COAL AND MINERAL PROCESSING PLANT DESIGN

Course Type	Course Code	Name of Course	L	T	P	Credit
DC	FMC304	Coal and mineral processing plant design	3	0	0	9

Course Objective
To give overall idea of coal and mineral processing plant design.
Learning Outcomes
Upon successful completion of this course, students will get project-based experiential learning of coal and mineral processing plant design, which includes flowsheet preparation, materials handling and utility systems selection, contracts and project management and economics using software tools.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Introduction –** BIS guidelines on flowsheet definitions and symbols, Basic data required for plant flowsheet design. Plant capacity estimation, techno-economic feasibility calculations. Basic calculations like mass, water, grade, energy balance. Environmental impact assessment during plant design.	3	This unit will give students the general background of plant design along with technical and environmental aspects.
2	**Mineral process plant flowsheets -** Development of plant flowsheets for mineral processing plants including iron, sulphide ore, mass, water and grade balancing.	6	Understanding of flows sheet design of mineral processing plants
3	**Coal preparation plant flowsheets -** Development of plant flowsheets for thermal and metallurgical coals on single and composite (blended) feed basis including mass, water and ash balancing.	8	Understanding of flows sheet design of coal preparation plants
4	**Other plant flowsheets -** Flowsheet development for beach sand, rock phosphate, limestone, graphite, uranium ore etc.	8	Understanding of flows sheet design of strategic, nuclear, industrial minerals, etc.
5	**Material handling and utility system:** General guidelines on solid and liquid storage and transportation (belt conveyor and pumps). Selection and sizing of belt conveyors and pumps. Guidelines on selection of valves, pipes, bends, blower, compressor, cooling tower.	8	This will help students to understand the handling of solid, water and slurry along with utilities used in plants.
6	**Contracts and Project Management** - Introduction to NIT (Notice Inviting Tender), technical and commercial contract. Steps of project award, Project costing, Basic and detail engineering, Purchase of equipment, Plant erection and commissioning, Performance Guarantee Test. Mechanical, civil, structural, instrumentation, electrical aspects in plant design. Plant optimization and profitability calculations	6	Students shall be able to get the idea handling contract, procurement, project costing, etc.
7	**Engineering economics:** Capital cost, operating cost, depreciation, return on investment	3	Knowledge related to economics of engineering
	Total	42	

Text Books:

S. No.	Resource/Book Name	Author(s)/Editor(s)	Publisher
1	Mineral Processing Plant Design	Andrew L. Mular, Roshan Boman Bhappu	Society of Mining Engineers (AIME)
2	Mineral Processing Design and Operation: An Introduction	A. Gupta and D.S. Yan	Elsevier

Reference Books:

S. No.	Resource/Book Name	Author(s)/Editor(s)	Publisher
1	Introduction to Mineral Processing	Errol G. Kelly, David J. Spottiswood	John Wiley and Sons