STATE BOARD OF TECHNICAL EDUCATION, BIHAR
Scheme of Teaching and Examinations for

III[rd] Semester Diploma in Mining Engineering

(Effective from Session 2022-23 Batch)

THEORY

Sl. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION SCHEME							
			Periods per Week	Hours of Exam.	Teacher's Assessment (TA) Marks (A)	Class Test (CT) Marks (B)	End Semester Exam. (ESE) Marks (C)	Total Marks (A+B+C)	Pass Marks ESE	Pass Marks in the Subject	Credits
1.	Elements of Mining Technology	2047301	03	03	10	20	70	100	28	40	03
2.	Elements of Mining Geology	2047302	03	03	10	20	70	100	28	40	03
3.	Basic Civil Engineering	2047303	03	03	10	20	70	100	28	40	03
4.	Mining Methods – Opencast Working	2047304	03	03	10	20	70	100	28	40	03
5.	Mine Ventilation	2047305	03	03	10	20	70	100	28	40	03
		Total : -	**15**				**350**	**500**			**15**

PRACTICAL

Sl. No.	SUBJECTS	SUBJECT CODE		EXAMINATION SCHEME					
			TEACHING SCHEME	EXAMINATION SCHEME	Practical (ESE)		Total Marks (PA+ESE)	Pass Marks in the Subject	Credits
			Periods per Week	Hours of Exam.	Internal (PA)	External (ESE)			
6.	Basic Civil Engineering Lab.	2047306	02 50% physical 50% Virtual	03	15	35	50	20	01
7.	Elements of Mining Geology Practice Lab.	2047307	04 50% physical 50% Virtual	03	15	35	50	20	02
8.	Mine Ventilation Lab.	2047308	04 50%physical 50% Virtual	03	15	35	50	20	02
		Total : -	**10**				**150**		**05**

TERM WORK

Sl. No.	SUBJECT	SUBJECT CODE	TEACHING SCHEME	EXAMINATION-SCHEME				
			Periods per Week	Marks of Internal Examiner (PA)	Marks of External Examiner (ESE)	Total Marks (PA+ESE)	Pass Marks in the Subject	Credits
9.	Elements of Mining Technology (TW)	2047309	02	07	18	25	10	01
10.	Python / Others (TW)	2000310	02	07	18	25	10	01
11.	Practical Training Project (TW)	2047311	04 Weeks	15	35	50	20	02
		Total : -	**04**			**100**		**04**
Total Periods per week Each of duration One Hour :- 29					**Total Marks :-**	**750**		**24**

ELEMENTS OF MINING TECHNOLOGY

Subject Code	Theory			No of Period in one session:42			Credits
	No. of Periods Per Week			Full Marks	:	100	03
2047301	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

RATIONALE:

The student of first year of Mining & Mine surveying must be aware of the Mineral Industry in the country and the Departments, which deal with mineral exploration, exploitation, safety, conservation and controlof the mining industry. All technical definitions and terminologies connected with above are included here, as the students at this stage must be acquainted with these to cope up with the contents at later stage. Blasting is an important operation in all the mining operations. Knowledge of all the types of explosives, their properties and selection for different conditions/situation types of detonator/fuses etc is a must for them. Also, it is essential for a mining engineer to understand systems of support of the mine workings. These all aspects have been included in the subject.

OBJECTIVES:

After undergoing the course of study the student shall be able to

1) State the various organizations engaged in coal and noncoal mining, their role and functions.
2) Understand various technical terms, operations involved in coal & noncoal mining.
3) Understand properties of explosives, procedure of conducting shot firing operation in underground coalmines with due regards to safety.
4) Understand the procedure of erection of temporary supports in underground coalmines.
5) State the major method of extraction of coal used in underground coal mines, their conditions of applicability.

UNIT	CONTENTS	HOURS
1.	**Introduction to Mineral & Important MiningOrganizations** Definition of minerals. Uses of important minerals mined e.g., Coal, Iron ore, copper, zinc, bauxite, gold, manganese, mica, uranium etc. Important Organizations involved like DGMS, IBM, GSI, CIL, MECL, CIMFR, CMPDIL etc their role and functions.	06
2.	**Mining Terminology & Definition.** Common terminologies used in coal mining. Common terminologies used in metalmining. Common terminologies used in mine ventilation and environment. Common terminologies used in mine supports. Simple definition, explanation, purposes and sketches.	06
3.	**Explosives & Accessories** Common explosive bases, Properties of Explosives, High Explosive & Low explosive, their comparison. Permitted explosives their types, composition, properties, uses, advantages & disadvantages. Brand names of some commonly used explosive of each	10

	type. A detonator, common types of detonators, plain detonators, instantaneous and delay action detonators their construction, uses, comparison etc. low tension & high-tension detonators. Safety fuses, detonating cords, detonating relays. Exploders	
4.	**Shot Firing** Drilling patterns for shot firing on machine cut face, in stone drift etc. Shot Firing tools Face preparation for shot firing, Preparation of priming charge, charging of hole in coal and rock in underground working only, Direct and inverse initiation, shot firing circuits, procedure of shot firing of holes in gassy mine, precautions. Simultaneous & delay firing. Solid blasting, conditions to be satisfied before doing solid blasting, advantages of solid blasting, drilling patterns used with solid blasting	08
5.	**Safety in Shot firing operation.** Explosive required for blasting in coal/rock. Powder factor, detonator factor. Precaution to improve blasting results. Misfires, causes, remedy and method of relieving dealing with misfires, blown out shots, blown through shots causes and precautions. Purpose of stemming, stemming materials used for shot firing, water ampoules for stemming. Storage of explosives, Magazines Disposal of outdated explosives.	07
6.	**Introduction to coal mining method** Classifications of method of working Board & Pillar Open cast method. Long wall. Applicability condition for selection of each methods of working. Layout of each method. Advantages & disadvantages	05
	Total	42

REFERENCE:

Author	Title	Year of Publication	Publisher
G.K. Pradhan	Explosive and Blasting Techniques	1996	Mintech publication Bhubaneshwar.
S.K. Das	Explosives and Blasting Techniques	1993	Lovely prakashan Dhanbad.
D.J. Deshmukh	Mining Technology Vol.- I	1995	Central techno publication, Nagpur

ELEMENTS OF MINING GEOLOGY

Subject Code 2047302	Theory			No of Period in one session:42			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

Mining Engineering is the application of the knowledge of science and other branches of engineering for the extraction of minerals and ores from the surface of the earth or from the underground. As such Geology becomes the first step of mining education. It is essential to knowand identify mineral and ore, their modes of occurrences in the earth crust and the formation and deposition of various rocks.

As such the subject Applied Geology is introduced in the second year of the three years diploma course in Mining and Mine surveying. The subject deals with the following topics which are the basic for a mining diploma education, in first stage.

a) General Geology
b) Mineralogy
c) Petrology
d) Physical Geology
e) Structural Geology
f) Coal Geology Stratigraphy

DETAILED CONTENTS:

UNIT	CONTENTS	HOURS
1.	**GENERAL GEOLOGY** Branches Sub branches Essential Allied Scope of geology Origin of Earth Age of Earth Interior of Earth Isostacy Plate Tectonic Theory & Continental drift	07
2.	**MINERALOGY** Elements of crystallography Characteristic symmetry elements Elements of crystal system Definition of Mineral Classification of Minerals. Physical and chemical properties of Minerals. Physical Chemical and Optical properties of following groups of rock forming minerals- Quartz,Pyroxene, Olivine, Amphibole.	07
3.	**PETROLOGY** Rock cycle and characteristics of various Rocktypes Igneous Rocks Origin Forms and structures Classification, occurrence & uses. Sedimentary Rocks Structure Occurrence & uses Metamorphic Rocks	06

4.	**PHYSICAL GEOLOGY** Weathering definition of weathering factors affecting weathering types of weathering Weathering & soil formation, weatheringprofile in various climatic region. Land form produced by river, wind, glacier,ocean. Earth quake Definition of Earth Quake, epicenter,hypocenter. Siesmic zones Volcano definition ,types & Land form	06
5.	**STRUCTURAL GEOLOGY** Strike & Dip Apparent Dip True Dip Dip-strike Problems Folds-classification & Recognition in field Faults- classification & Recognition in field Unconformity- classification & Recognition infield Joints and cleavages Outlier and Inlier	06
6.	**COAL GEOLOGY** Physical & chemical properties Origin, occurrence and distribution Ranks of coal Banded constituents of coal. Structural features of coal seam. Commercial classification of coal.	06
7.	**GEOLOG ICAL MAPS** Drawing of Geological section of maps. Description of Geological maps. Characteristics of contour line.	04
	Total	42

REFERENCE:

AUTHOR	TITLE	YEAR OF PUBLICATION	PUBLISHER
P.K. Mukherjee	A text book of Geology	1986	The world press pvt.Ltd. Calcutta.
A.K. Dutta	Physical Geology	1962	A. K. Bose Ranchi.
S.W. Chiplonkar	Structural Geology		
Pravin singh	Engineering & General Geology	2016	Katsons, Delhi

BASIC CIVIL ENGINEERING

Subject Code 2047303	Theory			No of Period in one session:42			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

The Civil works is most common to each and every field of engineering. Civil is a basic engineering subject and is a prerequisite to any other project. Before starting any project of engineering such as electrical, mechanical, mining or metallurgy, civil works are required like planning township, plant construction, water supply and other similar works

In Mining Engineering, knowledge of civil engineering is required in surface planning, roads, building, underground construction of stopping, Dams, etc. In open cast mining, soil erosion and slope stability create problems, which are solved by the knowledge o soil mechanics. Similarly, water is also a problem in both underground and open cast mines, which requires the knowledge of hydraulics. In designing this course, the requirement of mining engineers is considered and only those topics are which form the knowledge of civil engineering to mining engineer

DETAILED CONTENTS:

UNIT	CONTENTS	HOURS
1	FLUID PROPERTIES: Properties of liquid, definition of liquid, action of shear forces on olids and liquid, type of fluids, ideal fluid, real fluid, definition of hydrostatics, hydro kinematics and hydrodynamics.	07
2.	HYDROSTATICS: Properties of liquid, definition of liquid, action of shear forces on solids and liquid, type of fluids, ideal fluid, real fluid, definition of hydrostatics, hydro kinematics and hydro dynamics. Pressure intensity, PASCAL's law, variation of hydraulics, absolute pressure and gauge pressure, pressure gauges, types of pressure measuring devices.	07
3.	HYDRO KINEMATICS: Principle of conservation of mass and its application, continue, ty equation, types of flows. Steady unsteady, laminar, and turbulent, uniform and non-uniform flow. Streamlines and their characteristics. Teynold's number.	06
4.	HYDRODYNAMICS Bernoulli's theorem, energies possessed by flowing liquid, potential energy, kinetic energy, pressure energy, datum head velocity head and pressure head Bernoulli's equation, venturer, orifice meter and pitot tube.	06
5.	BRICKS & CEMENT Requirement of good bricks, types of bricks, laboratory tests for bricks, field-tests for bricks manufacturing process of bricks. Cement, Composition of cement, types of cement, laboratory test and field test on cement.	06
6.	FOUNDATIONS Necessity of foundations, bearing capacity and safe bearing capacity, types of foundation, shallow foundation and deep foundation, selection of type of foundation, procedure to givelayout, different	06

	terms. Centre line plan, foundation plan checking accuracy of layout, utility of control point.	
7.	MASONRY Brick Masonry, Necessity of bonds in brick masonry, and their type, mortars used in brick masonry, stone masonry, types of stone masonry, dry stone masonry, revetment.	04
	Total	42

SUGGESTED LEARNING RESOURCES :

REFERENCE:

1. Building construction - By Sushil Kumar
2. Building Material - By S.C.Rangwala
3. Soil Mechanics - By S.N.Awasthy
4. Soil Mechanics - By Dr. B.C.Punamia
5. Fluir Mechanics - By R.S.Khurmi
6. Estimating and costing - By B.N.Dutta

MINING METHODS - OPENCAST WORKING

Subject Code 2047304	Theory			No of Period in one session:42			Credits
	No. of Periods Per Week			Full Marks	:	100	03
	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

After obtaining Diploma in Mining Engineering Diploma Engineer required to supervise operations involved in opencast mines, the number of opencast mines are increasing to enhance production rate and due to present policy of linking large opencast mines to the super thermal power plant. Thus Diploma engineer must have knowledge of unit operations involved. Type of machineries used their applicability and working, knowledge of explosive used and procedure for carrying out blasting operation in large opencast mines by deep hole blasting. All these are essential aspects are included in subject opencast mining in Third year of the programme.

COURSE OUTCOMES:

After undergoing the course of study the student shall be able to

1. **Supervise operations involved in the opencast mining both coal and non-coal.**
2. **Supervise the operations of the equipment used in opencast mines.**
3. **Select suitable explosive for deep hole blasting in large opencast mines.**
4. **Supervise/carryout blasting operation to give the optimum results from the blast.**

Take proper care of environmental aspects, which may get affected due toblasting and other opencast mining activity.

Unit	Content	Hours
1.	**INTRODUCTION TO OPEN CAST MINING** Classification of Surface Mining methods, Factors affecting choice of opencast mining methods; Advantages and disadvantages of opencast mining Stripping Ratio: Maximum allowable stripping ratio, Overall stripping ratio, Break even stripping ratio, Benches parameters: Height, width, angleof slope, toe, crest, statutory provisionsregarding height, width, angle of slope etc.	07
2.	**OPENING UP OF DEPOSIT** Unit operations involved, site preparation, Box cut, Entry system in opencast mines Opencast mine layout, factor determining choices of layout, overburden excavation, Disposal of overburden, overcasting etc, Sample layouts for Lime Stone, Copper, Coal, Iron ore deposits, method of work, machines required, manpower, OMS etc.	07
3.	**OPENCAST MINING MACHINERY** Classification of Excavating equipment,selection, choices of opencast mining machinery. Excavators shovel, Rope shovel, hydraulic shovel, application, advantages,disadvantages, comparison Rope shovel and hydraulic shovel, operating parameter, output of a shovel. Various attachments to shovel. Back hoe, operating parameter, application. Dragline, operating parameters, applicability, working, advantages, disadvantages, comparison with shovel. Bucket wheel and Bucket chain excavators. Application, advantages & disadvantages, operation, working methods by Bucket wheel excavator, terrace cut,	12

	Dropping cut etc.Rippers. Scrappers, bulldozer etc. Surface miner its application, working. In pitcrushing system Precautionary measures while use of HEMM.	
4.	**BLASTING PRACTICE IN OPENCAST MINES** Bench blasting terminology, Blast hole geometry, hole depth, burden, spacing, sub grade drilling, bottom change, column charge, stemming height. Factors to be considered while blast designing Simple numerical on blast design for thebench of surfaces mine Single and multiple rows blasting their comparison, Sequence of blasting in single & multiple row. Precautions while charging and firing of holes in deep hole blasting, deck charging, muffled blasting, control blasting techniques, secondary blasting/breaking in opencast mines. Transport of Explosives in bulk, precautions while drilling and blasting of deep holes.	**10**
5.	**ENVIRONMENTAL ASPECTS OF OPENCASTMINING** Environmental aspects of opencast mining Flyrock, ground vibration, air blast their causes & prevention. Noise pollution, water pollution, Degradation of land, land reclamation. Salient features of environment protection Act,EMP and Environment impact assessment. Slope stability: Causes of un-stability,forms of failure preventive measures.	**06**

REFERENCE BOOKS:

Author	**Title**
G.K. Pradhan	Explosive and Blasting Techniques
S.K. Das	Surface Mining Technology
S.K. Das	Explosive and Blasting Techniques
D.J. Deshmukh	Elements of Mining

MINE VENTILATION

Subject Code	Theory			No of Period in one session:42			Credits
	No. of Periods Per Week			Full Marks	:	100	03
2047305	L	T	P/S	ESE	:	70	
	03	—	—	TA	:	10	
				CT	:	20	

The underground working is devoid of the natural air. As such to make the working places safe for the persons to work and pass it is necessary to circulate the air artificially through the mine working. A mining engineer must know the principles of how the flow of air can be created, regulated, controlled and monitored. They must also know the effect of the heat and humidity, condition and means of measuring andcontrolling the same. Number of mine gases is produced in the mine, which has got dangerous and toxic properties. The mining engineer should have knowledge of source of these gases their measurement detection and dealing with these aspects ofknowledge essential for mining engineer.

COURSE OUTCOMES:

After undergoing the course of study the student shall be able to

1. Take measurement of quantity of air, pressure, humidity and cooling power of the mine air, and take corrective action if these do not meet thedesired standards.
2. Detect presence of inflammable and toxic/noxious gases in the mine andtake precautions to remove the some and make the working places safe.
3. Provide and maintain ventilation appliances in their districts so as toensure compliance with standards of ventilation prescribed.
4. Generally, appreciate the ventilation system of a mine as a whole andimportance of maintaining safe and comfortable working conditions inside the mine.

Unit	Content	Hours
1.	**MINE AIR** Different Gases / Damps found in mines, Definition of damps, their threshold limits, physiological effects, source ofproduction and detection, Degree ofgassiness of seam. Flame safety lamps, its principle, construction, safety features, and comparison. Detection of Methane by flame safety lamp. Methano meter its principle of working, construction. Principle of other method of detection of methane (description of equipment not required)	6
2.	**MINE CLIMATE** Purpose and standards of ventilation, standards for minimum & maximum velocity of air for different locations. Pressure, ventilating press, water Guage. Temperature, sources of heat in mines. Moisture content of mine air relative humidity, wet bulb temperature, measurement of relative humidity. Cooling power of mine air, determination of coiling power, methods of improving cooling power of mine air, effect of heat and humidity on miners.	8

3.	**NATURAL VENTILATION** Natural ventilation Pressure, geothermic gradient, Factors causing NVP, Effect of seasonal changes on direction of Natural ventilation, limitation of Natural ventilation. motive column, calculation of naturalventilation pressure.	5
4.	**ARTIFICIAL VENTILATION** Different types of fans used in mines: centrifugal & axial flow, their principle of working, Exhaust & forcing type. Purposes of evasee & volute casing. Reversal of air current, and characteristics curves of fans. Fans in series and parallel, Comparison between axial flow & Centrifugal fan; exhaust & forcing Fan. Fan laws, Manometric efficiency overall efficiency, theoretical depression producedby fan. Numerical on fan laws.	8
5.	**DISTRIBUTION & COURSING OF AIR IN MINES** Laws of air flow in Mines, Atkinson's formula splitting, advantages & disadvantages, Numerical on splitting,equivalent orifice. Numerical on equivalent orifice. Ventilation appliances, Auxiliary ventilation: Different methods, advantages & disadvantages, hazards associated with auxiliary ventilation, precautions required. Booster fan: purpose, dangers associated, Precautions before installation. Numerical on Booster fan, Ascensional and Declensional ventilation,Advantages and disadvantages.	9
6.	**VENTILATION SURVEY** Scope and importance of ventilation survey, survey interval and location of survey station, ventilation plan. Measurement of quantity & pressure difference, anemometer, pitot statictube, Manometer. Conduct of Pressure & quantity survey, precautions during and before conducting ventilation survey.	6

REFERENCE BOOKS :

Author	Title	Publisher
D.J. Deshmukh	Elements of Mining Technology Vol	Central techno publication, Nagpur
G.B. Misra	Mine Environment & Ventilation	Oxford University Press, Calcutta
M.A. Ramlu	Mine Disaster & Mine Rescue	Oxford University Press, Calcutta

BASIC CIVIL ENGINEERING LAB.

Subject Code 2047306	Practical			No of Period in one session:28			Credits
	No. of Periods Per Week			Full Marks	:	50	01
	L	T	P/S	Internal (PA)	:	15	
	—	—	02	External (ESE)	:	35	

COURSE OUTCOMES

Student will be able,

Understand the elastic behavior and thermal properties of materials.

Understand the properties and applications of Bricks.

Understand thermal properties of the material.

Understand setting and final setting time of cement.

Understand about venturi meter

LIST OF EXPERIMENTS

1. Verification of Bernoulli's Theorem
2. Calibration of given venturi meter
3. Calibration of given Orfice meter
4. Grading of course aggregates and fine Aggregates
5. Compressive strength of Bricks
6. Determination of Water Absorption of Bricks
7. Fineness test on cement
8. Determination of initial setting and final setting time of cement
9. Determination of Normal Consistency of cement

SUGGESTED LEARNING RESOURCES :

Reference Books:

1. Building construction - By Sushil Kumar
2. Building Material - By S.C.Rangwala
3. Soil Mechanics - By S.N.Awasthy
4. Soil Mechanics - By Dr. B.C.Punamia
5. Fluir Mechanics - By R.S.Khurmi
6. Estimating and costing - By B.N.Dutta

ELEMENTS OF MINING GEOLOGY PRACTICE LAB.

Subject Code	Practical			No of Period in one session:56			Credits
	No. of Periods Per Week			Full Marks	:	50	
2047307	L	T	P/S	Internal (PA)	:	15	02
	—	—	04	External (ESE)	:	35	

LIST OF PRATICAL

1. Identification of Minerals in sets. Colour, Form, Cleavage, Fracture, Luster & Streak using Moh's scale of hardness.
2. Identification of Minerals on the basis of physical properties in hand specimens.
    a. Quartz group
    b. Feldspar group
    c. Mica group
    d. Amphibole group
    e. Pyroxene group
    f. Feldspathoid group
    g. Miscellaneous silicate group
    h. Non-silicates.
3. Identification of Igneous Rocks in Hand specimen.
4. Identification of sedimentary rocks in Hand specimen.
5. Identification of Metamorphic rocks in Hand specimen.
6. Drawing of Geological section Maps (any ten)
7. Draw profile from contour map along a given line using available software.
8. Indentify the rank of given coal specimen.
9. Indentify the structural band of coal specimen.
10. Measure the dip & strike of inclined plane using Brunton compass.
11. Measure the Hing & axil plane of fold in given model.

REFERENCE:

AUTHOR	TITLE	YEAR OF PUBLICATION	PLACE OF PUBLICATION & PUBLISHER
P.K. Mukherjee	A text book of Geology	1986	The world press pvt.Ltd. Calcutta.
A.K. Dutta	Physical Geology	1962	A. K. Bose Ranchi.
S.W. Chiplonkar	Structural Geology		
Pravin singh	Engineering & General Geology	2016	Katsons, Delhi

MINE VENTILATION LAB.

Subject Code	Practical			No of Period in one session:56			Credits
	No. of Periods Per Week			Full Marks	:	50	
2047308	L	T	P/S	Internal (PA)	:	15	02
		—	04	External (ESE)	:	35	

The underground working is devoid of the natural air. As such to make the working places safe for the persons to work and pass it is necessary to circulate the air artificially through the mine working. A mining engineer must know the principles of how the flow of air can be created, regulated, controlled and monitored. They must also know the effect of the heat and humidity, condition and means of measuring andcontrolling the same. Number of mine gases is produced in the mine, which has got dangerous and toxic properties. The mining engineer should have knowledge of source of these gases their measurement detection and dealing with these aspects of knowledge essential for mining engineer.

PRACTICAL:

1. Demonstration of co-detector and measurement of carbon monoxide usingCo-detector.
2. Dismantling & assembling of different types of Flame safety lamps.
3. Detection of Methane using flame safety lamp
4. Demonstration of whirling hygrometer and determination of relativehumidity using whirling hygrometer.
5. Demonstration of Kata thermometer and determination of cooling power byKata thermometer.
6. Demonstration of water gauge and measurement of fan water gauge.
7. Demonstration of centrifugal mine fan.
8. Demonstration of Reversal arrangement of centrifugal mine fan.
9. Demonstration of Axial flow fan.
10. Demonstration of various ventilation devices.
11. Demonstration of vane Anemometer and determination of quantity byAnemometer.
12. Demonstration of velometer and measurement of air velocity by velometer.
13. Demonstration of Inclined manometer and pitot static tube anddetermination of velocity pressure.
14. Study of ventilation plan and conventional signs used in it.

REFERENCE BOOKS:

Author	Title	Publisher
D.J. Deshmukh	Elements of Mining Technology Vol II	Central techno publication, Nagpur
G.B. Misra	Mine Environment & Ventilation	Oxford University Press, Calcutta
M.A. Ramlu	Mine Disaster & Mine Rescue	Oxford University Press, Calcutta

ELEMENTS OF MINING TECHNOLOGY (TW)

Subject Code	Term Work			No of Period in one session:28			Credits
	No. of Periods Per Week			Full Marks	:	25	01
2047309	L	T	P/S	Internal (PA)	:	07	
	—	—	02	External (ESE)	:	18	

RATIONALE:

The student of first year of Mining & Mine surveying must be aware of the Mineral Industry in the country and the Departments, which deal with mineral exploration, exploitation, safety, conservation and controlof the mining industry. All technical definitions and terminologies connected with above are included here, as the students at this stage must be acquainted with these to cope up with the contents at later stage. Blasting is an important operation in all the mining operations. Knowledge of all the types of explosives, their properties and selection for different conditions/situation types of detonator/fuses etc is a must for them. Also, it is essential for a mining engineer to understand systems of support of the mine workings. These all aspects have been included in the subject.

OBJECTIVES:

After undergoing the course of study, the student shall be able to

1. State the various organizations engaged in coal and noncoal mining, their role and functions.
2. Understand various technical terms, operations involved in coal & noncoal mining.
3. Understand properties of explosives, procedure of conducting shot firing operation in underground coalmines with due regards to safety.
4. Understand the procedure of erection of temporary supports in underground coalmines.
5. State the major method of extraction of coal used in underground coal mines, their conditions of applicability.

LIST OF PROJECTS

1. Setting of Cross Bar in the gallery.
2. Withdrawal of supports by Using Sylvester machine.
3. Demonstration of different Types of permitted Explosives Cartridges.
4. Demonstration of Instantaneous Electric Detonator
5. Demonstration of delay Detonator used for Shot firing in underground Mines.
6. Demonstration of shot Firing tools.
7. Demonstration of single Shot and multi shot exploder.
8. Study of different Drill hole patterns used For blasting in stone drifts
9. Demonstration of Preparation of Priming Cartridge.
10. Demonstration of methods of Charging of holes (Direct & Inverse initiation) for Blasting in undergroundMines.
11. Demonstration of various Shot firing circuits.
12. Detection of misfire Shot and dealing with the misfire.
13. Sketch and Specifications Of explosive magazine

REFERENCE:

Author	Title	Year of Publication	Publisher
G.K. Pradhan	Explosive and Blasting Techniques	1996	Mintech publication Bhubaneshwar.
S.K. Das	Explosives and BlastingTechniques	1993	Lovely prakashanDhanbad.

PYTHON / OTHERS – TW

Subject Code 2000310	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	25	01
	L	T	P/S	Internal (PA)	:	07	
	—	—	02	External (ESE)	:	18	

CONTENTS	
UNIT – 01	Write a program to demonstrate basic data type in python.
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of 1+½+1/3….1/n
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.
UNIT – 07	Write a Python program to check if a string is palindrome or not.
UNIT – 08	Write a Python program to Extract Unique values dictionary values
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.
UNIT – 10	Write a Python program for Linear Search

PRACTICAL TRAINING PROJECT (TW)

Subject Code 2047311	Term Work						Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	Internal (PA)	:	15	
	—	--	04 Weeks	External (ESE)	:	35	

Learning from textbooks, lectures and other study material does not suffice for holistic learning. Practical, hands-on learning is essential for better understanding of work processes and business functions.

The practical training activityis important for students to relate their theoretical knowledge to practical aspects of the studied courses, in terms of mining unit operations, process and concepts, and impact of its activities on health, safety, environment and society.

Benefits of industrial visits to diploma students:

1. Industrial visits help them gain hands-on experience of how industryoperations are executed
2. Industry visits bridge the gap between theoretical training and practicallearning in a real-life environment
3. Industry visits provide opportunity for active/interactive learning experiences in-class as well outside the classroom environment
4. With industry visits, students are able to better identify their prospective areas of work in the overall organizational function.
5. Industry visits help enhance interpersonal skills and communication techniques.
6. Students become more aware of industry practices and regulationsduring industry visits.
7. Industry visits broaden the outlook of students with exposure to differentworkforces from different industries.

COURSE OUTCOMES:

After undergoing the course of study, the student shall have

1. Exposure to actual working environment
2. Acquisition of skills needed at actual work place to be supplemented by training
3. Follow safety practices and regulations inside the industry
4. Develop employability skills
5. Prepare reports

STRATEGY OF IMPLEMENTATION:

Conducting Industrial visits, seminars, group discussion, and practical assignments on different topics shall complete the curriculum for the subject.