

CH 205: Mechanical Operations

CREDITS = 5 (L = 4, P = 2)

1. **Solids:** Size reduction, Types of crushers, grinders and disintegrators for coarse, intermediate and fine grinding. Power requirements, close and open circuit grinding. Laws of crushing. Introduction to size enlargement and agglomeration. 6 Hours
2. **Size Separation:** Particle size analysis: Screening; industrial screening; equipment. Elutriation. Settling. Classification. Floatation. Electrostatic and magnetic separation; centrifugal separation. 4 Hours
3. **Mixing and agitation;** Fundamentals of mixing; characteristics of mixing equipment; power consumption and equipment. 6 Hours
4. **Settling, sedimentation and Froth Flotation:** free and hindered settling. Types of thickeners - batch and continuous; settling chambers. Cyclones and their design; dusts and fumes. Flow of solids through fluids; settling velocities; Stock's law; terminal velocity. 8 Hours
5. **Fluidization:** Aggregate and particulate fluidization; incipient fluidization velocity; expansion of fluidized beds. 6 Hours
6. **Filtration:** Batch and continuous filtration equipment; theories of filtration and washing; filter aids, industrial practice; centrifuges. Micro filtration and ultra filtration. 5 Hours
7. **Conveying and Elevators for handling solids:** Mechanical and pneumatic conveying; elevators; Storage of solids. 5 Hours

REFERENCE BOOKS:

Title: Unit operations of chemical engineering
Author: W C McCabe & J C Smith
Publisher: McGraw Hill, 3rd edition.

Title: Chemical Engineering, vol. II
Author: J M Coulson and J F Richardson
Publisher: Pergamon press

Title: Particle Technology
Author: D Venkateswarlu and A Prabhakara Rao
Publisher: Indian Institute of Technology, Madras. 1972