

# AMPTE10 PRINCIPLES OF CHEMICAL ENGINEERING

## UNIT-1 FUNDAMENTALS OF CHEMICAL ENGINEERING AND FLUID FLOW

- 1.1 Introduction, units, concept of atomic weight, equivalent weight and moles, composition of Solids, liquids and solutions, gas constant, ideal gas law, Fluid Flow:
- 1.2 Newtonian and Non Newtonian fluid- flow characteristics
- 1.3 Bernoulli's theorem-Hagen Poisuille equation, measurement of fluid flow.

## UNIT-2 MECHANICAL OPERATIONS

- 2.1 Properties of solids - Sieve analysis; Laws of crushing, Crushers and grinders.
- 2.2 Principle of separation and selection and details of equipment for screening, sedimentation, cyclones and hydro cyclones.

## UNIT-3 HEAT TRANSFER

- 3.1 Modes of heat transfer; Heat transfer by conduction - Fourier's law, conduction across composite walls.
- 3.2 Film concept and convective heat transfer coefficient. Heat transfer by natural & forced convection. Co current, Counter current, shell & tube heat exchangers.

## UNIT-4 MASS TRANSFER

- 4.1 Principles of diffusion, theory of diffusion, Two film theory and mass transfer coefficients Humidification - operation, humidity chart, equipments
- 4.2 Cooling towers and spray chambers Drying
- 4.3 Principles and definitions. Rate of batch drying- Equipments for drying.

## UNIT-5 UNIT OPERATIONS

- 5.1 Absorption - Principle and equipment (packed towers and plate columns).
- 5.2 Distillation - Vapour liquid equilibria, flash distillation, and Binary distillation. Industrial equipments for distillation Adsorption - Principle and equipment for adsorption.
- 5.3 Extraction - Principle and equipment for adsorption.
- 5.4 (Basic principles and equipment description only. Mathematical consideration not required for absorption adsorption, extraction)

### References Books:

1. Richardson and Coulson, "Chemical Engineering", Vol. 1 & Vol. 2, Asian Books Pvt. Ltd., India, 1996.
2. Chemical Engineer's handbook - Perry and Chilton.
3. Principles of Unit Operations - Foust A.S., Walzel.L.A. , John Wiley.