## ELEMENTS OF MINERAL ENGINEERING

| Course Type | Course Code | Name of Course | L | T | P | Credits |
|---|---|---|---|---|---|---|
| OE | FMO431 | Elements of Mineral Engineering | 3 | 0 | 0 | 9 |

| Course Objective |
|---|
| To learn about the principles and practices of different mineral engineering operations, in brief |
| **Learning Outcomes** |
| Upon successful completion of this course, students will have a brief knowledge of<br>● the fundamentals of mineral engineering<br>● the comminution and classification techniques applied in mineral engineering<br>● the concentration techniques used in mineral engineering<br>● the various dewatering techniques applied for ores and coal<br>● the methods of hydrometallurgical extraction<br>● the flowsheets of different ores and coal |

| Unit No. | Topics to be Covered | Lecture Hours | Learning Outcomes |
|---|---|---|---|
| 1 | **Introduction:** Scope, objectives and applications of mineral processing; Liberation and beneficiation characteristics of minerals and coal | 4 | Familiarisation with the basic introductory concepts of mineral engineering |
| 2 | **Comminution:** Theory and practice of crushing and grinding; Different types of crushing and grinding equipment, their application | 7 | Information about the fundamental different comminution principles and equipment |
| 3 | **Size separation:** Laboratory size analysis and interpretation; Settling of solids in fluids; Industrial screens; Mechanical classifiers and hydrocyclones | 5 | Information about the basics of different classification principles and equipment |
| 4 | **Density separation methods:** Jigging, dense medium separation<br>Spirals and Wilfley tables: theory, application and limitations. | 9 | Introduction to the different density-based concentration technologies |
| 5 | **Froth flotation:** Physico-chemical principles; Reagents; Machines; Flotation of sulphides, oxides and coal. | 6 | Familiarisation with basics of froth flotation technology |
| 6 | **Electrical and magnetic methods of concentration:** Principles, fields of application and limitations. | 4 | Introduction to the electrical and magnetic methods of concentration |
| 7 | **Dewatering:** Thickening, filtration and drying. | 4 | Knowledge of the fundamentals of dewatering |
| 8 | **Typical flow sheets:** Coal, copper, lead-zinc, iron, beach sands, etc. | 3 | Familiarisation with the conceptual flowsheets of important ores and coal, employed in mineral engineering plants |
| | **Total** | 42 | |

Text Books:

| S. No. | Resource/Book Name | Author(s)/Editor(s) | Publisher |
|---|---|---|---|
| 1 | Wills' Mineral Processing Technology | Barry A. Wills James Finch | Butterworth-Heinemann |

Reference Books:

| S. No. | Resource/Book Name | Author(s)/Editor(s) | Publisher |
|---|---|---|---|
| 1 | Principles of Mineral Dressing | Antoine Marc Gaudin | McGraw Hill |