

Course Type	Course Code	Name of Course	L	T	P	Credit
DC	MMC305	UNDERGROUND MINING EQUIPMENT	3	1	0	11

### Course Objective

The objective of the course is to introduce students to the constructional details, operation, design and maintenance related aspects of various production and transport equipment used in underground mines..

### Learning Outcomes

Upon successful completion of this course, students will:

- Have a conceptual understanding of basic construction and working of different production machines.
- Understand the constructional, maintenance and design related aspects of different transport equipment used in underground mines.

Unit No.	Topics to be Covered	L + T	Learning Outcome
1	<b>Classification of Production Machines:</b> Classification of machinery for production by drilling-blasting method and mechanical cutting in underground coal, metal and other mines; mechanics of rock cutting.	1+1	Get introduced to different production machines
2	<b>Drilling Machines:</b> Electro hydraulic drill machine, drill bits, Quad-bolter and Tunnel boring machine, Percussive drills, Rotary drills, Rotary-percussive drills, construction, operation, Maintenance practices of Electric drills, Pneumatic drills, hydraulic drills, electro hydraulic jumbo drills, drill bits, drill rods, Rock drilling principle.	3+1	Get an overview of the constructional details, working and Maintenance of a different drilling machines
3	<b>Coal cutting machines:</b> Constructional and operational details of Shearers, Plough, AFC, Stage Loader, Feeder, Continuous miner, Construction, safety and Maintenance.	7+2	Get an overview of the constructional details, working and Maintenance of a different coal cutting machines
4	<b>Tunneling Equipment:</b> Construction, operation, application of Road header, Dint header, Tunnel boring machines,	2+1	Get introduced to different equipment used for tunneling
5	<b>Mine winder:</b> Classification of winders, shaft fittings, rope fittings, selection, working principles, breaking systems, duty cycle, steel wire ropes, safety devices, headgear structures, cages, skips, capacity and power calculations, statutory provisions, maintenance practices..Calculation of maximum velocity for different possible duty cycle diagrams, Energy consumption and Efficiency of Hoist , Torque diagram for Drum winders and Koepe winders	7+2	Get introduced to construction, working and design aspects of Mine winders
6	<b>Roof Supports:</b> Classifications of roof supports, constructional features and selection, operation of power roof supports, theory and practices of hydraulic control of power supports, safety features, power packs, roof bolting machines, maintenance.	3+1	Get introduced to different types of roof support systems

7	<b>Trackless Haulage:</b> LHD, SDL, Rocker shovel, LPDT, shuttle cars, FSV, Maintenance, safety features and regulations.	5+2	Get introduced to construction, working and maintenance related aspects of different types of trackless haulages
8	<b>Rope Haulage:</b> Classification, constructional features, selection, capacity and power calculation, maintenance, safety features and regulations.	3+1	Get introduced to construction, working and maintenance related aspects of rope haulage
9	<b>Mine Locomotive:</b> Classification, constructional features, selection, capacity and power calculation, maintenance, safety features and regulations.	2+1	Get introduced to construction, working and maintenance related aspects of different types of mine locomotives
10	<b>Man Riding Systems:</b> Classifications, line components and their functions of different types of man riding systems, lift car, Monorail system, free steered vehicle, Diesel driven personnel transporter, Locomotive safety features.	3+1	Get introduced to construction, working and maintenance related aspects of different types of man riding systems
11	<b>Mine pumps:</b> Classification, construction and operation of Mine pumps, Multistage centrifugal pump, Parallel and series operation of pumps, selection, power calculation, Installation and maintenance of mine pumps.	6+1	Get introduced to construction, working and maintenance of mine pumps

#### Text Books

1. Longwall Mining- Syd S Peng, H S Chaing (Wiley Publisher)
2. Elements of Mining Technology- D J Deshmukh (VidyasewaPrakashan)
3. Longwall Machinery and Mechanisation- S N Mukharjee (Lovely Prakashan)
4. Coal Mining Practices- I C F Stathan (London Publisher)

#### Reference Books

1. Modern Coal Mining Technology- S K Das (Lovely Prakashan)
2. Coal Mines Regulation (1957); (Lovely Prakashan)
3. Metalliferous Mines Regulations (1961); (Lovely Prakashan)
4. Mine Winder- P K Chakraborty (CMPDI, Ranchi)
5. Surface and Underground Excavators – Methods, Techniques and Equipment; Ratan Raj Tatiya (CRC Press).