

Syllabus:

Unit – I: Dimensions and units:

9 h

Basic Chemical Calculations -Atomic weight, molecular weight, equivalent weight, Mole, composition of (i) Liquid mixtures and (ii) gaseous mixtures.

Ideal gas law, vapor pressure, Humidity and Saturation.

UNIT - II:

9 h

Material Balance without Chemical Reactions: Flow diagram for material balance, simple material balance with or without recycle or by-pass for chemical engineering operations such as distillation, absorption, crystallization, evaporation and extraction.

Material Balance involving chemical reactions: concept of limiting reactant, conversion, yield, selectivity, and liquid phase reaction, gas phase reaction with or without recycle or bypass.

UNIT - III:

9 h

Energy Balance: Heat capacity of pure gases and gaseous mixtures at constant pressures, sensible heat changes in liquids, Enthalpy changes during phase transformation: Enthalpy of fusion, Enthalpy of vaporization, Enthalpy of condensation, Enthalpy of sublimation, Hess's law of constant, Heat Summation and its applications

UNIT - IV:

9 h

Utilities in Chemical Industry

- a) **Boilers:** Types of boilers and their functioning
- b) **Water:** Specifications of industrial use, various water treatments.
- c) **Steam:** Generation and use.
- d) **Air:** Specification of industrial use, processing of air

UNIT - V:

9 h

Fluid flow and Pumps Fluid flow:

Fans, blowers, compressors, vacuum pump, ejectors.

Pumps: Reciprocating pumps, Gear pumps, centrifugal pumps.

List of Reference Books:

1. B.I. Bhatt and S.M. Vora: Stoichiometry, Tata McGraw-Hill publishing Company Ltd, New Delhi.
2. E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK
3. R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.
4. J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.
5. P. C. Jain, M. Jain: Engineering Chemistry, DhanpatRai& Sons, Delhi.
7. B. K. Sharma: Engineering Chemistry, Goel Publishing House, Meerut
8. S. C. Bhatia: Chemical Process Industries, Vol. I & II, CBS Publishers, New Delhi.
10. O. P. Vermani, A. K. Narula: Industrial Chemistry, GalgotiaPublicationsPvt. Ltd., New Delhi.