

UCH303 CHEMICAL ENGINEERING THERMODYNAMICS

L	T	P	Cr
3	1	0	3.5

Prerequisite(s): None

Review: Laws of thermodynamics and their application to real processes, Heat capacities, Heat effects during phase change, reaction, formation, combustion and mixing, Enthalpy-concentration diagram, Thermodynamic analysis of flowing fluids.

Thermodynamic properties of fluids and equation of state: Relationships among thermodynamic properties. Behavior of gases in multi-component systems, Thermodynamic properties of gases and their mixtures, Thermodynamic diagrams, Equation of state and generalized property correlations for gases.

Vapour/liquid equilibria and solution thermodynamics: Criteria for equilibrium. Fugacity of gases and liquids, pure component and mixtures Composition of phases in equilibrium, generalized correlations for the fugacity coefficients, Models for the excess Gibbs energy, Effect of pressure and temperature on phase behavior, Chemical Reaction Equilibria.

Refrigeration and liquefaction: Refrigeration cycle, vapor compression cycle, eco-friendly refrigerants, Absorption and adsorption refrigeration, liquefaction processes.

Text Books

1. Smith J.M., Van Ness H.C. and Abbott, M., *Introduction to Chemical Engineering Thermodynamics*, Tata McGraw-Hill (2004) 6th ed.
2. Rao, Y.V.C., *Chemical Engineering Thermodynamics*, University Press (1997).

Reference Books

1. Weber, H.C. and Meissner, H.P., *Thermodynamics for Chemical Engineers*, John Wiley (1970) 2nd ed.
2. Hougen, O.A., Watson, K.M. and Ragatz, R.A., *Chemical Processes Principles (Thermodynamics) Part 2*, C.B.S. Publications (2006) 2nd ed.