

MINERAL PROCESSING

Code MinE-850	CreditHours 3
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CourseDescription

Introduction to mineral processing, Comminution (crushing and grinding), Sizing and classification, Gravity separation and classification, Magnetic Separation, Electro-static Separation, Separation by flotation, Dewatering and Tailing disposal, Flowsheet design and simulation

TextBook:

1. Gupta and D.S. Yan "Introduction to Mineral Processing Design and Operation" Perth, Australia, January 2006
2. Maurice C. Fuerstenau, Kenneth N. Hahn—Principles of Mineral Processing, SME, 2003
3. Jan drzymala —Mineral Processing Technology, Wroclaw university, Wybrzeze Wyspianskiego 27, 50- 370 Wroclaw, 2007, ISBN 978-83-7493-362-

ReferenceBook:

Nil

Prerequisites

Nil

ASSESSMENTSYSTEMFORTHEORY

Quizzes	10%
Assignments	10%
MidTerms	30%
ESE	50%

TeachingPlan

Week No	Topics	LearningOutcomes
1	Introduction and need for mineral processing	CourseOutline,objectives,teachingplan,assessmentmethod , conceptsreview. Introduction to mineral processing. Debate economical ores, their chemical and mineralogical contents and the role of mineral processing science in preparing minerals for industrial usage
2	Terminologies	Interpret the mineral processing terminologies such as liberation, economical size of liberation, metallurgical balance, recovery, concentration, yield, reject, representative sampling etc

2-6	Introduction to Comminution	Introduction to mineral processing, Comminution (crushing and grinding). Compare the different size-reduction equipment's used for liberation of minerals regarding their design and operating parameters, size of feed and product, energy consumption, safety instructions, maintenance plans
7-8	Mineral Separation by gravity	Demonstrate the different methods applied for determination of size distribution including coarse and ultrafine fractions and evaluate screening efficiency
9	MIDTERM EXAM	
10-13	Mineral Separation	Evaluate the different methods of gravity separation of minerals. Categorize principles and techniques applied for magnetic separation of minerals. Illustrate the principles of electro-static separation of minerals. Separation by flotation, Dewatering and Tailing disposal. Recognize minerals separation by flotation with stress on hydrophobicity and hydrophilicity, flotation reagents types and roles, contact angle and work of adhesion. List the different techniques applied for solid /liquid separation and mention the basics for safe - economical tailing disposal in mineral processing plants
14-15	Flow sheet design and simulation	Design a flowsheet involving comminution and multi-separation stages for optimal upgrading of local ores (phosphate, bauxite, iron, copper or gold) and run simulation for a simple flowsheet using available commercial software
16-17	Case studies	Metallic ore and coal mineral processing flowchart.
18	END SEMESTER EXAM	