| COURSE TYPE | COURSE CODE | NAME OF THE COURSE | L | T | P | CREDIT |
|---|---|---|---|---|---|---|
| DP | NFMC510 | Simulation of Mineral Processing Systems Lab | 0 | 0 | 3 | 1.5 |

**COURSE OBJECTIVE**

This course covers techniques for the use of quantitative models for mineral processing unit operations and the simulation of the steady-state operation of mineral processing plants.

**LEARNING OUTCOMES**

Upon successful completion of this course, the students will learn about the

- Simulation of the unit operations involved in a mineral processing plant using the MODSIM simulator.
- Interpretation of the information that is produced by the simulator and how to apply it to the solution of practical operating problems

| NO. | TOPICS TO BE COVERED | HOURS | LEARNING OUTCOME |
|---|---|---|---|
| 1 | Orientation of Simulation of Mineral Processing Systems Lab | 3 | Introduction to Simulation of Mineral Processing Systems Lab |
| 2 | Introduction to the MODSIM simulator | 3 | Downloading and installing MODSIM Learning to use MODSIM graphics editor. |
| 3 | Particle populations and distribution functions | 3 | Use of MODSIM simulator for performing simulations to learn particle populations and distribution functions |
| 4 | Simulation of mineral liberation and comminution | 3 | To understand mineral liberation during comminution stages through simulation |
| 5 | Simulation of crushing circuits, including vibratory screens | 3 | To understand the techniques for simulating crushing circuits. |
| 6 | Simulation for open grinding circuits. | 3 | To implement to models for ball, rod, SAG and AG mills for simulating milling circuits |
| 7 | Simulation of closed grinding circuits. | 3 | Implementation of classifier models for simulating closed loop milling circuits |
| 8 | Simulation of gravity separation plants and dense media separations – baths and cyclones | 3 | Gain proficiency in simulating gravity separation plants and dense media separations |
| 9 | Autogenous gravity separations - jigs, sluices, Reichert cones, water-only cyclones and spiral concentrators and Gravity | 3 | Apply simulation techniques to model the performance of autogenous gravity separation equipment accurately. |

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| | plant flowsheets | | |
| 10 | Simulation of flotation plants and flotation systems | 3 | To learn the simulation of flotation plants and systems to optimize flotation operations effectively. |
| 11 | Flotation plant structure and plant specification by grade recovery relationships. | 3 | To understand the structure of the flotation plant and its specifications by grade recovery relationships analysis |
| 12 | Simulation of combined comminution and concentration plants including regrinding. | 3 | To learn simulation techniques for combined comminution and concentration plants, incorporating regrinding processes effectively. |
| 13 | Putting it all together - simulating complex plants. | 3 | Knowledge of integrating diverse processes to simulate complex mineral processing plants effectively. |
| 14 | Simulation for designing new plants | 3 | Learn to design new processing plants effectively using simulation techniques. |
| | **Total** | **42** | |

**TEXT BOOKS:**

1. Simulations of Mineral Processing Systems Laboratory Manual by FMME Department, IIT (ISM) Dhanbad