

4 th Semester	RPL4D001	Fundamentals of Chemical Engineering	L-T-P 3-0-0	3 CREDITS
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Module- I (10 Hrs.)

Fundamentals of Chemical Engineering and Fluid Flow Introduction, units, concept of atomic weight, equivalent weight and moles, composition of Solids, liquids and solutions, gas constant, ideal gas law, Fluid Flow: Physical properties of fluids, fluid classification, Types of flow, Newtonian and Non-Newtonian fluid, Bernoulli's theorem, measurement of fluid flow: area meters, Head meters, Reciprocating and Centrifugal pump. Solution of simple numerical.

Module- II (08 Hrs.)

Mechanical Operations: Properties of solids - Sieve analysis; Laws of crushing, solution of simple numerical, Crushers and grinders. Principle of separation and selection and details of equipment for screening, sedimentation, cyclones and hydro cyclones.

Module- III (09 Hrs.)

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

Module- IV (09 Hrs.)

Mass Transfer Principles of diffusion, theory of diffusion, Two film theory and mass transfer coefficients Humidification - operation, humidity chart, equipments - cooling towers and spray chambers Drying - Principles and definitions. Rate of batch drying- Equipments for drying. Numerical related to drying only.

Module- V (09 Hrs.)

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

Books :

- W.L .Mc Cabe, J.C. Smith, "Unit Operations of Chemical Engineering", McGraw-Hill, 1993.
- W.L.Badger, J.T. Banchero. "Introduction to Chemical Engineering", McGraw-Hill, UK, 1997. References:
- Richardson and Coulson, "Chemical Engineering", Vol. 1 & Vol. 2, Asian Books Pvt. Ltd., India, 1996
- Chemical Engineer's handbook - Perry and Chilton.
- Principles of Unit Operations - Foust A.S., Walzel.L.A. , John Wiley