



IIPM SCHOOL OF ENGINEERING & TECHNOLOGY

LESSON PLAN: 2022-23

Sub: Surface Mining Technology (SMT)

Branch : Mining Engineering Semester : 3rd
 Faculty name : Sanjay Kumar Majhi
 Duration : 60 hours

Unit - 1	Choice of Opencast Mining <ul style="list-style-type: none"> • State factors affecting choice of Open casting Mining method. • Define stripping ratio. • Determine overburden/ore ratio. • Find out cut off stripping ratio. • Determine quarriable limit. • State favorable conditions for mechanized Opencast Mines. • State limitations of large open pits. • Define Box cut and determine the location of Box cut.
Unit – 2	Benching <ul style="list-style-type: none"> • Determine bench parameters- height, width & slope. • Determine length of bench for overburden and ore.
Unit – 3	Slope Stability <ul style="list-style-type: none"> • Define slope stability. • Factors affecting slope stability. • Types of slope stability. • Causes and prevention of slope stability.
Unit – 4	<ul style="list-style-type: none"> • Explosive and blasting accessories • Define explosive, state constituents of explosives , properties & characteristics of explosives. • Classify explosives, state composition and uses of explosives. • Explain PMS and SMS. • Define permitted explosive and classify permitted explosive. • Explain sheathed, equivalent sheathed and ultra safe explosive. • State properties of permitted explosives. • State composition & constructional features of safety fuse, detonating fuse, detonating relay, igniter cord, nonel and raydet.. • Describe different types of detonators and uses, state advantages of delay detonators. • State different types of exploder, its construction and safety features, circuit tester. • Describe stemming rod, crack detector knife, crimper.
Unit – 5	Drilling <ul style="list-style-type: none"> • Explain different principles and methods of exploratory drilling in surface mining. • State different types of drill used in Opencast mining. • Describe simple constructional features of churn drill, drills master, wagon drill

	<p>and jack hammer.</p> <ul style="list-style-type: none"> • State D.T.H.. • Describe different types of drill bits in drilling.
Unit – 6	<p>Blasting practices in Mines</p> <ul style="list-style-type: none"> ○ Describe preparation of charge. ○ State procedure of firing shots, direct and inverse initiation, stemming materials, water ampoules, cushion firing. ○ Define blasting efficiency. ○ State and describe plaster shooting and pop shooting, toe blasting.
Unit – 7	<p>Controlled Blasting Techniques as per statutory provision</p> <ul style="list-style-type: none"> ○ State and describe pre-splitting, cushion blasting, muffle blasting, coyote hole blasting, chambered hole blasting, directional blasting, Electronics Blasting System (EBS) .
Unit – 8	<p>Magazines</p> <ul style="list-style-type: none"> ○ Describe layout and arrangement of different types of magazines, state their safety features.

Sl. No.	Title of the Book	Name of Authors
1	Surface Mining Technology	S.K. DAS
2	Blasting Manuals	Sandhu & Pradhan
3	Blasting Practices in Mines	S.K. DAS
4	EMT VOL I	D.J. DESHMUKH
5	Surface Mining	G.B. Mishra

Objective

- Develop the concept of choice of Opencast Mining.
- Determine bench parameters.
- Define slope stability and types, prevention of Slope failure.
- Explain various compositions, properties of Explosives and Blasting accessories.
- State and explain different drilling methods.
- Explain blasting practice in Mines.
- Describe blasting techniques as per statutory provisions.
- Identify basic constructional features and safety provisions of magazine.

Learning Outcome: As a Mining Engineer, one has to develop the basic concepts and principles of winning and working in mines. Further, he should have basic knowledge of explosives for development of mines.

Sl. No	Chapter	Proposed Week for Teaching	Lecture No.	Sub. Topic	Important Teaching Points	Content Source
01	I	1 ST	01	Choice of open cast mining	Introduction and types mines	Surface Mining Technology
02			02	Choice of open cast mining	Factors affecting on choice of open cast mining	Surface Mining Technology
03			03	Choice of open cast mining	Condition favouring adoption of mechanized o/c mines	Surface Mining Technology
04			04	Choice of open cast mining	Stripping ratio, Break even ratio, <u>Factors affecting stripping ratio</u>	Surface Mining Technology
05		2 ND	01	Choice of open cast mining	Quarriable limit	Surface Mining Technology
06			02	Choice of open cast mining	Limitation on large open pit mines	Surface Mining Technology

07	II		03	Choice of open cast mining	Doubt Clearing Class		
08			04	Choice of open cast mining	Box cut,Location ,layout	Surface Mining Technology	
09			3 RD	01	Choice of open cast mining	Determination of overburden,ore ratio	
10				02	Choice of open cast mining	Calculation of ore reserve and OB	Surface Mining Technology
11		03		Choice of open cast mining	Doubt Clearing Class on 1 st chapter		
12		04		Bench Parameters	Bench terminology in open cast mines with figure	Surface Mining Technology	
13		4 TH	01	Bench Parameters	Bench,Bench height,,face,width,crest,t oe,bench face angle,pit slope angle	Surface Mining Technology	
14			02	Bench Parameters	Cut,safety catch,berm,description of berm	Surface Mining Technology	
15			03	Bench Parameters	Determination of bench Parameters...Height,Wi dth and slope	Surface Mining Technology	
16			04	Bench Parameters	Length of ore bench andOB bench and Doubt Clearing Class	Surface Mining Technology	
17		5 TH	01	Class test	Chapter 01 and 02		
18			02	Slope stability	Intro,slope stability	Surface Mining Technology	
19			03	Slope stability	Types of slope stability	Surface Mining Technology	
20			04	Slope stability	Factors affecting slope stability	Surface Mining Technology	
21		6 TH	01	Slope stability	Cause of slope stability	Surface Mining Technology	
22			02	Slope stability	Prevention of slope stability on ore bench,OB bench and OB dump yard	Surface Mining Technology	
23			03	Slope stability	Doubt Clearing Class		
24			04	Explosive and Blasting accessories	Blasting,explosive,comp osition of explosive,diff. properties and charactristic of explosive	Explosive & Blasting Practices in Mines	

25		7 TH	01	Explosive and Blasting accessories	Classification of explosive and use of explosive	Explosive & Blasting Practices in Mines
26			02	Explosive and Blasting accessories	Explain PMS and SMS	Explosive & Blasting Practices in Mines
27			03	Explosive and Blasting accessories	Permitted explosive & classification	EMT vol. 1
28			04	Explosive and Blasting accessories	Sheathed explosive, Equivalent sheathed explosive, & ultra safe explosive	EMT vol. 1
29	III	8 TH	01	Explosive and Blasting accessories	Properties of Permitted explosive	EMT vol. 1
30			02	Explosive and Blasting accessories	Composition & constructional features of safety fuse, detonating fuse, relay, ignitor, nonel, raydet	Explosive & Blasting Practices in Mines
31			03	Explosive and Blasting accessories	Types of detonator, its uses, advantages of delay detonator	Explosive & Blasting Practices in Mines
32			04	Explosive and Blasting accessories	Types of exploder, its construction, safety feature & circuit tester	EMT vol. 1
33		9 TH	01	Explosive and Blasting accessories	Stemming rod, crack detector, knife, crimper	EMT vol. 1
34			02	Explosive and Blasting accessories	<u>Class test & doubt class</u>	
35			03	DRILLING	Intro. & application of Drilling/Boring	EMT vol. 1
36			04	Drilling	Principles & method of exploratory drilling in o/c mines	EMT vol. 1
37	IV	10 TH	01	Drilling	Types of drill used in o/c mines	EMT vol. 1
38			02	Drilling	Construction features of churn drill & rope drill	EMT vol. 1
39			03	Drilling	Drill master, wagon drill, & jack hammer	EMT vol. 1
40			04	Drilling	Explanation of D.T.H& T.L.D	Explosive & Blasting Practices in Mines

41	V	11 TH	01	Drilling	Diff. types of drill bits in drilling	EMT vol. 1
42			02	Drilling	<u>Doubt Clearing Class</u>	
43			03	BLASTING Practices in o/c mines	Intro & Description	Explosive & Blasting Practices in Mines
44			04	Blasting Practices in o/c mines	Preparation of loading & charge	EMT vol. 1
45		12 TH	01	Blasting Practices in o/c mines	Procedure of blasting or firing	EMT vol. 1
46			02	Blasting Practices in o/c mines	Pattern of blasting	Explosive & Blasting Practices in Mines
47			03	Blasting Practices in o/c mines	Diff. system of Blasting initiation	Explosive & Blasting Practices in Mines
48			04	Blasting Practices in o/c mines	Procedure of stemming	Surface Mining Technology
49		13 TH	01	Blasting Practices in o/c mines	Water ampoules,cushion blasting	Explosive & Blasting Practices in Mines
50			02	Blasting Practices in o/c mines	Blasting efficiency	Surface Mining Technology
51			03	Blasting Practices in o/c mines	Diff. types of secondary blasting	Explosive & Blasting Practices in Mines
52			04	Blasting Practices in o/c mines	Class test on chapter 5 & 6	
53		14 TH	01	Controlled Blasting techniques use in o/c mines	Pre-splitting,Cushion blasting	Explosive & Blasting Practices in Mines
54			02	Controlled Blasting techniques use in o/c mines	Muffled blasting,coyote hole blasting	Explosive & Blasting Practices in Mines
55			03	Controlled Blasting techniques use in o/c mines	Chambered hole blasting,Electronic blasting system	Explosive & Blasting Practices in Mines
56			04	Controlled Blasting	Diff. directional blasting	Explosive & Blasting

				techniques use in o/c mines		Practices in Mines
57		15 TH	01	Controlled Blasting techniques use in o/c mines	Revision ,Discussion and Doubt clearing class	
58			02	MAGAZINE	Intro. , layout of magazine & types of magazine	Explosive & Blasting Practices in Mines
59			03	Magazine	Safety features of magazine	Explosive & Blasting Practices in Mines
60			04	Magazine	Unit test on chapter 7 & 8	

Signature of

Faculty Member

HOD

Principal/ Director