IIPM SCHOOL OF ENGINEERIN AND TECHNOLOGY
LESSON PLAN: SUMMER-22

Sub : Electrical Equipment in Mines **Semester-**4th
Faculty name : Mausumibala panda
Duration : 60 hours

Objective:-

- Various types of electrical cables used in Mines.
- Various types circuit breakers circuit diagram of gate-end box and drill panel.
- Different types of protective system.
- Different types of electric braking.
- Flame proof apparatus and intrinsically safe apparatus.
- Underground signaling arrangement.

Learning Outcome : Understanding of basics of the Electrical sources, Protective system and their uses.

Sl.No	Chapter	Proposed Week for Teaching	Lecture No.	Sub. Topic	Important Teaching Points	Content Source
1	I	1st	1	INTRODUCTION	1.Electrical cables-Introduction 2.Classification of Cables.	Electrical Power System V K Mehta
2			2		1.Constructional features of high tension cables. 2. low-tension Cables	
3			3		1.Size of cables 2. Their uses.	
4			4		1.procedures of cable laying at surface, underground roadway & in shafts. 2.Cable joint box mining type.	
5	**II**	2nd	1		Assignment	
6			2	Protective Systems	Protective Systems- 1.Introduction 2.Fuse-Definition	Electrical Power System V K Mehta
7			3		1.Fuse Materials 2. Rewireable Fuse -Advantages -Disadvantages	
8			4		1 HRC Fuse -Advantages -Disadvantages 2.Uses of fuse	

9		3rd	1	Protective Systems	1.Circuit Breakers-Definition -Air Circuit Breaker. 2. Minimum Oil Circuit Breaker (MOCB) -Advantages -Disadvantages	Electrical Power System V K Mehta
10			2		1.Bulk Oil Circuit Breaker (BOCB). 2.Air Blast Circuit Breaker -Construction and Principle -Advantages -Disadvantages	
11			3		1..SF6 Circuit Breaker -Advantages -Disadvantages 2.Essential qualities of a good protective system.	
12			4		1.plunger, induction & direction over current, over loads.	
13		4th	1		1.No volt and latching relay, frequency relay and Earth leakage relay. 2. Construction,Principle	
14			2		1.Plunger type relay 2.Induction type relay 3. Directional over current relay -Construction and Principle	
15			3		1. protection of transformer by differential relay.	
16			4		1.Functions & operation of drill panel. 2.Earthing system in mines. 3.Voltage limit	Electrical Equipment in Mines H.Cotton
17		**5th**	1		1.General principle of working-basis remote control circuit & various protective devices of Gate-End Box.	
18			2		Assignment	
19			3		Class test	
20	III		4	Transformer	1.Transformer-Construction working Principle. 2.E.M.F Equation of Transformer.	Electrical Equipment in Mines H.Cotton
21		**6th**	1		1.Ideal Transformer 2.Practical Transformer Difference between them 3.Transformation ratio	
22			2		1. Practical Transformer on no load condition -Phasor Diagram	
23			3		1.Practical Transformer on load Condition 2.Phasor diagram	

24			4		1.Shifting Impedance of Transformer	
25		7th	1		1.No load test of Transformer	
26			2		1.Short Circuit test of Transformer 2.Rating of Transformer	
27			3		Assignment	
28			4		Class Test	
29	IV	8th	1	Industrial drives	1.Industrial drives-Introduction. 2.DC Motor-Introduction 3.Types of DC Motor	Electrical Equipment in Mines H.Cotton
30			2		1. Characteristics of DC Motor -Speed current Characteristics - Speed Torque Characteristics	
31			3		1.Characteristics of AC Motor 2. selection of motors for mining use.	
32			4		Assignment	
33	V	9th	1	Electric braking used in Mines	1.Electric braking-Introduction 2.Types of Braking	Electrical Equipment in Mines H.Cotton
34			2		1-Regenerative braking -Definition 1.Advantages and Disadvantages of Regenerative braking	
35			3		1.Magnetic braking. -Definition 1.Advantages and Disadvantages of Magnetic braking	
36			4		Assignment	
37		10th	1		Doubt Clear class	
38			2		Class Test	
39	VI		3	Flame proof & intrinsically safe apparatus	1.Flame proof apparatus -Definition -Uses	Electrical Equipment in Mines H.Cotton
40			4		1.Safety features of flame proof Apparatus.	
41		11th	1		1.Intrinsically safe apparatus - Definition -Uses	
42			2		1.Safety features of flame proof intrinsically safe Apparatus	
43			3		Assignment	
44			4		Class Test	
45	VII	12th	1		1.signals & shaft signal.	

					-Definition -Uses	
46			2	Underground signaling arrangement	1.communication system in U/G mines. -Uses	Electrical Equipment in Mines H.Cotton
47			3		1.Point to point communication -Application 2.Intercom system/Telephone 3.Cordless system	
48			4		Assignment	
49		13th	1		Class test	
50	VIII		2	Sensors & their applications	1.Sensors –Introduction 2.Types of sensors	Electrical Equipment in Mines H.Cotton
51			3		1.Position sensors 2.Pressure sensors 3.Temperature sensors	
52			4		1Force sensors 2.Fluid property sensor	
53		14th	1		1. Vibration sensor 2.Humidity sensor	
54			2		Assignment	
55	IX		3	Battery locomotive and Electric LHD	1.Thyrister-Introduction 2.VI Characteristics of Thyrister	Electrical Equipment in Mines H.Cotton
56			4		1.Battery locomotive-Introduction	
57		15th	1		1.Elecrical LHD-Introduction 2.Uses	
58			2		1.Electric mine phone. Introduction 2.Uses	
59			3		Assignment	
60			4		Class test	
61		16th			Doubt clearing class	