

MLPC2003 PHYSICAL SEPARATIONS AND PROCESSES (3-0-0)

Course Objective:

To enhance the fundamental knowledge and applications of various physical separation processes in Mineral industry.

Module I (6 hrs)

Basics of gravity concentration: Free settling and hindered settling, concentration criterion, types, Jigging: Principle and operation of jigging, type of jig, Advanced gravity concentration equipment. Fluidized bed separator: principle and types

Module-II (6 hrs)

Thin stream separation: classification, Principle of concentrating table, separation of particles using Wilfley table, tilting frames, strake table, Mozelymineral separator, factors affecting thin stream separation, Principle of Spiral concentrator, Mechanized and pinched sluices, Reichert cone and Vanners

Module III (6 hrs)

Centrifugal and pneumatic concentrator: Multi-gravity separator, Floatex density separator, Knelson concentrator, Falcon separator, Kelsey Jig
Mass balance in mineral processing

Module IV (6 hrs)

Magnetic separation: Review of magnetic theory, principles, Classification of minerals on basis of magnetic properties, Types of magnetic separator: Dry and wet magnetic separation, Low and high intensity magnetic separators, HGMS, OGMS, isodynamic separator. Applications of magnetic separation

Module V (6 hrs)

Superconducting separation, Electrostatic separator: Principle, types, High tension separator, Eddy current separation and Dielectric separation Ore sorting: principle; types and application.

Text Books:

1. Wills B.A. and Napier-Munn T., Mineral Processing Technology, Elsevier Science & Technology Books
2. Gaudin A.M., Principles of Mineral Dressing, McGraw Hill Book Company, 1971

Reference Books:

1. Taggart, A.F., Handbook of Mineral Dressing, John Wiley and Sons, New York, 1990.
2. Jain, S.K., Ore Processing, Oxford – IBH Publishing, 1984

Course Outcome:

- CO1: To understand the concept of gravity separation processes
CO2: Demonstrate proficiency and perceive of the basic concepts in thin stream separation
CO3: To explore the principle and construction of centrifugal and pneumatic separators
CO4: To acquire the knowledge of magnetic separators and their applications in mineral industry
CO5: To explore the principle of superconducting and electrostatic separators