4293 - MINE DEVELOPMENT

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
Lectures	Practical	Credits			Theory		Practical Ex.	Total
3	2	5	25	25	3 Hrs	100	-	150

Pre-requisite	Source
Nil	MIN

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	50	50	200

Rationale: The Mine Development is the foundation course for Mining Engineering. The course introduces mining to the beginners in topic one and further topics deal with under ground opening and developments.
Objectives: On completion of this subject. A student acquires the knowledge and skill for further learning of various mining. Processes and Technology.

COURSE CONTENTS	Hrs	Mks
1. INTRODUCTION Mining; Mine; History of mining, its contribution to civilisation; specific character of mineral industry; Past performance, Present status & Future goal; Different stages in mining. Coal & Mineral industries in India; Mining organisation i.e. IBM, DGMS, CMRI, MMTC, CMPDI etc; Reserve of important minerals in India: Use of Minerals & its product.	5	10
2. TERMINOLOGY & DEFINITIONS Minerals; Ore; Rock; Gangue; Ore Body; Country rock. Footwall; Hangwall; Dip; True-Dip & Apparent –Dip; Strike; seam; Lode; Vein; Out-Crop; Sampling; Exploration; Exploitation; prospecting; Development; Screening; Benefaction.	3	8
4. OPENING OF MINERAL DEPOSITS Opencast Entry: - Boxcut, trenches and entry system. Underground Entry:- Applicability of incline, Adit and Shaft; comparative study of various types of mode of entries; selection of site for entries; shape & size of incline, Adit and shaft. Opening up of (a) Gently dipping ore Body (b) Inclined deposits (c) steeply inclined deposits (d) Scattered Deposits.	8	20
5. OPENCAST MINE DEVELOPMENT Applicability; factors affecting the choice of opencast mining; Advantages & disadvantages. Minerals Amenable for o/c mining in India. Elements of o/c benches: sequence of development; stripping ratio-different types.	4	10
6. UNDERGROUND COAL MINE DEVELOPMENT Definition of board & Pillar Development; Advantages & Disadvantages; Size & Shape of a Pillar; Selection of Gallery size; Panel\District, opening out a district (from main dip, on rise side). Developments by cross cuts. Development in steep seams, Out put available from a district by solid blasting & by coal cutting machine; loading and transportation in galleries; Layout of Panels showing various loading & transportation systems; Mine regulations on development.	10	20

7. UNDERGROUND METAL MINE DEVELOPMENT Position of drifts & levels; level interval; Main principles of development; Formation of block by driving Levels, Winzes, Raises, etc; Ventilation; Comparison of coal mining with metal mining.	6 12	10 22
8. INTRODUCTION TO ROCK MECHANICS Definition, scope & problems of rock mechanics in mining; stress, strain, young's modulus, Poissons ratio. Modulus of rigidity and bulk modulus, Tension, Compression & shear; Uniaxial & Triaxial strength in rocks. Pressure arch theory. Rock Bursts & subsidence, Angle of Draw factors affecting angle of draw. Calculations of area of influence. Dimension of safety Pillar. Slope stability, factors affecting. Slope stability, angle of repose, forms of failures, Preventive measures.		
Total	48	100

PRACTICALS:

1. Study of coal & mineral industries of India
2. Sketch & study of various entry systems.
3. Sketch various modes of opening out districts
4. Sketch a development block in u/g metal mines
5. Calculations of stripping ratio
6. Determination of bench parameter
7. Study of entry system for open cast mines.
8. Calculating compressive strength of a given rock sample.
9. Calculating tensile strength of a given sample.

REFERENCE BOOKS:

1. Elements of Mining Technology vol-1 by D. J.Deshmukh
2. Elements of Mining Technology vol-2 by D. J. Deshmukh
3. U.M.S. Series
4. Mining of Ores & Non-metalic Deposits by Boridov
5. Mining of Mineral Deposits by L Shevyakov