

Course Type	Course Code	Name of Course	L	T	P	Credit
ESO	MME 202	MINING MACHINERY	3	0	0	9

Course Objective

The course will give a brief feature, operational detail, selection of different type of underground mining equipment and transportation system in underground mining. The course will also impart conceptual knowledge on constructional features, environmental issues and design features.

Learning Outcomes

Upon successful completion of this course, students will:

- understand the transportation system in mining industries.
- learn the different types of ore Transporting Equipment in Surface Mines.
- learn about rock drill, roof supports, production machines in underground mines
- learn about excavating equipment and ancillary Equipment in Surface Mines..

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Transportation - Haulage & Hoisting in Underground Mines: Mine winders: Drum, Friction, Blair winders; Rope attachments; Shaft fittings; Safety devices; Hoisting cycle; Productivity calculation; Cages; Skips; Wire ropes Rope haulages: Classifications; Operation; Productivity calculation; Mine cars; Rope fittings; Scope and application Locomotive haulages: Electric, Battery, Diesel locomotives; Tractive effort; Drawbar pull; Ideal gradient; Optimum gradient; Neutral gradient; Super elevation; Track layouts & safety devices; Locomotive calculations; Scope & application. Trackless haulage system: LHD; Shuttle cars, LPDT, SDL Man riding systems	8	Understanding of basic about transportation in underground mining.
2	Ore Transporting Equipment in Surface Mines- Dumpers: Classifications; System components and functions Belt conveyors: System components and functions; Maintenance, Capacity & power calculations; Scope & application High Angle Conveyor: Constructional features; Operation; Scope & application Cable belt conveyor: Constructional features; Operation; Scope & application Pipe belt conveyor: System components and functions; Scope & application Aerial ropeways: Classifications; Operation; Angle stations; Loading & discharging stations; Buckets; Scope & application	6	Knowledge on ore transporting equipment's for surface mining.
3	Rock Drills: Types of rock drills, Constructional features and operation of electric and hydraulic coal drills; Jack hammers, Hydraulically operated drill machines, Electro hydraulic jumbo drills, Top hammer drills, DTH drills, Wagon drills, Blast hole drills, Drill bits, Drill rods, Flushing mechanisms, Dust collectors, Scope & application	6	An in-depth knowledge of rock drill, its construction features and application

4	Roof Supports: Friction supports; Hydraulic supports; Power supports; Nomenclatures; Hydraulic circuits: Hydraulic oil & properties; Power pack unit, Roof bolts, Scope & applications	6	Contouring requirements for roof supports, its scope and application.
5	Production Machines in Underground Mines: Construction and operation of shearer, plough, continuous miner; Scope & application; Cutting picks; Cutting heads; Dust control; AFC; Stage loader.	6	Depth knowledge of Production Machines in Underground Mines
6	Excavating Equipment in Surface Mines: Construction and operation of Surface miners, Electric rope shovels, Hydraulic shovels, Draglines, Bucket wheel excavators; Scope & application	8	Contouring requirements for excavating equipment in surface mines.
7	Ancillary Equipment: Road header; Dint header; Dozers, Motor graders.	2	Knowledge about ancillary equipment.

Text Books

1. De, A. (2015). Latest Development of Heavy Earth Moving Machineries, Lovely Prakashan.
2. Tatiya, R. R. (2005). Surface and underground excavations: methods, techniques and equipment. CRC Press.

Reference Books

1. Nichols, H. L. (1976). Moving the earth-the workbook of excavation.
2. Chugh, C. P. (1977). Drilling technology handbook. Oxford & IBH Publishing Company.
3. Peng, S. S., & Chiang, H. S. (1984). Longwall mining, Wiley Publisher.
4. Deshmukh, D. J. (1982). Elements of mining technology. VidyasewaPrakashan.
5. Mukharjee, S. N. (1993), Longwall Machinery and Mechanisation, Lovely Prakashan.
6. Kaku, L. C. (2000). The Coal Mines Regulations. 1957. Dhanbad: Lovely Prakashan.
7. Kaku, L. C., (1961), Metalliferous Mines Regulations, Lovely Prakashan.
8. Chakraborty, P. K., Mine Winder, CMPDI, Ranchi.
9. Stathan, I C F, Coal Mining Practices, London Publisher.
10. Das, S K., Modern Coal Mining Technology, Lovely Prakashan.