

## MLPC3004 DESIGN OF PROCESS FLOWSHEET AND EQUIPMENT (3-0-0)

### Course Objective:

- To study the development of flowsheets for processing of different minerals.
- To explore the knowledge skills for the selection and designing of various mineral processing equipment

### Module - I (06 Hours)

Sampling and Testing: Sampling a mineral deposit for feasibility studies and metallurgical testing. Metallurgical testing procedures. Solid and water balance calculations for the estimation of flow rates in beneficiation circuits.

### Module - II (06 Hours)

Metallurgical flow sheet development. Flow sheet development for a coking coal and non-coking coal washing. Flow sheet development for Iron ore, copper, zinc, gold, silver, uranium, graphite and beach sand beneficiation plants.

### Module - III (06 Hours)

General guidelines for plant design. Size selection for a mineral beneficiation plant. Size reduction and energy requirement. Selection and design features of Crushing and Grinding Equipment like Jaw crusher, Gyratory crusher, Cone crusher, Roll crusher, Ball mill, Rod mill

### Module - IV (06 Hours)

Selection and sizing of various types of screens, screen efficiency, straight and curved screen, Free and hindered settling, Selection and sizing of different classifiers including hydrocyclone.

### Module - V (06 Hours)

Selection and sizing of gravity separation equipment like jig, table, spiral etc. Preparation of heavy medium and design of heavy media separation equipment. Selection and design of magnetic and electrostatic separator.

### Course Outcome:

CO1: To understand the concept of metallurgical testing

CO2: To acquire the basic knowledge of flowsheet development

CO3: To explore the design principle of crushing and grinding equipment.

CO4: To acquire knowledge on selection and design of equipment in size separation

CO5: To explore the selection principle of concentration process

### Text Books:

1. Gupta A., Yan D.S., Mineral Processing Design and Operation: An Introduction, Elsevier Science, 2016
2. Mular A.L. and Bhappu R. B., Mineral Processing Plant Design, Society of Mining Engineers of the American Institute of Mining, Metallurgical, and Petroleum Engineers

### Reference Books:

1. Malhotra D., Taylor P.R., Spiller E. and LeVier M., Recent Advances in Mineral Processing Plant Design, Society for Mining, Metallurgy, and Exploration (SME), 2009