

**Scheme of Teaching and Examination for
2nd Year of 3 Years Diploma in Mining Engineering**

Duration of Year: 28 Weeks

Student Contact Hours: 36 Hrs/week

Total Marks: 1600

Effective from: 2017 -18 Session

Sl. No.	Name of Subject	Subject Code	Subject	Teaching Scheme			Examination Scheme					
				L	T	P	Hours of Exam.	Full Marks of Subject	Final Exam / Committee Marks	Internal Assessment	Pass Marks Final / External Exam	Pass Marks in Subject
1.	Mining Methods – Opencast Working	M201	Theory	2	1	-	3	100	80	20	26	40
2.	Economics and Field Geology	M202	Theory	2	-	-	3	100	80	20	26	40
3.	Engineering Mechanics	M203	Theory	2	-	-	3	100	80	20	26	40
4.	Mine Surveying – II	M204	Theory	2	-	-	3	100	80	20	26	40
5.	Rock Engineering & Ground Control	M205	Theory	2	1	-	3	100	80	20	26	40
6.	Mine Ventilation	M206	Theory	2	-	-	3	100	80	20	26	40
7.	Mining Machinery – I	M207	Theory	2	-	-	3	100	80	20	26	40
8.	Environment Studies	M208	Theory	2	-	-	3	100	80	20	26	40
9.	Economics and Field Geology	M209	Practical	-	-	4	4	100	80	20	26	40
10.	Mine Surveying – II	M210	Practical	-	-	2	4	100	80	20	26	40
11.	Rock Engineering & Ground Control	M211	Practical	-	-	2	4	100	80	20	26	40
12.	Mine Ventilation	M212	Practical	-	-	2	4	100	80	20	26	40
13.	Practical Training Project - I	M213	Sessional	-	-	1*	-	100	60	40	-	50
14.	Application of GIS Auto CAD in Mining	M214	Sessional	-	-	2	-	100	60	40	-	50
15.	Engineering Mechanics	M215	Sessional	-	-	2	-	50	30	20	-	25
16.	Mini Project and Seminar	M216	Sessional	-	-	1	-	50	30	20	--	25
17.	Development of Generic Skills & Professional Practices	M217	Sessional	-	-	2	-	100	60	40	-	50
Total Hours of Teaching Per Week				16	2	18	36					

L: Lecture

T: Tutorial

P: Practical

* Per batch review, guidance and preparation of project report of practical training project work.

Note:

1. Period of Class hours should be of 1 hrs duration as per AICTE norms.
2. Practical / Sessional examinations will be held at parent institution.
3. Board will depute examiner for Practical examination.
4. Regarding sessional examination the parent institution will form a three member committee and this committee will examine the sessional records and hold viva of the examinee for 60 % marks allotted to the subject. Marks for remaining 40 % will be provided by the Faculty concerned on the basis of evaluation of each job / work throughout the semester.
5. Practical Training of 12 weeks shall be started after completion of 1st Year annual examination (Mandatory training for the partial fulfilment of Diploma).

Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : **Mining Methods - Opencast Working**
Subject Code : **M201**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
2	1	0	100	80	20	26	40	3 Hrs.

*Duration of year is considered 28 weeks

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 to blasting and other opencast mining activity.

Unit	Content	Contact Hours	Marks
1.	INTRODUCTION TO OPENCAST MINING 1.1 Classification of Surface Mining methods, Factors affecting choice of opencast mining methods; Advantages and disadvantages of opencast mining 1.2 Stripping Ratio: Maximum allowable stripping ratio, Overall stripping ratio, Break even		

	<p>stripping ratio</p> <p>1.3 Benches parameters: Height, width, angle of slope, toe, crest, statutory provisions regarding height, width, angle of slope etc.</p>		
2.	<p>OPENING UP OF DEPOSIT</p> <p>2.1 Unit operations involved, site preparation, Box cut, Entry system in opencast mines</p> <p>2.2 Opencast mine layout, factor determining choices of layout, overburden excavation, Disposal of overburden, overcasting etc,</p> <p>2.3 Sample layouts for Lime Stone, Copper, Coal, Iron ore deposits, method of work, machines required, manpower, OMS etc.</p>		
3.	<p>OPENCAST MINING MACHINERY</p> <p>3.1 Classification of Excavating equipment, selection, choices of opencast mining machinery.</p> <p>3.2 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.</p> <p>3.3 Dragline, operating parameters, applicability, working, advantages, disadvantages, comparison with shovel.</p>		
	<p>3.4 Bucketwheel and Bucket chain excavators. Application, advantages & disadvantages, operation, working methods by Bucket wheel excavator, terrace cut, Dropping cut etc.</p> <p>3.5 Rippers. Scrappers, bulldozer etc.</p> <p>3.6 Surface miner its application, working. In pit crushing system</p> <p>3.7 Precautionary measures while use of HEMM.</p>		
4.	<p>OPENCAST EXPLOSIVES</p> <p>4.1 Explosives used in opencast mine, ANFO, slurry explosive, emulsion explosives, Heavy ANFO explosive, LOX, their properties, composition etc. Boosters.</p> <p>4.2 Initiation system, non-electric initiation system, Raydets, Nonel, Shock Tubes, electronic detonators, etc.</p> <p>4.3 Bulk explosive system, site mixed slurry, site mixed Emulsion, Bulk-loading system. Advantages, ANFO precautions while mixing,</p>		

	<p>handling and use, Conditions for using bulk explosives.</p>		
5.	<p>BLASTING PRACTICE IN OPENCAST MINES</p> <p>5.1 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</p> <p>5.2 Simple numerical on blast design for the bench of surfaces mine</p> <p>5.3 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.</p> <p>5.4 Transport of Explosives in bulk, precautions while drilling and blasting of deep holes.</p>		
6.	<p>ENVIRONMENTAL ASPECTS OF OPENCAST MINING</p> <p>6. Environmental aspects of opencast mining Fly rock, ground vibration, air blast their causes & prevention. Noise pollution, water pollution, Degradation of land, land reclamation.</p> <p>6.1 Salient features of environment protection Act, EMP and Environment impact assessment.</p> <p>6.2 Slope stability: Causes of un-stability, forms of failure preventive measures.</p>		

STRATEGY OF IMPLEMENTATION:

Conducting theory classes, practical, Industrial visits, seminars, group discussion, and assignment on different topics shall complete the curriculum.

REFERENCE BOOKS:

Author	Title	Publisher
G.K. Pradhan	Explosive and Blasting Techniques	Mintech publication Bhubaneshwar.
S.K. Das	Surface Mining Technology	Lovely Prakashan Dhanbad.
S.K. Das	Explosives and Blasting Techniques	Lovely Prakashan Dhanbad.
D.J. Deshmukh	Elements of Mining Technology Vol I	Central techno publication, Nagpur
G.B. Misra	Surface Mining	Oxford University Press, Calcutta

Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : **ECONOMIC & FIELD GEOLOGY**
Subject Code : **M202**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
2	0	0	100	80	20	26	40	3 Hrs.
Practical (MI 209)		2	100	80	20	26	40	4 Hrs.

*Duration of year is considered 28 weeks

Material that needs to be explored comprises rocks and minerals. It is essential for engineers to have knowledge of mining geology

COURSE OUTCOMES:

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

1. Identify landforms in field
2. Explain the relation of landforms for mineral deposit and mining activity
3. Outline stratigraphy of India and mineral deposits
4. Identify the fossils
5. Explain the principle of formation of mineral deposit
6. Describe mode of occurrence, distribution and uses of ores.
7. Investigate minerals in field using geological, geophysical, geochemical method of prospecting
8. Mark the mineral prospect zone using remote sensing techniques.
9. Delineate suitable site for dam and reservoir and tunnel

Unit	Content	Contact Hours	Marks
1.	Geomorphology 1.1 Definition of landform 1.2 Forces changing the landforms 1.2.1 Endogenetic 1.2.2Exogenetic 1.3 Geomorphic agents and their landforms 1.3.1 landforms produced by mass movement		

	<p>1.3.2 Fluvial landforms 1.3.3 Aeolian landforms 1.3.4 Glacial landforms 1.3.5 coastal landforms 1.3.6 landform produced by groundwater</p>		
2.	<p>Paleontology</p> <p>2.1 Definition of fossil 2.2 Mode of preservation of fossil 2.3 Uses of fossils 2.4 Classification of animal and plant kingdom 2.5 Morphology and geological range of occurrence of animal fossils - order Foraminifera (Phylum protozoa), class corals (phylum Coelenterata), phylum brachiopoda, class gastropoda (phylum mollusca and class trilobite 2.6 Morphology and geological range of occurrence plant fossils - Glassopteris, Gangamopteris, Ptilophyllum</p>		
3.	<p>Stratigraphy</p> <p>3.1 principles of stratigraphy 3.2 standard stratigraphic and time scale 3.3 Tectonic divisions of India 3.4 Stratigraphy of India 3.4.1 Stratigraphic succession, lithology, distribution and economic mineral deposits of Precambrian basement in Singhbhum and Dharwar, 3.4.2 Stratigraphic succession, lithology, distribution and economic mineral deposits of Cuddapah supergroup, Vindhyan supergroup and Gondwana supergroup</p>		
4.	<p>Economic Geology</p> <p>4.1 Definition of ore, gangue, tenor 4.2 process of formation of ore deposits 4.3 morphology of principal type of ore deposits 4.4 Classification of ore deposits 4.5 Origin, mode of occurrence, distribution and uses of gold, iron, copper, manganese, chromium, Aluminum, Pb, zinc and petroleum 4.6 Metallogenic provinces of India 4.7 ore deposit through geological time in India</p>		
5.	<p>Exploration & Prospecting</p> <p>5.1 definition of prospecting and exploration 5.1.1 Geophysical prospecting 5.1.2 Geochemical prospecting 5.1.3 Geobotanical prospecting</p>		

	5.2 Remote sensing techniques for exploration		
6.	Engineering Geology 6.1 Geological investigation for site selection of dam and reservoir, tunnel, hill slope and rock cutting		
7.	Geology Mapping 7.1 Features of geological maps 7.1.1 topography 7.1.2 lithology 7.1.3 geological structure 7.1.4 signs and symbols 7.2 field equipment For geological mapping 7.3 features of toposheet 7.3 Method of collection of sample 7.4 completion and tracking of outcrop		

PRACTICAL:

- 1. Outcrop map preparation and interpretation. (Any Ten including Horizontal, Vertical and Inclined/Fault & fold outcrop)**
- 2. Toposheet interpretation and preparation of geological map on toposheet (Jharia, Raniganj and Rajmahal coal fields)**
- 3. Identification of ore mineral”: Galena, Chalcopyrite, Magnetite, Hematite)**
- 4. Identification of fossils : Trinobite, Gastropods, Glassopteris, Gangamopteris, foraminifera.**
- 5. Identification of landforms in satellite image : Fluvial, Aeolian, Glacitr, Landform.**
- 6. Interpretation of satellite image for Demarcation of outcrops of Vindhyan Supergroup, Cuddapah Supergroup, Singhbhum group on it**

STRATEGY OF IMPLEMENTATION:

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

REFERENCE BOOKS:

Author	Title	Publisher
Praveen Singh	Engineering and General Geology	Catson Educational Series
Umeshwar Prasad	Economic Mineral Deposit	CBS Publisher, New Delhi
D K Todd	Ground Water Hydrology	Willey and Sons, New York

K R Karanth	Hydrology	Tata Mcgraw Hills, New Delhi
P.K. Mukherjee	A text book of Geology	The world press pvt. Ltd. Calcutta.
A Laberson	Geology of Petroleum	
M B Dobrine	Introduction of Geophysical Prospecting	Mcgraw Hills
F.H. Lahee	Field Geology	

Course Name : Three years Diploma in Mining Engineering
 Year : Second
 Subject Title : **ENGINEERING MECHANICS**
 Subject Code : **M203**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
2	0	0	100	80	20	26	40	3 Hrs.
Sessional (MI215)		2	50	30	20		25	

*Duration of year is considered 28 weeks

Mechanics mainly deals with problems connected with motion or equilibrium of material and bodies and resulting interaction between them. Its purview come varieties of general and specialized engineering discipline connected with mining structures, machine mechanism or their parts.

Basic understanding of the concept and principles involved in mechanics is essential. Application of the principles to engineering situation relevant to mining should be emphasized.

COURSE OUTCOMES:

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

1. Understand the concept and principles of machines.
2. Apply the principles to solve engineering problems.

Unit	Content	Contact Hours	Marks
1.	Basic Concept Introduction of Engineering Mechanics, Rigid bodies, Basic and derived units, Kinetics and Kinematics, Scalar and Vector quantities, System of units, International system of units.		
2.	Force, Resolution & composition of forces 2.1 Definition of force, unit of force, Effect of force,		

	<p>Absolute and gravitational unit, characteristics of a force, System of forces, Coplanar and on Coplanar forces, concurrent and non-concurrent forces, parallel forces.</p> <p>2.2 Laws of forces, parallelogram law of forces, triangle laws of forces, law of polygon of forces, principles of physical impedence of forces, Principle of transmissibility.</p> <p>2.3 Composition of forces, Resolution of forces, forces acting in various quadrants.</p> <p>2.4 Definition of moments and its units in S.I. system, Types of moments, Definition of Couple, Types of Couple, Varignon's theorem of moments, Resultant & Equilibrant force.</p>		
3.	<p>Equilibrium</p> <p>3.1 Definition of Equilibrium Laws of Equilibrium, Analytical condition of equilibrium, Graphical conditions of equilibrium, Finding reaction of simply supported, overhang beams graphically, Free body diagrams, equilibrium of parallel forces & non parallel forces.</p> <p>3.2 Lami's Theorem and its application</p> <p>3.3 Beam reactions –Definition of beam, span. Types of beams, simply supported beam carrying concentrated loads and uniformly distributed loads.</p>		
4.	<p>Friction</p> <p>4.1 Concept of friction, Importance of friction in engineering. Useful and harmful effects of friction, Types of friction, Laws of friction, Limiting Equilibrium, Limiting friction, Coefficient of friction, Angle of friction, Angle of repose, Relation between coefficient of friction and Angle of friction.</p> <p>4.2 Equilibrium of bodies on level surface, Inclined plane with external forces acting in various directions. (Numerical)</p>		
5.	<p>Centroid and Center of Gravity</p> <p>5.1 Introduction, Difference between centroid and center of gravity, Method of finding out Centroid and center of gravity of regular figures such as Triangle, Rectangle, Circle, Semicircle, Trapezoidal.</p> <p>5.2 Center of gravity Solids, Sphere, Hemisphere, Cone, Frustum of cone, Pyramid Cylinder and hollow Solids.</p>		
6.	<p>Simple Lifting Machines</p> <p>8.1 Concept of machine, Definition of load, Effort,</p>		

	<p>Mechanical advantage, Velocity ratio, Input of machines, Output of machine. Efficiency of machine, Reversible and non-reversible machine.</p> <p>8.2 Ideal machine, Friction in machine, law of machine, maximum mechanical advantage, Maximum Efficiency.</p>		
7.	<p>Transmission of power by Belt and Rope</p> <p>9.1 Types of belts, Velocity ratio, Follower, driver, slip.</p> <p>9.2 Friction in belt, ratio of tension in belt, power transmitted by belt & ropes.</p> <p>9.3</p>		
8.	<p>Strength of materials.</p> <p>10.1 Concept of elastic, plastic and rigid bodies.</p> <p>10.2 Concept of axial loads, axial stresses (Compressive & tensile), axial strains, lateral strain, Poisson's ratio, volumetric strain, Composite section under axial load, modular ratio. Concept of bi axial & triaxial stresses. Definition of bulk modulus. Concept of temperature stresses.</p> <p>10.3 Elastic constants, concept of shear load, shear stresses & shear strain, modulus of rigidity, relation between 'E', 'C' and 'K'.</p>		
9.	<p>Moment of Inertia.</p> <p>11.1. Concept of moment of inertia, moment of inertia for plane areas such as rectangle, triangle, circle, semicircle and quarter circle.</p> <p>11.2. Parallel axis and perpendicular axis theorem, moment of inertia of composite sections.</p>		
10.	<p>Shear force & bending moment.</p> <p>12.1. Concept of shear force and bending moment. Definition sign convention. Relation between bending moment, shear force and rate of loading.</p> <p>12.2. Shear force & bending moment diagrams for simply supported beams, overhanging beams, and cantilever beams subjected to point loads and uniformly distributed loads, point of contraflexure.</p>		

SESSIONAL WORK:

- 1. Verification of Law of Polygon of forces.**
- 2. Study of forces in the members of JIB-CRANE.**
- 3. Verification of Lami's theorem.**

4. Verification of Equilibrium of parallel forces on beam.
5. Comparison of Co-efficient of friction between different surfaces.
6. Simple Wheel and Axle.
7. Differential Axle and Wheel.
8. Simple Screw jack.
9. Two sheave and three sheave pulley block.
10. Single Purchase Crab.
11. Double Purchase Crab.
12. Worm and Worm wheel
13. Study of U.T.M.
14. Tension test on mild steel.
15. Drawing S.F. D. & B.M.D. for six problems (Simply supported & cantilever beams with different types of loading). On A2 size drawing sheet.

STRATEGY OF IMPLEMENTATION:

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REFERENCE BOOKS:

Author	Title	Publisher
Khurmi	Strength of materials.	New delfi S. Chand & Co.
Timoshenko & Young	Engg Mechanics	New york: Mcgraw Hills.
Singer	Engineering Mechanics	London: Harper & Row.
Ramanutham	Applied Mechanics	Delhi: DhanpatRai& Sons.
Timo Sanko	Applied Mechanics	

Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : **Mining Methods - Opencast Working**
Subject Code : **M201**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
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*Duration of year is considered 28 weeks

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:

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2. Supervise the operations of the equipment used in opencast mines.
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Take proper care of environmental aspects, which may get affected due to blasting and other opencast mining activity.

Unit	Content	Contact Hours	Marks
1.	INTRODUCTION TO OPENCAST MINING 1.1 Classification of Surface Mining methods, Factors affecting choice of opencast mining methods; Advantages and disadvantages of opencast mining 1.2 Stripping Ratio: Maximum allowable stripping ratio, Overall stripping ratio, Break even		

	<p>stripping ratio</p> <p>1.3 Benches parameters: Height, width, angle of slope, toe, crest, statutory provisions regarding height, width, angle of slope etc.</p>		
2.	<p>OPENING UP OF DEPOSIT</p> <p>2.1 Unit operations involved, site preparation, Box cut, Entry system in opencast mines</p> <p>2.2 Opencast mine layout, factor determining choices of layout, overburden excavation, Disposal of overburden, overcasting etc,</p> <p>2.3 Sample layouts for Lime Stone, Copper, Coal, Iron ore deposits, method of work, machines required, manpower, OMS etc.</p>		
3.	<p>OPENCAST MINING MACHINERY</p> <p>3.1 Classification of Excavating equipment, selection, choices of opencast mining machinery.</p> <p>3.2 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.</p> <p>3.3 Dragline, operating parameters, applicability, working, advantages, disadvantages, comparison with shovel.</p>		
	<p>3.4 Bucketwheel and Bucket chain excavators. Application, advantages & disadvantages, operation, working methods by Bucket wheel excavator, terrace cut, Dropping cut etc.</p> <p>3.5 Rippers. Scrappers, bulldozer etc.</p> <p>3.6 Surface miner its application, working. In pit crushing system</p> <p>3.7 Precautionary measures while use of HEMM.</p>		
4.	<p>OPENCAST EXPLOSIVES</p> <p>4.1 Explosives used in opencast mine, ANFO, slurry explosive, emulsion explosives, Heavy ANFO explosive, LOX, their properties, composition etc. Boosters.</p> <p>4.2 Initiation system, non-electric initiation system, Raydets, Nonel, Shock Tubes, electronic detonators, etc.</p> <p>4.3 Bulk explosive system, site mixed slurry, site mixed Emulsion, Bulk-loading system. Advantages, ANFO precautions while mixing,</p>		

	<p>handling and use, Conditions for using bulk explosives.</p>		
5.	<p>BLASTING PRACTICE IN OPENCAST MINES</p> <p>5.1 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</p> <p>5.2 Simple numerical on blast design for the bench of surfaces mine</p> <p>5.3 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.</p> <p>5.4 Transport of Explosives in bulk, precautions while drilling and blasting of deep holes.</p>		
6.	<p>ENVIRONMENTAL ASPECTS OF OPENCAST MINING</p> <p>6. Environmental aspects of opencast mining Fly rock, ground vibration, air blast their causes & prevention. Noise pollution, water pollution, Degradation of land, land reclamation.</p> <p>6.1 Salient features of environment protection Act, EMP and Environment impact assessment.</p> <p>6.2 Slope stability: Causes of un-stability, forms of failure preventive measures.</p>		

STRATEGY OF IMPLEMENTATION:

Conducting theory classes, practical, Industrial visits, seminars, group discussion, and assignment on different topics shall complete the curriculum.

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Author	Title	Publisher
G.K. Pradhan	Explosive and Blasting Techniques	Mintech publication Bhubaneshwar.
S.K. Das	Surface Mining Technology	Lovely Prakashan Dhanbad.
S.K. Das	Explosives and Blasting Techniques	Lovely Prakashan Dhanbad.
D.J. Deshmukh	Elements of Mining Technology Vol I	Central techno publication, Nagpur
G.B. Misra	Surface Mining	Oxford University Press, Calcutta

Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : **ROCK ENGINEERING and GROUND CONTROL**
Subject Code : **M205**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
2	1	0	100	80	20	26	40	3 Hrs.
Practical (MI 211)		2	100	80	20	26	40	4 Hrs.

*Duration of year is considered 28 weeks

The Diploma holder in Mining and Mine surveying must have knowledge of Rock engineering as the underground opening are subject to accumulation of stress which make opening unstable, therefore he must understand the kind of support required to stabilize the opening. He also required to work as technical asst. in various Technical and Research Institutes, therefore he must have knowledge of different properties of rock and procedure of determining the properties of rock in laboratory and insides the mine. The mining engineer should have knowledge of Rock burst, bumps, precautions measure and methods of prediction etc.

COURSE OUTCOMES:

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

1. Classify to rock mass.
2. Identify the kind of support required to the excavation.
3. Conduct different laboratory test to determine properties of rock.
4. Carryout monitoring, predict and supervise and carryout preventive measures for rock burst, bumps etc.
5. Carryout and supervise roof bolting and stitching operation.

Unit	Content	Contact Hours	Marks
Group A			
1.	ORIGIN of SOIL & ITS FORMATION Weathering, Post Depositional changes, Sediment erosion, Transport and Deposition, Rock and		

	Mineral Stability.		
2.	SOIL as THREE PHASE SYSTEM Weight and Volume relationship, Inter relationship between three phase elements, Density and unit weight relationship		
3.	PERMEABILITY and SEEPAGE Darcy's Law, Effective Permeability, Laboratory determination of permeability (Falling and Constant Head), Seepage force and different heads, Quick Sand condition		
4.	SHEAR STRENGTH of EARTH PRESSURE THEORIES Columb's Law of shear strength, Direct and tri axial shear test, Rankine's theory of earth pressure, Active, passive and earth pressure at rest, Simple application on Cohesionless backfills.		
5.	STABILITY of SLOPES Finite and infinite Slopes, Factor of safety and slip surfaces, Method of slices for c- ϕ soil, Friction circle method, Taylor's and Bishop method, Stability number, Application to open cast mining.		
Group B			
1.	INTRODUCTION TO ROCK MECHANICS 1.1 Concept of stress and strain in rock, stress due to weight of strata, vertical lateral stresses. 1.2 Stress due to tectonic and orogenic force, Residual stresses, Induced stresses. 1.3 Field stresses 1.4 Introduction to elementary rock mass classification based on strength, hardness, RQD, Bieniawski RMR classification.		
2.	ROCK MASS PROPERTIES 2.1. Strength Properties: Compressive strength, Tensile Strength, Shear Strength, Flexural Strength. 2.2. Strength Indices- Point Load Strength index, Impact Strength index, Protodykonov strength index. Rebound hardness, insitu stress by flat jack 2.3. Material Characteristics: Brittle material, Ductile material, Elastic material, Plastic material. 2.4. Time dependent properties: creep, Creep curve, factors contributing Creep. Deformation, weatherability.		

3.	ROCK TESTING 3.1. Uniaxial compressive strength, Tensile strength – Brazilian test, Bending test. Shear strength test- punch shear test, Direct shear test on Rock cube, Triaxial method. 3.2. Determination of strength indices- point load strength index, Protodykonov strength index, impact strength index.		
4.	ROCK BRUST AND BUMPS 4.1. Rock burst, Bumps, causes controlling measures, factors affecting proneness to rock burst/Bumps. 4.2. Pillar Design- factors considered. Pillar design by tributary area approach, determination of factor of safety.		
Group C			
5.	MONITORING GROUND MOVEMENT 5.1. Classification of field instrumentation for ground control and rock mechanics studies. 5.2. Closure meters: Telescopic closure meter, Tape closure meter/ extensometer, and Remote indicating closure meter. 5.3. Borehole Extensometer: Rod type; Magnetic type. 5.4. Stress Meter, Bolt meter, Rock Bolt Pull Out Tester, Load Cell.Their application, working principle Construction etc.		
6.	GROUND CONTROL 6.1. Theories of mechanics of strata behavior: Dome or arch theory, Beam theory. 6.2. Function of roof bolts. Principle of Action Roof Bolts. 6.3. Varieties of Roof Bolts: Slot and Wedge, Expansion shell Grouted Roof Bolts, Resin Roof Bolts. 6.4. Anchorage Testing of Roof Bolts. 6.5. Bolt density. 6.6. Code of practice for roof bolting in underground mines. 6.7. Roof stitching, Principle of Roof stitching, Cable Bolting.		

PRACTICAL:

1. Sand bottle method of field density and void ratio
2. Determination of Plastic Limit, Liquid Limit and Shrinkage Limit

3. Falling head permeameter for permeability
4. Direct shear test for soil
5. Preparation of rock sample for laboratory testing.
6. Determination of uniaxial compressive strength of a rock sample.
7. Determination of tensile strength (Brazilian test) of a rock sample.
8. Determination of shear strength. of a rock sample.
9. Determination of point load strength index.
10. Determination of Protodykonov strength index.
11. Determination of impact strength index.
12. Demonstration of use of flat jack for in-situ stress determination.
13. Demonstration of Closure Meters, Extensometer, Stress cells and Load Cells
14. Demonstration of various Rock bolts.
15. Study of anchorage testing of rock bolts.
16. Demonstration of cable bolting.

STRATEGY OF IMPLEMENTATION:

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

REFERENCE BOOKS:

Author	Title	Publisher
D.J. Deshmukh	Elements of Mining Technology Vol I	Central techno publication, Nagpur
S.K. Das	Modern Coal mining Technology	Mintech publication Bhubaneshwar.
B.S. Verma	The elements of mechanics of mining ground	Tuhin& Co. Lucknow
Dr. B.P. Verma	Rock Mechanics for Engineers.	Khanna Publication Delhi.

Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : **MINE VENTILATION**
Subject Code : **M206**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
2	0	0	100	80	20	26	40	3 Hrs.
Practical (MI 212)		2	100	80	20	26	40	4 Hrs.

*Duration of year is considered 28 weeks

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 and controlling 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.

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 the desired standards.
2. Detect presence of inflammable and toxic/noxious gases in the mine and take precautions to remove the some and make the working places safe.
3. Provide and maintain ventilation appliances in their districts so as to ensure compliance with standards of ventilation prescribed.
4. Generally appreciate the ventilation system of a mine as a whole and importance of maintaining safe and comfortable working conditions inside the mine.

Unit	Content	Contact Hours	Marks
1.	<p>MINE AIR</p> <p>1.1. Different Gases / Damps found in mines, Definition of damps, their threshold limits, physiological effects, source of production and detection, Degree of gassiness of seam.</p> <p>1.2. Flame safety lamps, its principle, construction, safety features, and comparison. Detection of Methane by flame safety lamp.</p> <p>1.3. Methanometer its principle of working, construction. Principle of other method of detection of methane (description of equipment not required)</p>		
2.	<p>MINE CLIMATE</p> <p>2.1. Purpose and standards of ventilation, standards for minimum & maximum velocity of air for different locations.</p> <p>2.2. Pressure, ventilating press, watergauge.</p> <p>2.3. Temperature, sources of heat in mines.</p> <p>2.4. Moisture content of mine air relative humidity, wet bulb temperature, measurement of relative humidity.</p> <p>2.5. Cooling power of mine air, determination of cooling power, methods of improving cooling power of mine air, effect of heat and humidity on miners.</p>		
3.	<p>NATURAL VENTILATION</p> <p>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 natural ventilation pressure.</p>		
4.	<p>ARTIFICIAL VENTILATION</p> <p>4.1. 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,</p> <p>4.2. Comparison between axial flow & Centrifugal fan; exhaust & forcing Fan.</p> <p>4.3. Fan laws, Manometric efficiency overall</p>		

	<p>efficiency, theoretical depression produced by fan.</p> <p>4.4. Numerical on fan laws.</p>		
5.	<p>DISTRIBUTION & COURSING OF AIR IN MINES</p> <p>5.1. Laws of air flow in Mines, Atkinson's formula splitting, advantages & disadvantages, Numerical on splitting, equivalent orifice. Numerical on equivalent orifice.</p> <p>5.2. Ventilation appliances, Auxiliary ventilation: Different methods, advantages & disadvantages, hazards associated with auxiliary ventilation, precautions required.</p> <p>5.3. Booster fan: purpose, dangers associated, Precautions before installation. Numerical on Booster fan,</p> <p>5.4. Ascensional and Descensional ventilation, Advantages and disadvantages.</p>		
6.	<p>VENTILATION SURVEY</p> <p>6.1. Scope and importance of ventilation survey, survey interval and location of survey station, ventilation plan.</p> <p>6.2. Measurement of quantity & pressure difference, anemometer, pitot static tube, Manometer.</p> <p>6.3. Conduct of Pressure & quantity survey, precautions during and before conducting ventilation survey.</p>		

PRACTICAL:

1. Demonstration of co-detector and measurement of carbon monoxide using Co-detector.
2. Demonstration of Methanometer and measurement of methane using Methanometer.
3. Dismantling & assembling of different types of Flame safety lamps.
4. Detection of Methane using flame safety lamp
5. Demonstration of whirling hygrometer and determination of relative humidity using whirling hygrometer.
6. Demonstration of Kata thermometer and determination of cooling power by Kata thermometer.
7. Demonstration of water gauge and measurement of fan water gauge.
8. Demonstration of centrifugal mine fan.
9. Demonstration of Reversal arrangement of centrifugal mine fan.
10. Demonstration of Axial flow fan.
11. Demonstration of various ventilation devices.

12. Demonstration of vane Anemometer and determination of quantity by Anemometer.
13. Demonstration of velometer and measurement of air velocity by velometer.
14. Demonstration of Inclined manometer and pitot static tube and determination of velocity pressure.
15. Study of ventilation plan and conventional signs used in it.

STRATEGY OF IMPLEMENTATION:

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

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

Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : **MINING MACHINERY - I**
Subject Code : **M207**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
2	0	0	100	80	20	26	40	3 Hrs.

*Duration of year is considered 28 weeks

A large number of mining machineries are used in the mine right from the winding of men and material through shafts, transport of material, wire, power for drilling, cutting and loading of coal on the faces. Pumping operations are also essential to deal with accumulation of water in underground workings. A mining engineer should be aware of the types of machineries available for these operations, their principles of operations and suitability of these equipments under different conditions, so that they can supervise the selection, installation and day-to-day operation and elementary maintenance of these equipments.

COURSE OUTCOMES:

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

1. Have general knowledge of electrical supply system
2. Understand basic principles of motors, transformers, instruments etc.
3. Connect above equipments to supply.
4. Understand and implement different units and standards of measurements.
5. Understand the working of I.C. Engines
6. Understand the working of different types of compressors.
7. Select appropriate engineering materials required for various machines components.
8. Supervise installation, maintenance of ropes and attachments; safe operation and understand the methods of dealing with breakdowns.

Unit	Content	Contact Hours	Marks
1.	Electric Circuit Resistance, Current, Voltage, Work, Power and Energy Ohm's Law AC Current – Three phase & Single phase Storage Batteries- Constructing & working		
2.	Electrical Machine DC Machine: Construction & principles of operating, Magnetization and load characteristics of series, shunt and compound generators and motors. Motor starter, speed control and their field of applications. AC Motors: Construction and principles of operation , types of transformers, Efficiency and Regulations, Auto transformer		
3.	Power Supply System Transmission & distributing of Electrical power by overhead lines and cables Types of cables, layout of underground cables, shaft cables protection system and switchgear for mines like Relays, circuit breaker and fuses. Earthing and types of earthing Indian Electricity		
4.	Engineering Materials Chemical composition, properties and uses of following ferrous Metals: Cast iron, steel, Wrought iron, manganese steel, nickel steel, chromium steel, nickel- chromium steel, stainless steel. Nonferrous: Aluminium, copper, nickel, bronze, brass, copper nickel alloys, Aluminium alloys etc.		
. 5	Electronic Components, Fundamental of Semi conductor, P & N Types, P N Junction, Diodes & their Applications, Special Diodes, Transistor, Amplifiers		
6	Machines Internal Combustion Engine: Classification, Otto cycle, Diesel cycle. Two stroke & four stroke petrol engine. Two stroke & four stroke Diesel engine. Different systems like fuel injection, fuel ignition for petrol & diesel engines.		
	Air compressor: Classification, Definitions of different terms such as inlet pressure, discharge pressure, capacity, theoretical power, break power, free air delivery. Compressor efficiencies, Working of reciprocating Compressor. Single stage & multistage. Linter		

cooling, After cooling, Conditions of maximum efficiency, Uses of compressed air (no derivation

	<p>and proof of formula.) Rotary compressor: Roots blower, vane type blower, screw compressor, turbo blower, turbo compressor, centrifugal & axial flow compressor (no derivation of formula.)</p> <p>Brakes & Clutches: Breaks : Classification, Construction & working of block brakes, internal expanding brakes, hydraulic brakes, vacuum brakes (no numerical problems)</p> <p>Clutches : Construction & working of plate clutches, cone clutches, centrifugal clutch, claw clutch (no numerical problems)</p> <p>Hydraulics & Hydraulic machines: Properties of fluid, components of hydraulic circuits and their symbols, constructional details and working of hydraulic of shaper and hydraulic press.</p> <p>Types of pumps. Working principle of centrifugal pump, working principle of reciprocating pump. Uses of pumps in mining industry.</p>		
6.	<p>WIRE ROPES</p> <p>6.1. Classification of different types of wire ropes, Stranded rope, Non stranded rope, Different types of stranded rope, Different types of Non stranded rope, Lays of rope, Different definition like Space factor, static load, dynamic load, factor of safety.</p> <p>6.2. Selection of wire rope, Care and maintenance in ropes, Types of deterioration in the ropes</p> <p>6.3. Testing of wire ropes.</p> <p>6.4. Types of Rope capping, White metal capping (cone socket type capel), Wedge type capping (Reliance rope capel), Capping with split capel and rivets (Split capel), Recapping, Rope splicing procedure</p>		

STRATEGY OF IMPLEMENTATION:

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

REFERENCE BOOKS:

Author	Title	Publisher
Edward Huges	Electrical Technology	
H. Cotton	Electrical Technology	C.B.S. Publisher
B.L. Theraja	Electrical Technology	S.Chand
Malvino	Electronic Principles	
P.L.Ballaney	Thermal Engineering	
Avner	Engineering Metallurgy	Mcgraw Hill

D.J. DESHMUKH	Vol- III	Central techno publication, Nagpur.
S. GHATAK	Mine pump, haulage, winding.	Coal Field Publisher Asansol.

Course Contents:**Unit 1: The Multidisciplinary nature of environmental studies**

Definition, scope and importance, Need for public awareness.

Unit 2: Natural Resources**Renewable and non renewable resources:**

- a) Natural resources and associated problems
 - Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people.
 - Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.
 - Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, case studies.
 - Energy Resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies
 - Land Resources: Land as a resource, land degradation, man induces land slides, soil erosion, and desertification.
- b) Role of individual in conservation of natural resources.
- c) Equitable use of resources for sustainable life styles.

Unit 3: Eco Systems

- Concept of an eco system
- Structure and function of an eco system.
- Producers, consumers, decomposers.
- Energy flow in the eco systems.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following eco systems:
 - Forest ecosystem
 - Grass land ecosystem
 - Desert ecosystem.
 - Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT 4: Biodiversity and it's Conservation

- Introduction-Definition: genetics, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical,

- aesthetic and option values
- Biodiversity at global, national and local level.
- India as a mega diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity: habitats loss, poaching of wild life, man wildlife conflicts.
- Endangered and endemic spaces of India.
- Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT 5: Environmental Pollution

Definition Causes, effects and control measures of:

- a. Air pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes

Role of an individual in prevention of pollution Pollution case studies

Disaster management: Floods, earth quake, cyclone and land slides

Unit 6: Social issues and the Environment

- Form unsustainable to sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, water shed management
- Resettlement and rehabilitation of people; its problems and concerns, case studies
- Environmental ethics: issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environment protection Act
- Air (prevention and control of pollution) Act
- Water (prevention and control of pollution) Act
- Wildlife protection act
- Forest conservation act
- Issues involved in enforcement of environmental legislations
- Public awareness

Unit 7: Human population and the environment

- Population growth and variation among nations
- Population explosion- family welfare program
- Environment and human health
- Human rights
- Value education
- HIV / AIDS
- Women and child welfare
- Role of information technology in environment and human health
- Case studies

Unit 8: Field work

Visit to a local area to document environment assets river / forest / grassland / hill / mountain. Visit to a local polluted site-urban/rural/industrial/agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hills lopes, etc (field work equal to 5 lecture works)

Recommended Books:

1. Textbook of Environmental studies, Erach Bharucha, UGC
2. Fundamental concepts in Environmental Studies, D D Mishra, S Chand & Co Ltd

Diploma in Engineering (Common)

Subject Title : Development of Life Skills- I (Group-I)

Subject Code :M217

Rationale:

In today's competitive world, the nature of organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. He will be a part of a team in the organization. As such the individual skills are not sufficient to work at his best.

This subject will develop the student as an effective member of the team. It will develop the abilities and skills to perform at highest degree of quality as an individual as well as a member of core group or team. Such skills will enhance his capabilities in the field of searching, assimilating information, managing the given task, handling people effectively, solving challenging problems.

THE SUBJECT IS CLASSIFIED UNDER HUMAN SCIENCE. Objectives: The

students will be able to:

1. Develop team spirit i.e. concept of working in teams
2. Apply problem solving skills for a given situation
3. Use effective presentation techniques
4. Apply techniques of effective time management
5. Apply task management techniques for given projects
6. Enhance leadership traits
7. Resolve conflict by appropriate method
8. Survive self in today's competitive world
9. Face interview without fear
10. Follow moral and ethics
11. Convince people to avoid frustration

CONTENTS: Interaction by faculty / professional

Chapter	Name of the Topic	Suggested Hours
1	SOCIAL SKILLS Society, Social Structure, Develop Sympathy And Empathy.	01
2	Swot Analysis – Concept, How to make use of SWOT.	01
3	Inter personal Relation Sources of conflict, Resolution of conflict , Ways to enhance interpersonal rela	02

4	<p>Problem Solving</p> <p>I)STEPS IN PROBLEM SOLVING,</p> <p>1)Identify and clarify the problem, 2)Information gathering related to problem, 3)Evaluate the evidence, 4)Consider alternative solutions and their implications, 5)Choose and implement the best alternative, 6)Review</p> <p>II)Problem solving technique.(any one technique may be considered)</p> <p>1) Trial and error, 2) Brain storming, 3) Lateral thinking</p>	02
5	<p>Presentation Skills</p> <p>Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board</p>	03
6	<p>Group discussion and Interview technique – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making</p> <p>INTERVIEW TECHNIQUE</p> <p>Necessity, Tips for handling common questions.</p>	03
7	<p>Working in Teams</p> <p>Understand and work within the dynamics of a groups. Tips to work effectively in teams, Establish good rapport, interest with others and work effectively with them to meet common objectives, Tips to provide and accept feedback in a constructive and considerate way , Leadership in teams, Handling frustrations in group.</p>	02
8	<p>Task Management</p> <p>Introduction, Task identification, Task planning ,organizing and execution, Closing the task</p>	02
TOTAL		16

CONTENTS: PRACTICAL -

List of Assignment: (Any Eight Assignment)

1. SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.
 - a) Your past experiences,
 - b) Achievements,
 - c) Failures,
 - d) Feedback from others etc.
2. Undergo a test on reading skill/memory skill administered by your teacher.
3. Solve the true life problem.
4. Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc.(One activity per group)
5. Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.
6. Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme. #####
7. Conduct an interview of a personality and write a report on it.
8. Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed
9. Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments.

Mini Project on Task Management: Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management.

LEARNING RESOURCES:

BOOKS:

Sr. No	Title of the book	Author	Publisher
1	Adams Time management	Marshall Cooks	Viva Books
2	Basic Managerial Skills for All	E.H. Mc Grath , S.J.	Pretice Hall of India
3	Body Language	Allen Pease	Sudha Publications Pvt. Ltd.
4	Creativity and problem solving	Lowe and Phil	Kogan Page (I) P Ltd
5	Decision making & Problem Solving	by Adair, J	Orient Longman
6	Develop Your Assertiveness	Bishop , Sue	Kogan Page India
7	Make Every Minute Count	Marion E Haynes	Kogan page India
8	Organizational Behavior	Steven L McShane and Mary Ann Glinow	Tata McGraw Hill
9	Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, Pvt Ltd
10	Presentation Skills	Michael Hatton (Canada – India Project)	ISTE New Delhi

11	Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
12	Target setting and Goal Achievement	Richard Hale ,Peter Whilom	Kogan page India
13	Time management	Chakravarty, Ajanta	Rupa and Company
14	Working in Teams	Harding ham .A	Orient Longman

INTERNET ASSISTANCE

1. <http://www.mindtools.com>
2. <http://www.stress.org>
3. <http://www.ethics.com>
4. <http://www.coopcomm.org/workbook.htm>
5. <http://www.mapforprofits.org/>
6. <http://www.learningmeditation.com> <http://bbc.co.uk/learning/courses/>
7. <http://eqi.org/>
8. <http://www.abacon.com/commstudies/interpersonal/indisclosure.html>
9. <http://www.mapnp.org/library/ethics/ethxgde.htm>
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. <http://members.aol.com/nonverbal2/diction1.htm>
12. http://www.thomasarmstron.com/multiple_intelligences.htm
13. <http://snow.utoronto.ca/Learn2/modules.html>
14. <http://www.quickmba.com/strategy/swot/>

Subject Title : Professional Practices-II (Group -II)

Rationale:

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and their attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Prepare a report on industrial visit, expert lecture

Sl. No.	Activity Heads	Activities	Suggested Hrs
1.	Acquire information from different sources	Topic related to the branch and current area of interest i.e. articles in internet on which research or review is undergoing may be decided for the students group. The group may be restricted to maximum 5 students. Literature survey from Internet , print media and nearby practices may be undertaken. Minimum of 10 to 15 papers may be suggested for reading to get an overview and idea of matters.	12
2.	Prepare notes for given topic	Making review or concept to be penned down in form of a article .(the article or review may be of 8 – 10 pages length in digital form of 12 font size in Times New Roman font)	4
3.	Present given topic in a seminar	A seminar or conference or work shop on branch related topic is to be decided and all students in group of 5-6 students may be asked to present their views.	4
4.	Interact with peers to share thoughts	A power point presentation of the article prepared in stage 2 may be presented before the classmates and faculty members.	4
5.	Prepare a report on industrial visit, expert lecture	A topic on best practices and product / software development may be assigned to the student group. The group may be asked to prepare a survey, come to opinion making and list out the activities to develop the activities with SWOT analysis.	12

Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : **Practical Training Project - I**
Subject Code : **M213**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
		1 (for monitoring and guidance)	100	60	40		50	

*Practical Training of 12 weeks

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 activity is 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 industry operations are executed
2. Industry visits bridge the gap between theoretical training and practical learning 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 regulations during industry visits.
7. Industry visits broaden the outlook of students with exposure to different workforces 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.

Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : **Application of GIS and Auto CAD in Mining**
Subject Code : **M214**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
Practical (MI214)		2	100	80	20		40	4 hrs

*Duration of year is considered 28 weeks

To give emphasis on scientific and systematic exploitation of coal / minerals and to ensure sustainability of the resources, mining industry has realised the importance of technologies such as, GIS and Auto CAD for mining.

Use of GIS for mining has brought about a revolution by ensuring cost efficient and detailed studies of the concerned area. GIS for mining help in creation of maps that are an amalgamation of all the information regarding the concerned area.

Further, a system can be design to improve mine production efficiency, provide data query, information analysis and technical decision support for mine. It can be a GIS integrated system based on AutoCAD that can support image-text interactive queries and automatic drawing.

For this a basic knowledge of GIS software and Auto CAD software is required.

Course Outcomes:

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

1. Topographical & Physiographical mapping
2. Mineral mapping to identify potential mineral zones
3. Geological database creation
4. Map updation for mineral exploration
5. Surface mapping
6. Data Analysis and Report Generation
7. Assist in the preparation of blueprints and other engineering plans
8. Create precise 2- and 3-dimensional drawings

Suggestive Works:

Demonstration and Concept building: Introduction to GIS, Hardware and Software requirements, Scanning of maps, Printing of maps, Geographic Data, Spatial Data, Non-spatial Data input

- 1. Map Scale: Type and conversion, Vertical Exaggeration, Enlargement and reduction**
- 2. Map Projection: Concept, Classification, Polyconic Projection, Mercator Projection**
- 3. Representation of Statistical Data: Choropleths, Isopleths dots unimodel, two dimensional and 3 dimensional diagrams**
- 4. Relief Representation Techniques: Profile identification and representation of land forms from toposheets**
- 5. Demonstration of Raster and Vector model for representing geographic features using GIS**
- 6. Demonstration of attributes and spatial data in GIS**
- 7. Preparation of Topographical sheet using GIS**
- 8. Preparation of Physiographical map using GIS**
- 9. Creation of geological database using GIS**
- 10. Surface mapping using GIS**
- 11. Data Analysis and Report Generation**
- 12. Demonstration of CAD techniques for drawing**
- 13. Draw rectangles and circles with cross-hatching and automatic dimensioning using Auto CAD Software**
- 14. Demonstration of used of AutoCAD in mine design**
- 15. Demonstration of common features for manipulation of 3D drawing in CAD**
- 16. Preparation of CAD generated drawing**

STRATEGY OF IMPLEMENTATION:

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

REFERENCE BOOKS:

Author	Title	Publisher
RL Singh	Elements of Practical Geography	Kalyani Publishers.
BG Tamaskar & VM Deshmukh	Geographical Interpretation of Indian Topographical Maps	Orient Longman Ltd.
FE Croxton, DJ Cowden & S Klein	Applied General Statistics	Practice Hill India
K Ramamurti	Map Interpretation	Racks Printer
KK Gupta & VC Tyagi	Working with Maps	Survey of India
	Understanding Map Projection	GIS by ESRI, 2003-2004, USA

Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : **Project and Seminar**
Subject Code : **M216**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
Sessional (MI214)		2	50	30	20		25	

*Duration of year is considered 28 weeks

In spite of theory concept students acquire, various industries also need to know their capacity to complete projects using their specific initiative. The importance of mini project includes, it gives a chance to use their brain and hands, students can share their knowledge, increase self-confident.

The small project and seminar allow students to experience solving real world problems, working with other people under deadlines and with often ambiguous guidance.

Mini projects for diploma students gives an edge over the race of recruitment to work hard to ensure a good career.

Course Outcomes:

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

1. Use their technical knowledge to solve real world problems
2. Complete small projects using their specific initiative
3. Experience solving real world problems

Suggested broad areas for Project & Seminar:

1. Extraction of coal by different methods
2. Different development and depillaring method of Board and pillar method
3. Various longwall method based on direction of face advance, cyclic, non-cycling unit, double unit.
4. Indian Geological Formations, Prospecting and Exploration
5. Application of principles of mechanics and strength of materials for general and specialized engineering aspects connected with mining structures, machine mechanism or their parts

6. Conduct survey to plot positions of underground workings, establish underground bench marks incorporate on mine plan and prepare sections of underground workings for proper planning of production and excavation operations.
7. Conduct laboratory and insitu tests on rock mass, understand the kind of support required to stabilize the excavation, reinforce the excavation openings by bolting/stitching and monitor the performance of support system
8. Maintain the adequate ventilation in underground workings and ensure safe & comfortable working conditions inside the mine
9. Use and maintenance of mining machines for getting desired result
10. Concerned faculty can assign any project related to their courses of studies

STRATEGY OF IMPLEMENTATION:

Conducting Industrial visits to assign area for project and seminar.