

MINERAL PROCESSING

Objective- Mining deals with extracting valuable minerals from the earth while mineral processing deals with extracting value from the mined minerals. Attending this course will explore the students with various steps involved in processing of minerals, even some students may find a career in this line also after refinement of their knowledge. With time the mined ore grades are depleting and consequently the importance of the subject is growing to make them saleable to the concerned industries.

Module-I (6 Hours)

Definition of minerals and ore, Importance of mineral processing to mining engineers, linkage between mining and mineral processing, economics of mineral processing, grade-recovery curve, numerical problems related to grade-recovery using various efficiency criterion, liberation and degree of liberation.

Module-II (8 Hours)

Rock breakage- fundamentals, principles of comminution, energy calculations, Bond work Index, Crushers, Milling operations, particle size distribution, sieving methods including interpretation of data, screening and various industrial screen types, crusher-screen circuit configurations- open and closed circuits.

Module-III(16 Hours)

Physical separation techniques-hydraulic classifiers (spiral and rake classifiers), hydrocyclones-principles of operation, efficiency evaluation and numerical problems, gravity concentration- principles, various designs like flowing film concentrators, jigging, heavy medium separators, magnetic separators- low intensity and high intensity separators and their applications, electrostatic separators, froth flotation-principles, basic reagents, different machines

Module-IV (8 Hours)

Solid-liquid separation-filtration and sedimentation, waste disposal, flow sheet development for some minerals-iron ore, beach sand, lead-zinc ore and chromite ores, environmental issues.

Text Books:

1. *Mineral Processing Technology* by B.A. Wills and Tim Napier-Munn

Reference Books

1. Jain, S.K., *Ore Processing*, Oxford – IBH Publishing, 1984.
2. Gaudin, A.M., *Principles of Mineral Dressing* – McGraw Hill Book Company, 1971. 3. Taggart, A.F., *Handbook of Mineral Dressing*, John Wiley and Sons, New York, 1990.
3. Wills, B.A. *Mineral Processing Technology*, Pergamon Press, 1985. 5. Vijayendra, H.G., *Handbook on Mineral Dressing*, Vikas Publishing House Pvt. Ltd. 1995.