

## MINERAL PROCESSING

### Module I (14 Hours)

Introduction to mineral beneficiation, sampling, liberation studies and its importance.

**Comminution:** Fundamentals of comminution, crushing -- construction and operational features of jaw, gyratory, cone and roll crushers.

**Grinding:** Theory of ball mill, rod mill, critical speed of the mill, open circuit and closed circuit, circulating load.

**Size separation:** Sieving and screening, laboratory sizing and its importance, representation and interpretation of size analysis data, industrial screening.

**Classification:** Movement of solids in fluids, free settling and hindered settling of particles, different types of classifiers, e.g. sizing and sorting classifiers used in mineral industry.

### Module II (12 Hours)

**Concentration:** Gravity separation, concentration criteria, jigging, flowing film concentration and tabling, dense media separation.

**Froth flotation:** Theory, reagents used in floatation processes, machines and practice.

**Magnetic and electrostatic separation:** Theory and application of magnetic and electrostatic separation techniques in mineral industry.

**Dewatering and drying:** Theory and practice of thickening; filtration and drying.

### Module III (12 Hours)

**Flow sheets:** Typical flow sheets for beneficiation of iron, gold, copper, lead-zinc sulphide ores, rock phosphate, beach sand, uranium and other industrial minerals.

**Agglomeration techniques:** Sintering, palletizing, briquetting and their applications in ferrous and non-ferrous metal industries, testing of agglomerates. Important mineral deposits in India.

### Books for reference

1. *Principle of Mineral Dressing* by A. M. Gaudin.
2. *Text Book of Ore Dressing* by R. H. Richards and C. E. Locks.
3. *Element of Ore Dressing* by A.E. Taggart.
4. *Handbook of Mineral Dressing- Ores and Industrial Minerals* by A.E. Taggart.
5. *Textbook of Ore Dressing* by S.J. Trusscott.
6. *Ore Dressing* by S.K. Jain.
7. *Mineral Processing Technology* by Berry A Willis.