Advanced Course in Mineral Processing

Overview

The future of the commodities market relies on efficient and sustainable processing of the world’s current ore bodies. Increasing efficiency in mineral or coal processing facilities often is the first step in making those processes sustainable. To make these operations efficient, mineral or coal processors must fully understand their respective operations. Having a detailed understanding of mineral processing fundamentals will allow mineral or coal processors to improve upon existing processing operations and design highly optimized plants in the future.

This course seeks to engage participants in critical thinking and understanding regarding the field of mineral and coal processing. Specific emphasis will be given to energy optimization, equipment selection, performance enhancement and reagent selection. Course participants will be able to take the tools that they have learned and apply them to their respective processes.

The course is designed with the following objectives:

1. Exposing participants to the fundamentals of mineral and coal processing
2. Creating connections between course material and industrial practices
3. Enhancing the capability of the participants to solve design-related and process-related problems in the near future
4. Exposing the participants with the new developments and emerging areas in a comprehensive manner

Participants will learn those topics through lectures and tutorials. Case studies and assignments will be shared to stimulate research motivation of participants.

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<td>You Should Attend If...</td>
<td>• You are involved in equipment design, selection and in plant design in the area of processing of coal and mineral</td>
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<td>Fees</td>
<td>The participation fees for taking the course is as follows:</td>
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The Faculty

S. Komar Kawatra is a Professor and the Chair of the Chemical Engineering at Michigan Technological University, USA. He is also the Director of the Advanced Sustainable Iron and Steel Center established by the National Science Foundation. He has received numerous National Awards such as Gaudin Award, Taggart Award, Aplan Award and the Richards Award. He is the author/Editor of 7 books. He has extensively conducted research in operating plants in the United States. He is the Editor-in-Chief of the Minerals, Metallurgical, Processing Journal and the Mineral Processing and Extractive Metallurgy Journal.

Arun Kumar Majumder is an Associate Professor in the Department of Mining Engineering of IIT Kharagpur. He is a PhD in Mineral Processing from the University of Queensland, Australia. Dr. Majumder has carried out extensive and in-depth modeling work on complex coal and mineral processing unit operations. These models are developed based on sound fundamental concepts and they have strong industrial relevance too. The most significant aspect of his work is the identification of many problems at their roots first and then providing solutions elegantly.

In recognition of his contributions in the areas of coal and mineral processing, various professional bodies have honored him with 12 awards so far.

Course Co-ordinator

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Proposed Lecture Details

5th December (AKM)
Lecture 1: Introduction to Mineral Processing
Lecture 2: Introduction to Coal Processing
Lecture 3: Liberation, Separation, and Economic Analysis

6th December (AKM)
Lecture 1: Comminution: Fundamentals
Lecture 2: Comminution: Industrial Practice
Lecture 3: Mass & Material Balancing

7th December (AKM)
Lecture 1: Sampling Fundamentals
Lecture 2: Laboratory and Industrial Practices
Lecture 3: Movements of Solids in Fluids

8th December (AKM)
Lecture 1: Classification: Fundamentals and Industrial Needs & Requirements
Lecture 2: Industrial Requirements for Sizing: Screens and Cyclones
Lecture 3: Analysis of Industrial Cyclone Data

9th December (AKM)
Lecture 1: Fundamentals of Gravity Concentration
Lecture 2: Important Gravity Concentrators: Jigs, Spirals, Dense Medium Cyclones, EGCs
Lecture 3: Coal Washing: Wet vs Dry; New Concepts of Optimization

10th December (AKM)
Tutorials

12th December (SKK)
Lecture 1: Methods for Calculating Energy Consumption in Laboratory and Industrial Comminution Operations
Lecture 2: Calculations
Lecture 3: Critical Analysis of Various Grinding Equipment used in Industry

13th December (SKK)
Lecture 1: Flotation: Historical Background
Lecture 2: Flotation: Reagents
Lecture 3: Flotation Practices: Direct ad Reverse

14th December (SKK)
Lecture 1: Flotation Cells: Large and Column
Lecture 2: Fundamentals of Thickening and Dewatering: Case studies from an operating plant
Lecture 3: Industrial Practices of Magnetic Separation: Low Intensity Vs. High Intensity; Magnetic Separation VS Flotation
15th December (SKK)
Lecture 1: Electrostatic Separation, Triboelectrification & Corona Discharge
Lecture 2: Pelletization: Fundamentals
Lecture 3: Pelletization: Binders, Industrial Practice

16th December (SKK)
Lecture 1: Instrumentation: Density Gauge
Lecture 2: Composition Analysis: XRF, XRD, SEM, and TEM
Lecture 3: Examples from Industry

17th December (SKK)
Lecture 1: Sustainability in Mining
Lecture 2: Strategies for Flowsheet Development
Lecture 3: US practice, New Developments and Emerging areas

AKM: Prof. A K Majumder

SKK: Prof. S K Kawatra