



# IIPM SCHOOL OF ENGINEERING & TECHNOLOGY

## LESSON PLAN: 2022-23

### **Sub: Th.05-UNDERGROUND METAL MINING**

**Branch** : **Mining** **Semester** : **5<sup>th</sup>**  
**Faculty name** : **Sanjay Kumar Majhi**  
**Duration** : **60 hours**

<b>Unit - 1</b>	<b>Access to ore body</b> Classify modes of entries – Adits , inclines and shafts ,applicability of entries.
<b>Unit – 2</b>	<b>Development in underground Metal Mine.</b> o Explain formation of blocks of mineral deposit. Explain level interval o Describe <input type="checkbox"/> Open raising method <input type="checkbox"/> Two compartment method <input type="checkbox"/> Jora raise lift <input type="checkbox"/> Long hole drilling method./Vertical Crater retreat (VCR) method. <input type="checkbox"/> Alimak raise climber <input type="checkbox"/> Raise borer. <input type="checkbox"/> Development of Ore passe system.
<b>Unit – 3</b>	Give a comparative study between coal and metal Mining.
<b>Unit – 4</b>	<b>Stoping methods.</b> o Classify stoping methods with application and factors affecting methods of stopping. o Preparatory arrangement for stoping. o Describe the following methods with layout including drilling, blasting, transportation and supports. <input type="checkbox"/> Open stoping. <input type="checkbox"/> Open stoping with pillar support. <input type="checkbox"/> Shrinkage stoping. <input type="checkbox"/> Cut & fill stoping. <input type="checkbox"/> Square set stoping. <input type="checkbox"/> Block caving. <input type="checkbox"/> Sub-level caving. <input type="checkbox"/> Top slicing.
<b>Unit – 5</b>	<b>Stone Drifting</b> <input type="checkbox"/> Describe conventional methods of drifting. Find out direction gradient of drift. Describe drilling and blasting, support, transportation, drainage, ventilation and lighting arrangements, organization and supervision in mechanised method of drifting.
<b>Unit – 6</b>	<b>Rock Burst</b> <input type="checkbox"/> Explain causes and prevention of rock burst.
<b>Unit – 7</b>	<b>Face mechanization</b> o Describe use of jumbo drill with air leg. o Describe various Loading & Transportation System like <input type="checkbox"/> L.H.D., L.P.D.T.(Low Profile Dump Truck), rocker shovel, spiral chutes and draw points, Scraper etc.

Sl. No.	Title of the Book	Name of Authors
1	SME Mining Engineering Hand Book Vol.I & II-1993 edition.	Chacharker
2	Metal Mining	Peele
3	Mining Engineering Hand Book	D.J.Desmukh
4	EMT Vol.II	Prof. B.S. Verma
5	Mining Ground control	Jermic
6	Rock Mechanics	Jugger & Cook
7	Rock Mechanics	Higam
8	Metalliferous Mining	Bullock.
9	Underground Mining Method	

### Books Suggested:

- E.M.T Vol-02                      D.jDeshmukh
- Metalliferous Mining              Y.P Chacharker  
Methods                                  Samir Kumar Da
- Explosive & Blasting  
Practices in Mines

### Objective

- Describe various methods to access an ore body.
- Explain various methods of development used in underground metal mines.
- Compare between coal & metal mining.
- Explain various stopping methods used in u/g metal mines.
- Stone Drifting.
- Explain causes & prevention of rock burst.
- Describe about face mechanization.

**Learning Outcome:** As Mining Engineer, one should have the knowledge in fundamental principles of generation in underground metal mines.

Sl. No	Chapter	Proposed Week for Teaching	Lecture No.	Sub. Topic	Important Teaching Points	Content Source
01	I	1 <sup>ST</sup>	01	U/G Metal mining	Intro. On u/g metal mining	
02			02	Access to ore body	Classification and various methods	Metal Mining Chacharker
03			03	Access to ore body	Adits, Tunnel	Metal Mining Chacharker
04			04	Access to ore body	Shafts, Incline	Metal Mining Chacharker
05		2 <sup>ND</sup>	01	Access to ore body	Applicability and methods of works on entries	Metal Mining Chacharker
06			02	Access to ore body	Doubt Clearing Class (Chapter 1)	Metal Mining Chacharker
07			03	Development in U/G Metal Mines	Intro. On Development in u/g metal mining	Metal Mining Chacharker

08	<b>II</b>		04	Development in U/G Metal Mines	Diff. terms use in U/G Metal mining	Metal Mining Chacharker
09		3 <sup>RD</sup>	01	Development in U/G Metal Mines	Formation of Blocks of Mineral Deposit	Metal Mining Chacharker
10			02	Development in U/G Metal Mines	Dip,Strike,Level ,Level Intervals	Metal Mining Chacharker
11			03	Development in U/G Metal Mines	Classification of Raising Methods	Metal Mining Chacharker
12			04	Development in U/G Metal Mines	Open Raising methods	Metal Mining Chacharker
13			4 <sup>TH</sup>	01	Development in U/G Metal Mines	Two compartment Raising methods
14		02		Development in U/G Metal Mines	Jora Raise Lift	Metal Mining Chacharker
15		03		Development in U/G Metal Mines	Long Hole Drilling Methods	Metal Mining Chacharker
16		04		Development in U/G Metal Mines	Alimak Raise climber	Metal Mining Chacharker
17		5 <sup>TH</sup>	01	Development in U/G Metal Mines	Raise Borer	Metal Mining Chacharker
18			02	Development in U/G Metal Mines	Unit Test (Chapter 01)&(Chapter 2)	.....
19			03	Study Between Coal & Metal Mining	Intro. On both Coal & Metal Mining	E.M.T vol=01 & 02
20			04	Study Between Coal & Metal Mining	Diff. Between Coal & Metal Mining	E.M.T vol=01 & 02 & Metal Mining Chacharker
21		6 <sup>TH</sup>	01	Study Between Coal & Metal Mining	Unit Test (Chapter 1),Ch-02 & 03	-----
22			02	Stopping Methods	Intro. On Stopping Methods	Metal Mining Chacharker
23			03	Stopping Methods	Classification of Stopping Methods	Metal Mining Chacharker
24			04	Stopping Methods	Application of Stopping Methods	Metal Mining Chacharker
25		7 <sup>TH</sup>	01	Stopping Methods	Factors affecting on Stopping Methods	Metal Mining Chacharker

26			02	Stopping Methods	Preparatory arrangement on Stopping Methods	Metal Mining Chacharker
27			03	Stopping Methods	Layout,Drilling,Blasting, Transportation& Support	Explosive & Blasting Practices in Mines
28			04	Stopping Methods	Doubt Clearing and class.	
29			8 <sup>TH</sup>	01	Stopping Methods	Classification of methods and their description
30	02	Stopping Methods		Open Stopping Method	Metal Mining Chacharker	
31	03	Stopping Methods		Overhand Stopping Method	Metal Mining Chacharker	
32	04	Stopping Methods		Underhand Stopping Method	Metal Mining Chacharker	
33	9 <sup>TH</sup>	01		Stopping Methods	Open Stopping Method with Pillar support	Metal Mining Chacharker
34		02		Stopping Methods	Shrinkage Stopping Method	Metal Mining Chacharker
35		03	Stopping Methods	Cut & fill Stopping Method	Metal Mining Chacharker	
36		04	Stopping Methods	Squire set Stopping	Metal Mining Chacharker	
37	10 <sup>TH</sup>	01	Stopping Methods	Block Caving Method	Metal Mining Chacharker	
38		02	Stopping Methods	Sub- Level Caving Method	Metal Mining Chacharker	
39		03	Stopping Methods	Top Slicing Method	Metal Mining Chacharker	
40		04	Stone Drifting	Introduction		
41	11 <sup>TH</sup>	01	Stone Drifting	Method of drifting & Gradient of Drifting	Metal Mining Chacharker	
42		02	Stone Drifting	Drilling,Blasting,Transpo rtation& Support	Explosive & Blasting Practices in Mines	
43		03	Stone Drifting	Drainage,Ventilation	EMT-02	
44		04	Stone Drifting	Lighting Arrengment	EMT-02	

45	V	12 <sup>TH</sup>	01	Stone Drifting	Organization & Supervision in Mechanized method of Drifting	EMT-02
46			02	Stone Drifting	Unit Test (Chapter 4), (Chapter 5)	-----
47			03	Rock Brust	Introduction on Rock Brust	EMT-02
48			04	Rock Brust	Sources of. Rock Brust	EMT-02
49		13 <sup>TH</sup>	01	Rock Brust	Causes Rock Brust	EMT-02
50			02	Rock Brust	Occurs & Prevention of Rock Brust	EMT-02
51			03	Rock Brust	Doubt class on Previous Topics	EMT-02
52			04	Face Mechanization	Use of Machineris in diff. U/G mines	EMT-02
53		14 <sup>TH</sup>	01	Face Mechanization	Jumbo Drill	EMT-01
54			02	Face Mechanization	Plan Layout of Loading & Transportation System	Metal Mining Chacharker
55			03	Face Mechanization	L.H.D & Scraper	Metal Mining Chacharker
56			04	Face Mechanization	L.P.D.T	Metal Mining Chacharker
57		15 <sup>TH</sup>	01	Face Mechanization	Rock Shovel	Metal Mining Chacharker
58			02	Face Mechanization	Diff .Types of Chutes& Draw Point	-----
59			03	Face Mechanization	Unit Test (Chapter 06) &(Chapter 07)	-----
60			04	Face Mechanization	Doubt Clearing Class	-----

Signature of Lecturer

Faculty Member

HOD

Principal/ Director