

UES004 THERMODYNAMICS

L	T	P	Cr
3	1	0	3.5

Basic Concepts: Concept of Continuum, Macroscopic approach, Thermodynamics system & properties, Various processes, Thermodynamic equilibrium, Ideal gas, Vander Waals equation of state, Compressibility chart, Process: Flow and non flow process, Cycle concept of work and heat, Specific heats, Zeroth law, Energy and its form, Pure substance, Thermodynamic diagrams, Triple point, Steam tables and their use.

First Law of Thermodynamics: Concept of internal energy & enthalpy, Energy equation as applied to a close and open system, PMMI, Transient flow processes.

Second Law of Thermodynamics & its Corollaries: Kelvin Plank and Clausius statements, Reversible and Irreversible processes, Carnot cycle, Clausius theorem and concept of entropy, Principle of increase of entropy, PMM2, Thermodynamic temperature scale, Second law analysis of control volume, Availability, Irreversibility, Availability function for open and closed system & second law efficiency.

Thermodynamic Cycles: Rankine cycle, Vapour compression refrigeration cycle, Air standard cycles: Otto, Diesel, Dual and Brayton cycles.

Non-Reacting Gas Mixtures: Properties of mixtures of gases and vapours, Adiabatic saturation, Properties of air.

Thermodynamic Relations: Maxwell & T-ds equations.

Text Books

1. Sonntag, R.E., Borgnakke, C. and Van Wylen, G.J., *Fundamentals of Thermodynamics*, John Wiley (2007) 6th ed.
2. Nag, P.K., *Engineering Thermodynamics*, Tata McGraw Hill (2008) 3rd ed.

Reference Books

1. Rao, Y.V.C., *Thermodynamics*, Universities Press (2004).
2. Ratha Krishana, E., *Fundamentals of Engineering Thermodynamics*, Prentice Hall of India (2005) 2nd ed.
3. Cengel, Y. A. and Boles, M., *Thermodynamics: An Engineering Approach*, Tata McGraw Hill (2008).
4. Rogers, G. and Mayhew, Y., *Engineering Thermodynamics*, Pearson Education (2007) 4th ed.