

PMI3I103 PARTICULATE TECHNOLOGY (3-0-0)

Module I

(08 hours)

Basic definitions, properties of particulates, storage & handling of Fine particulates. Sampling of solids and slurries- principle, methods, sampling theories, sampling for different application, Indian standards. Laboratory & industrial Sampling techniques.

Module II

(10 hours)

Production of fine particles and their characterization, particle size distribution, shape, surface roughness, porosity; packing in heaps and sediments; particle charge; adsorbed material; interfacial tension; granule strength/attrition/deformation.

Module III

(12 hours)

Powder Storage - Angle of repose, hopper storage, fines percolation.

Mechanical transport – Belt, bucket and screw conveyors; flowability, dynamic weighing, power consumption, selection based on particle size/shape/strength of agglomeration.

Convective transport – sedimentation rate, suspension in stirred tanks, rheology of slow-settling slurries.

Module IV

(06 hours)

Bulk solids packing density and ratio, Bulk solids properties – bulk density, true density, abrasivity, voidage, friability and flowability. Fundamentals of blending – effects of component size, shape, and density on blend time.

Text Books:

1. Introduction to Particle Technology by Martin Rhodes
2. J. K. Beddow, Particulate Science and Technology.
3. R. B. Bird, W. E. Stewart, and E. N. Lightfoot Transport phenomena, John Wiley & Sons; Revised 2nd Edition Edition, 2007
4. M. Leva, Fluidization.