CEPC2003 MECHANICAL OPERATION (3-0-0)

Module I: **(10 hrs)**

Properties and storage of solids: Characteristics of solid particles and solids in bulk. Size Reduction: Objectives, Methods, and Principles of size reduction, Size reduction equipment: Coarse, Intermediate, and Fine Crushers and Ultra-fine grinders, Open & closed circuit grinding.

Module II: **(10 hrs)**

Solid-solid separation: Screening, Electrical separation, Classification, Gravity concentration, and Floatation and their latest equipment.

Module III: **(08 hrs)**

Gas-solid separation: Principle and equipment.

Transportation of solids: Conveyors and elevators.

Module IV: **(10 hrs)**

Thermal methods in processing of ores: Roasting, sintering, calcination, pelletisation, and briquetting. Chemical and electrochemical methods in mineral processing: Leaching – acid and bacterial leaching, amalgamation and cyanidation.

Module V: **(07 hrs)**

Introduction and scope of mineral processing in extractive metallurgy.Ores and Mineral resources in India and worldwide for basic metals like iron, copper, aluminum, lead, and zinc.Physical and chemical characteristics of industrial minerals.

Beneficiation flow sheets of coal and simple ores of copper, lead, zinc, and iron with reference to Indian deposits.

Textbook:

1. Unit Operations, by G G Brown, CBS Publishers
2. Unit Operations of Chemical Engineering, 7th ed. by W L McCabe, J C Smith, and P Harriott, McGraw-Hill.

Reference books:

1. Mechanical Operations for Chemical Engineers, 3rd ed. by C M Narayanan and B CBhattacharya, Khanna Publishers.
2. Perry's Chemical Engineers' Handbook, 8th ed. by D W Green and R H Perry,McGraw-Hill.
3. Handbook of Mineral Dressing: Ores and Industrial Minerals by A F Taggart, John Wiley.

Web learning resources:

1.Mechanical Unit Operations by Prof. Nanda Kishore, Department of Chemical Engineering, IIT Guwahati (Link: https://nptel.ac.in/courses/103/103/103103155/)