4292 - MINING TECHNOLOGY - I

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
					Theory		Practical Ex.	Total
Lectures	Practical	Credits						
3	2	5	25	25	3 Hrs	100	50	200

Pre-requisite	Source
Nil	MIN

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

COURSE CONTENTS Hrs 12 Mks 20

1. EXPLOSIVE AND ACCESSORIES

Definition of explosive: essential constituents of explosive; essential; properties of explosives; chemistry of explosive; classification of explosives based on Indian explosive rules. Risk of initiation; Low & high explosives: description of common explosives-gun powder, Nitro-glycerine, TNT, ANFO, Slurry emulsion explosive HANFO, LOX, Permitted explosives. Safety fuse; detonation fuse. Plain detonator, electric detonator. Low & high tension; delay detonators: detonating relay: Nonel; Booster Crimper; Pricker; Exploder; Circuit Tester; Crack Detector; Shot firing cable; regulations on use of explosives. Storage of explosive, magazine, transport of explosive; disposal of old & damaged explosives; related mine regulations. Substitute for explosives:- purpose: various substitutes such as cardox hydrex, hydraulic buster, Armstong air buster etc.

2. BLASTING	12	20
Theory of blasting. Mechanics of rock blasting, preparation of charge & charging; direct & inverse initiation, various blasting patterns - wedge cut, pyramid cut, fan cut drag cut, burn cut, coromant cut, ring drilling etc., Solid blasting in coal mines. Blasting patterns used in opencast mines, subgrade drilling, secondary blasting - pop & plaster shooting. Deck charging, stemming, controlled blasting, pulsed infusion shot firing. Muffle blasting. Safety aspects in blasting:-Vibration. Flying fragments; danger zone, misfire, blown out shot, blown through shot. Burden; spacing; selection of hole diameter; calculation of explosive requirement; powder factor, mine regulations on blasting.		
3. ROOF SUPPORTS	8	20
Various types of roof, yielding & non-yielding type supports, materials used for support. Various types of support, description of prop. Cog, chock, friction prop, hydraulic prop, arch, bar, girder etc. Safari support, roof bolting, cable bolting, roof stitching, setting of props, roof testing; systematic support rule, supporting of junction, roadway places of excessive height in B & P. Freshly exposed roof. Prop withdrawer, Sylvester prop withdrawer, mine legislation on supports.		
4. SHAFT SINKING	8	20
Preliminary considerations for shaft sinking; marking centre of shaft; drilling & blasting; removal of debris; kibble; temporary lining; permanent lining (brick, concrete, tubbing); walling scaffold, rider; folding doors; shaft centring arrangement; dealing with water, ventilation & lighting. Special methods of shaft sinking - caisson. Piling, freezing, cementation methods; Deepening of shaft, widening of shaft.		
5. TUNNELING, WINZING AND RAISING	8	20
Tunnelling:- selection of size & shape for drift, level, crosscut; basic cyclic operations, selection of drilling patterns, drilling and blasting, mucking operation, various machinery used, drainage & ventilation, temporary & permanent supports; organisation of work; non-cyclic operations. Winzing:- purpose, drilling and charging; removal of debris; specific problems in Winzing. Raising:- purpose, various methods used such as two compartment method, long hole drilling & drop raising; use of alimack raise climber. Raise borers; main difficulties.		
Total	48	100

PRACTICALS:

1. Design of blast hole patterns.
2. Prop withdrawal by Sylvester Prop withdrawer.
3. Designing of magazine.
4. Calculation of power factor.
5. Sketch various types of underground drill patterns.
6. Sketch & study various blasting accessories.
7. Sketch & study hydraulics & friction props.
8. Sketch & study pressure arch theory.
9. Sketch & study of temporary lining.
10. Sketch & study of brick wall lining.
11. Sketch & study of English & German tubbing
12. Sketch various methods in tunnelling
13. Sketch various methods in raising.