & Sons
3. 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. Steam Tables in SI Units by Ramalingam, Scitech
4. Steam Tables by C.P.Kothandaraman, New Age International
5. Thermodynamics and Thermal Engineering by Kothandaraman & Domkundwar, Dhanpat Rai
6. Applied Thermodynamics by P.L.Ballaney, Khanna Publishers
7. Fluid Mechanics by J.F.Douglas, J.M.Gasiorek, J.A.Swaffield and L.B.Jack, Pearson Education.