

4299 - OPENCAST MINING MACHINERY										
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)					
Lectures	Practical	Credits			Theory			Practical Ex.		Total
3	2	5	25	25	3 Hrs	100		50		200
Pre-requisite		Source	Semester							
Nil		MIN		Theory	Test	Total	TW	PR	Gr Total	
				75	25	100	50	50	200	

Rationale: Mining diploma holder is required to supervise various operations in mines with the Mechanisation of mines. It has become essential for him to understand the machines for its proper use and productive performances.

Objective: On completion of this course the diploma holder is expected to be able to choose suitable machinery for certain works and to ensure its safe and efficient performance.

COURSE CONTENTS		Hrs	Mks
1. FACE MACHINERY		18	40
Drilling Machines:			
Purpose of drilling, principles & mechanism of drilling, various methods of drilling, surface arrangement & applications. Types of drill bits, selection of drill bits. Fishing tools, core recovery – core barrel, wire line drilling feed mechanism – hydraulic, mechanical. Bore hole deviation- courses, preventive measures, and measurement techniques. Major types of blast hole drills used in India (DTH, WAGON DRILL). Principle of operation, components of drill machine.			
Excavation and loading machines:			
Shovel – classification, construction, operation, technical details, maintenance, hydraulic system diagrams, undercarriage, and comparative study of shovels. Front end loader – classification, construction, operation, maintenance, technical specifications, comparison of a crawler mounted with wheel mounted shovel. Dragline – classifications, construction, operation, technical specifications, maintenance, walking mechanism of a dragline. Multi bucket excavators – classification, construction, operation, technical specifications, maintenance			

2. TRANSPORT MACHINERY

10 22

Dumpers – General classification, construction, operation, hydraulic circuit, safety devices, Technical Specification, Maintenance. Tyres – types, design, causes of tyre damage and their remedies; Comparison of various types of Dumpers CMR REG: 95 (a), 96,97.

Conveyors - Classification, Belt conveyor: construction details – Belt, pulley, idlers, loop take up systems, hold back system, coupling, belt joining design of belt, drive system, maintenance. Brief introduction of booster belt conveyor, cable belt conveyor, high angle belt conveyor CMR REG:- 92

Aerial ropeways: definition, applicability, advantages & disadvantages, types and construction.

10 16

3. AUXILIARY MACHINERY

Bulldozer – classification, components, operation; Dozer blades – types, selection: maintenance, Technical specification, and hydraulic system.

Ripper – classification, construction; types of shank, shank components, ripper tip selection, maintenance, Technical specifications.

Brief description and specifications of grader, scraper, clamshell, lump breaker, stacker, spreader, crane.

10 22

4. MINE PUMPS

Types of pumps used in mines: Basic components – impeller, casing shaft, wear ring, stuffing box, bearings, valves and accessories, starting and stopping of pumps, priming, water hammer, cavitation, Air vessels, axial end thrust, hydraulic balancing disc. Characteristic curves of turbine pumps, selection of pumps. Care and maintenance of pumps. Submersible pumps:- construction advantages and disadvantages. Numerical problems based on H.P., no of stages, head, quantity, efficiency

48 100

Total

PRACTICALS: (Any Ten)

1. Visit to a drill site to study operation of blast hole drills.
2. Calculation of the rate of drilling of a drill machine.
3. Study of Maintenance of a shovel in a nearby mine workshop.
4. Visit to a mine workshop to study the maintenance procedure of dumpers.
5. On site study of safety arrangements of Heavy earth moving machines.
6. Sketch and study of dragline.
7. Visit to a conveyor site to study the operation of conveyor belt.
8. Sketch and study of tensioning and loop take up mechanism in a belt conveyor.
9. Sketch and study of mono cable aerial ropeway.
10. Study of characteristic curves of centrifugal pump.
11. Sketch and study of submersible pumps
12. Visit to a mine to study the pump characteristics.

REFERENCE BOOKS:

- 1) Surface Mining by G. B. Mishra
- 2) Mine Pumps., Haulage and Winding by S. Ghatak.
- 3) Latest Developments of HEMM by Amitosh De
- 4) Surface Mining Technology by S. K. Das.
- 5) Heavy Construction Equipment by Jagman Singh.

