CM2200

Introduction to Minerals and Material Processing

Curricular Designation: Elective

Catalog Description: Fundamentals of minerals processing, raw materials production, and extractive metallurgy, including primary metals production.

Credits: 3.0, Lec-Rec-Lab (3-0-0), Semesters Offered: Fall

Prerequisites: None

Textbook(s) and/or Other Required Materials: Mineral Processing Technology, 8th Edition, by B. A. Wills and James A. Finch (optional)

Course Objectives:

1. Master the principles involved in the extraction of metals, commodity chemicals, and other materials from natural minerals and recycled industrial byproducts.
2. Familiarity with the physical, chemical, and thermal treatments of minerals needed to prepare them for further processing and to extract useful materials from low-value feedstocks.
3. Familiarity with the unit operations used in processing particulate materials and how they are integrated to create an entire process.
4. Introduction to technical report writing.

Topics Covered

1. Mass Balances
2. Crushers and Grinding Mills
3. Industrial Particle Size Control
4. Screens and Gravity Classifiers
5. Hydrocyclones
6. Particulate Separation Processes
7. Heavy-Media Separations
8. Jigging and Hindered Settling
9. Flowing Film - Spirals, Tables, and Cones
10. Froth/Column Flotation
11. Magnetic Separators
12. Electrostatic Separators
13. Dewatering and Materials Handling
14. Thickeners
15. Filters and Centrifuges
16. Primary Metal Production
17. Smelting and Refining Basics
18. Hydrometallurgy Basics
19. Copper, Aluminum, Steel, Precious Metals, Rare Metals

Contribution of Course to Curriculum: Engineering, Science, General Education
### Relationship of Course to Program Outcomes:

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<thead>
<tr>
<th>Outcome</th>
<th>Contribution</th>
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<tbody>
<tr>
<td>An ability to apply knowledge of mathematics, basic science, and engineering science</td>
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<td>An ability to design and construct experiments as well as to analyze and interpret data</td>
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<td>An ability to design a system, component or process to meet needs within realistic constraints</td>
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<td>An ability to function on multidisciplinary teams</td>
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<td>An ability to identify, formulate, and solve engineering problems</td>
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<td>An understanding of professional and ethical responsibility</td>
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<td>An ability to communicate effectively</td>
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<td>The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social context</td>
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<td>A recognition of the need for, and the ability to engage in lifelong learning</td>
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<td>A knowledge of contemporary issues</td>
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<td>An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice</td>
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Prepared by: S. Komar Kawatra                                           December 9, 2016