**RAJASTHAN ILD SKILL UNIVERSITY (RISU) JAIPUR**

**(A State Government University)**

THIRD SEMESTER PAPERS/SUBJECTS

1. UNDERGROUND COAL MINING

**SEMESTER : III**

**COURSE TITLE : UNDERGROUND COAL MINING**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Periods per week** | | **HRS OF EXAM** | **scheme of examination** | | | | **TOTAL** | **CREDIT** |
| **THEORY** | **P** | **THEORY** | | | **PRACTICAL** |
| **L** | **ESE** | **CT** | **TOTAL** | **ESE** |
|  | 4 | - | 3 | 80 | 20 | 100 | - | 100 |  |

RATIONAL:

Though the present trend of mining is for opencast mining, the importance of underground mining can not be ignored. Future of coal is underground mining.The deep deposits of coal can only be worked by underground mining. It is also a fact that accident ratio are more in under-ground mining than in open cast mining, yet where the over burden ratio is beyond working limit, underground mining becomes the necessity. This course is designed to make students comprehend different mining methods used for underground mining of coal, safety measures and management of other related operations.

DETAIL COURSE CONTENT

CHAPTER 1: Applicability of underground coal mining, relative advantages and disadvantages, methods of underground coal mining, cyclic and continuous mining, relative advantages.

1.1 Introduction to Pit Top and Pit Bottom layout: Basic requirements of pit top layout, factors affecting the pit top and pit bottom layouts, ideal pit top and pit bottom layout, Tub circuit, study of pit top and pit bottom lay outs of important underground mines of India.

CHAPTER 2: BORD AND PILLAR AND ROOM AND PILLAR METHOD OF WORKING:

2.1 Development: Types of panel formation, panel system, whole followed by broken method layout, size of panels, orientation, number of headings, machines, formation of pillars, gallery width and height, pillar dimension, shape of pillars, pillar strength, load on pillars, factor of safety, steps of operations for development, drilling, blasting, loading, transportation, support, ventilation, ventilation circuit, face ventilation, face support, face machines.

2.2 Extraction of pillars: Advantages and disadvantages of mining with caving and stowing method, Sequence of extraction, manner of extraction, splitting and stooking, splitting and slicing, size of splits and slices, rib pillars and its dimensions. Steps of operation during extraction, supporting, goaf edge support, overriding of pillars, caving span and air-blast, precautions against air-blast.

* 1. Mechanised Bord and pillar working:

1. with SDL /Tub combination, LHD/Tub combination and SDL/Chain conveyor combination
2. with Scraper/ Loader.
3. Continuous Miner-Road Headers and Dint Headers layouts.

Advantages of panel system over board and pillar.

2.4 ROOM & PILLAR MINING: Room and Pillar method of mining – layout, dimensions, factors affecting size of panels, types of room and pillar mining – split and fender, Wongawilli, Rib-Pillar, face machineries and their deployment, face support. face ventilation, communication, hazards and precautions

CHAPTER 3. COAL FACE MACHINERY: Electric coal drills & Jumbo drill- its operation, constructional features, specifications & use, drill rod, drill bits. Coal cutting machines- use, different types, constructional features, chain driving mechanism, haulage driving mechanism, jib, chain, pick, mounting arrangement.

CHAPTER 4: POWERED SUPPORTS

* 1. Powered supports, principle of operation of power supports, classification of power supports, designation of power supports, major application of power supports, hydraulic fluids.

CHAPTER 5: LONGWALL METHOD OF WORKING

* 1. Suitable working conditions, comparison between advancing and retreating method of longwall working, layout of single unit and double unit faces, roof support in the system.
  2. Sequence of operations, installation of Longwall face, face ventilation, Longwall strata behavior, periodic weighting, main weighting, weighting intervals, abutment pressure.
  3. Face support –Powered supports –types (Chock, Shield, Chock-shield), capacities, structural features of powered supports, strata monitoring.
  4. Water spraying, dust suppression, frictional ignition
  5. Single ended drum. Double ended drum shearer: layouts, conveyors, sumping method.
  6. Ploughs- applicability construction layout.
  7. Mechanized Long wall mining.

A- Layout

B- Conveyors

C- Drum Shearer

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SUGGESTED INSTRUCTIONAL STRATEGIES:

* + Lecture method
  + Industrial visit
  + Expert Lecture
  + Demonstration

##### Reference Books:

|  |  |  |
| --- | --- | --- |
| **Sl.No.** | **Title** | **Author, Publisher, Edition and Year** |
| 1. | Mines planning for coal | S. P. Mathur |
| 2. | Surface Mining Technology | Sameer Kumar |
| 3. | Modern Coal MIning Technology | -- -- |
| 4. | Coal Mine Ground Control Vol- II | Syed. S. Peng |
| 5. | Underground Winning of Coal | T. N. Singh |
| 6. | Mine Working Part I & II | H. N. Karmkar |
| 7. | Elements of Mining Technology Vol.I | D. J. Deshmukh |

**RAJASTHAN ILD SKILL UNIVERSITY (RISU) JAIPUR**

**(A State Government University)**

1. Underground Metal Mining

**SEMESTER : III**

**COURSE TITLE : UNDERGROUND METAL MINING**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Periods per week** | | **HRS OF EXAM** | **scheme of examination** | | | | **TOTAL** | **CREDIT** |
| **THEORY** | **P** | **THEORY** | | | **PRACTICAL** |
| **L** | **ESE** | **CT** | **TOTAL** | **ESE** |
|  | 3 | - | 3 | 80 | 20 | 100 | - | 100 |  |

RATIONALE:

DETAIL COURSE CONTENT

1. Mine Structures: Construction of mine portals, shaft insets and plats; ore and waste bins; skip-pockets, engine chambers, ore passes, chutes, garages, grizzlies. Underground chambers and sumps and other subsidiary excavations.
2. Secondary Breaking: Conventional, electrical and mechanical methods.
3. Stoping Methods: Selection of stoping methods, classification of different mining methods, Stope layouts and stope preparation work with different stoping methods. Haulage and dumping, ventilation, loading, underground crushing.
4. Open stoping method: Room and Pillar, Sub-level, Shrinkage, Blast Hole and Vertical Crater Retreat, Stoping and their variations.
5. Supported stoping methods: Timber, Post and Pillar, Square Set, Cut and Fill and their variations.
6. Fill Support: Material of backfill and its’ procurement; sand gathering plant, theoretical aspects of slurry transportation; preparation, transport and placement of hydraulic backfill with and without cement; rock and concrete fills, surface arrangement for storage and mixing; pneumatic and mechanical methods of backfill.
7. Caving Stoping methods: Top slicing, sub-level caving, block caving and their variations. Design and construction of draw points, mechanics of draw and draw control procedures, recovery and dilution. Stoping of superimposed veins and parallel ore bodies. Combined methods.

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## Reference Books

|  |  |  |
| --- | --- | --- |
| **Sl.No.** | **Title** | **Author, Publisher, Edition and Year** |
| 1. | Mines planning for coal | S.P. Mathur |
| 2. | Surface Mining Technology | Sameer Kumar DGS |
| 3. | MordernCoal mining Technology | -- -- |
| 4. | Coal mine ground control Vol- II | Syd. S. Peng |
| 5. | Under ground Winning of coal | T.N. Singh |
| 6. | Mine Working Part I & II | H.N. Karmkar |

**RAJASTHAN ILD SKILL UNIVERSITY (RISU) JAIPUR**

**(A State Government University)**

1. MINE VENTILATION

**SEMESTER : III**

**COURSE TITLE : MINE VENTILATION**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Periods per week** | | **HRS OF EXAM** | **scheme of examination** | | | | **TOTAL** | **CREDIT** |
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| **L** | **ESE** | **CT** | **TOTAL** | **ESE** |
|  | 4 | 2 | 3 | 80 | 20 | 100 | 100 | 200 |  |

RATIONALE:

DETAIL COURSE CONTENT

CHAPTER- 1 MINE ATMOSPHERE

* 1. Pollution of mine atmosphere
  2. Mine gases.
  3. Origin and occurrence of mine gases.
  4. Effects and detection of mine gases.
  5. Methane drainage
  6. Monitoring system of mine environment
  7. Analysis of mine air

CHAPTER – 2 HEAT AND HUMIDITY

* 1. Heat and humidity in mine atmosphere and their effects
  2. Cooling power of mine air
  3. Assessment of comfort conditions
  4. Air conditioning of mines, surface, underground and divided installations
  5. Spot coolers

CHAPTER – 3 MINE VENTILATION SYSTEM

* 1. Object and standard of ventilation
  2. Degree of gassiness of mines, composition of mine air
  3. Measurement of air quantity, pressure and velocity
  4. Law of air flow in mines, flow of air in ducts and mine roadways, resistance of air ways, Chezy’s and Atkinson’s equations
  5. Equivalent resistance and equivalent orifice of mine
  6. Regulations related with above topics, ecological and environmental laws related to mines
  7. Dust monitoring
  8. Mechanical ventilation, different types of fans used in mines, theoretical characteristics of centrifugal and axial flow fans, forcing and exhaust fans, relations between pressure quantity and power of fan, numerical calculation, fan drift, their constructional feature, auxiliary and booster fans, constructional feature, splitting of air current, advantage of splitting, reversal of air current, ventilation survey, pressure survey and quantity survey.

CHAPTER – 4 NATURAL VENTILATION

* 1. Natural ventilation and its measurements
  2. Thermodynamics of natural ventilation
  3. Distribution and control of air current
  4. Accessories of ventilation used in mines – Door, regulator, stoppings, air lock, air crossing, brattice

CHAPTER – 5 MINE LIGHTING AND COMMUNICATION

* 1. Lighting sources in mines, cap lamps, constructional feature of lamps
  2. Underground lighting
  3. Flameproof and intrinsically safe lighting
  4. Lamp room layout, lamp room organization, care and maintenance of cap lamps

Wireless communication in underground mines.

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SUGGESTED INSTRUCTIONAL STRATEGIES:

* Lecture method
* Demonstration
* Field Practice

SUGGESTED LEARNING RESOURCES:

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## Reference Books:

|  |  |  |
| --- | --- | --- |
| **Sl.No.** | **Title** | **Author, Publication, Edition & Year** |
| 1. | Elements of Mining Technology Vol.2 | D.J.Deshmukh |
| 2. | Mine ventilation | G.B.Mishra |

1. Others:

* VCDs
* Video cassettes
* Learning packages

**RAJASTHAN ILD SKILL UNIVERSITY (RISU) JAIPUR**

**(A State Government University)**

1. MINING MACHINERY

**SEMESTER : III**

**COURSE TITLE : MINING MACHINERY**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Periods per week** | | **HRS OF EXAM** | **scheme of examination** | | | | **TOTAL** | **CREDIT** |
| **THEORY** | **P** | **THEORY** | | | **PRACTICAL** |
| **L** | **ESE** | **CT** | **TOTAL** | **ESE** |
|  | 4 | - | 3 | 80 | 20 | 100 | - | 100 |  |

RATIONALE:

DETAIL COURSE CONTENT

CHAPTER – 1. Mine Transport System

1.1 Different types of Rope Haulage - description with simple sketches.

1.2 Different types of safety devices on rope haulages including Jazz rail, Back catch, Spring catch, Drop warrick, Inter-coupled stop block & runway switch, Drags, tub retarder.

1.3 Different types of rope clips, tub couplings.

1.4 Size of rail sleepers & rail fastening, fish plates, ballast, Jim crow, Super elevation, Transition curve, Reverse curve, Goose neck curve, Diamond crossing.

1.5 Different types of conveyors- shakers conveyor, belt conveyor, scraper chain conveyor, & armoured flexible conveyor; their principles of operation, application, merits and demerits. Drive of belt conveyor, loop take-up arrangement, troughed belt, carrying capacity of belt conveyor.

1.6 Different types of locomotive haulage systems their application merits and demerits. Safety devices of Diesel locomotives including flame trap and exhaust conditioner box. Feeder breakers,

1.7 Electrical LHDs, SDLs and mine utility vehicles,

CHAPTER – 2. Winding System

2.1 Function of headgear- height of headgear - different factors, design of headgear, headgear pulley, constructional features, angle of fleet.

2.2 Cage - constructional features, cage suspension gear, detaching hook and its function, safety catches at headgear, keps-props & guides used in mine shafts rigid and flexible guides, guide shoes, guide rope suspension & tensioning arrangement, guide rope & winding rope changing.

2.3 Winding Drum Different profile of winding drum- merits & demerits, attachment of winding rope to drum. Winding brakes - mechanical-post and caliper brakes Various safety devices on winding system including automatic contrivances for over wind, over speed and slow banking etc.

2.4 Friction winding principle, Ground Koepe and Tower Koepe, advantages and disadvantages of the system, Multi-rope system of winding, rope creep.

2.5 Skip winding Skip its constructional features its difference with cage winding, operation of

skip.

2.6 Man riding system.

CHAPTER – 3. Wire Ropes and Rope Capel etc.

Wire- testing of wires of rope, construction of various types of rope used in mining; factor of safety of rope; nominal and actual F.O.S. and factors influencing the F.O.S. efficiency of rope construction, space factor, bending factor etc; laying of rope, deterioration of rope, care and maintenance of rope in use and also in storage; splicing of haulage rope; calculation of size of winding rope; examination of rope; life of rope and norms for discarding a rope. Rope caple for haulage, winding and recapping.

CHAPTER –4.

Flame proof & intrinsically safe apparatus- application, features & safety aspects. Underground signaling arrangement- haulage signals, shaft signals and use of telephone underground.

CHAPTER – 5. Mine Pumps

Sources of water in pump. classification of mine pumps; basic definition of head, suction, lift, suction head, discharge head; friction of water in pipes. Causes of water hammer & cavitation, use of air vessels, Principle and operation of Siphon. Ram pump- constructional features, working and use. Constructional features , working and use of Rotodynamic pump like Centrifugal and Turbine pump-, End thrust in Turbine pump & its balancing, characteristic curve for turbine/Centrifugal pump, Arrangement of different valves and other components in Centrifugal / Turbine pump. Mono/ Roto pump - constructional features , working and use. Troubles in pumps & remedial measures. Pump calculations - numerical problems. Main sump at pit bottom.

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REFERENCE BOOKS:

1. Opencast mining By C.P.Singh.
2. Surface mining By G.B.Mishra.
3. Elements of Mining-II By D. J Deshmukh
4. Mining and Working By S. Ghatak
5. Elements of Mining Vol-III By D. J. Deshmukh
6. Mine Fires, Explosion, Recovery By M. A. Ramlu.

and Inundations

1. Water Problems in Mines By Rakesh & M. C. Lele
2. Mine Disasters in india VOL I & II By National Councile of Safety in Mines
3. Combating coal fires By Dr. B. Singh
4. Mining of Coal By S. Ghatak

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**RAJASTHAN ILD SKILL UNIVERSITY (RISU) JAIPUR**

**(A State Government University)**

1. Rock Mechanics and Strata Control

**SEMESTER : III**

**COURSE TITLE : ROCK MECHANICS AMD**

**: STRATA CONTROL**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Periods per week** | | **HRS OF EXAM** | **scheme of examination** | | | | **TOTAL** | **CREDIT** |
| **THEORY** | **P** | **THEORY** | | | **PRACTICAL** |
| **L** | **ESE** | **CT** | **TOTAL** | **ESE** |
|  | 3 | 2. | 3 | 80 | 20 | 100 | 100 | 200 |  |

RATIONALE: Strata control is one of the most important aspects of safety in open cast as well as underground mines. It is also important for the students to be fully aware of different strata control techniques adopted in different situations in the field. This also requires to understand the basic concept of strata control mechanism and principle of supports in mining. This course will enable students to comprehend the essential requirements in this area to function effectively.

DETAIL COURSE CONTENT

1. ROCK MECHANICS:

Application of Rock Mechanics.

Stress and strain in rock: Analysis of stress, strain and constitutive relations n isotropic and anisotropic rock under static and dynamic loading.

Physico-mechanical Properties of Rock:

Determination of physical properties, strengths, RQD, RMR, strength indices and static elastic constants; parameters influencing strength, abrasivity and of its determination. Specific gravity, hardness, porosity, moisture content, permeability, swell index, slake durability, thermal conductivity.

Behavior of Rock mass: Rock mass structure, classification in-situ elastic properties and strength determination.

Failure Criteria for Rock and Rock mass: Mechanics of rock failure; Coulomb, Mohr and Griffith criteria; empirical criteria.

Pre-mining state of stress: sources, methods of determination including over coring and hydro-fracturing methods.

Ground Water: Influence of water on rock and soil behavior; permeability of rocks; measurement of permeability; ground water flow in rock mass; measurement of water pressure.

1. SUPPORTS:

Timber & Steel supports, Examination of Roof, Roof Bolting, Roof stitching, Hydraulic roof bolters, Cable Bolting

* 1. Method of supporting roadways, supporting under different conditions viz: pit bottom, crossing , junctions, faulted area,
  2. Support loads, Systematic Support Rules, Support plan, Support withdrawal.

1. STOWING:
   1. Principal methods of stowing - hand packing, hydraulic, pneumatic and mechanical, their relative merits and applicability, face arrangements, pipe wear, pipe jams.

Power plant fly ash, crushed overburden and other rejects to be used as stowing material in underground coal mines.

1. STRATA CONTROL:

Basic concepts of ground movement, rock pressure due to narrow and wide excavation, support estimation as per the RMR, Failure of roof and floor, measurement of strata movement, definition of rock burst, bumps, gas outbursts, pot holes. Strata Control and Management Plan (SCAMP).

1. SUBSIDENCE:
   1. Basic concept of subsidence, damage and loss due to subsidence, vertical and lateral movements and their estimation, angle of fracture and angle of draw, factors affecting subsidence, subsidence control, protection of surface structures, introduction of protection pillars including shaft pillars.

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SUGGESTED INSTRUCTIONAL STRATEGIES:

Lecture method

Industrial visits

Expert lecture

Demonstration

## Reference Books:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Title** | **Author, Publisher, Edition & year** |
| 1. | Strata Control in Mines | Chang and Peng |
| 2. | Winning and Working of Coal | R.T. Deshmukh and D.J.Deshmukh |
| 3. | Modern Coal Mining Practices | R.D. Singh |
| 4. | D.G.M.S. Circulars (Tech.) 1995 Onwards |  |
| 5. | Longwall Mining | Syed. S. Chang and Peng |

Others:

Learning Packages

Lab Manuals

Charts

Models

**RAJASTHAN ILD SKILL UNIVERSITY (RISU) JAIPUR**

**(A State Government University)**

1. ADVANCE MINE SURVEYING

**SEMESTER : III**

**COURSE TITLE : ADVANCE MINE SURVEYING**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Periods per week** | | **HRS OF EXAM** | **scheme of examination** | | | | **TOTAL** | **CREDIT** |
| **THEORY** | **P** | **THEORY** | | | **PRACTICAL** |
| **L** | **ESE** | **CT** | **TOTAL** | **ESE** |
|  | 3 | 2. | 3 | 80 | 20 | 100 | 100 | 200 |  |

RATIONALE:

Statutory provisions

gulation

1961,

require

employment of

a mine

surveyor,

having

certificate of

competency to work in mines, as a surveyor, granted by board of mining examination under the chairmanship of “Director General of Mines Safety” of Govt. of India.

BME has granted an exemption to pass outs of three years Diploma in mining and mine surveying from appearing in the examination for certificate of competency this exemption is the special achievement and credit to this diploma, in the country ; and this

honor

and

status

is awarded

only on

the

ground

of adequate

theoretical

& Practical

teaching of the following subjects in the final year :-

1. Rectangular coordinate system.
2. Tachometry
3. Curves
4. Triangulation survey .
5. Correlation survey
6. Stope surveying
7. Open cast mine surveying.
8. Drifts, Dip, Strike borehole problems
9. Faults problems..
10. Modern survey technique
11. Introduction to Arial photography

with the acquired skill of maintaining the standard of accuracy a student will become qualified mine surveyor as target to achieve designed by this course.

DETAIL COURSE CONTENT

CHAPTER- 1 RECTANGULAR COORDINATE SYSTEM

* 1. Definitions; latitudes & departures.
  2. Partial latitude and partial departures.
  3. 1.3

Calculation of

Partial latitude and partial departures

* 1. Total latitude and total departures
  2. 1.5
  3. 1.6
  4. 1.7
  5. 1.8

Calculation of Calculation of Calculation of Calculation of

Total latitude and total departures

length & bearing from total coordinates. Area by Partial coordinate

Area by total coordinates Methods

* 1. National grid system.
  2. To join colliery survey with N.G.

CHAPTER- 2 TACHEOMETRY

* 1. General
  2. Stadia Diaphram and its principle.
  3. Theory of analytic lens.
  4. Determination of Multiply and additive constant.
  5. Tachometric survey.

CHAPTER- 3 CURVE

* 1. Definition & properties of circle.
  2. Types of Curves.
  3. Nomenclature of a simple circular curve.
  4. Elements of simple curve ( Circular )
  5. Pet Interval , Degree of curve.
  6. 3.6

Classification of curve

ranging method.

* 1. Methods of simple circular curve ranging .
     1. Chain and tape
        1. By successive bisection of arc.
        2. by taking perpendicular off sets from tangents.
        3. by taking perpendicular off sets from long chord
        4. Chord and off set method.
     2. Instrumental methods.

method method)

i)

ii)

iii)

Chord and angle method (tangential angle

by taking angles from single station .( ranking

by taking angles from Two stations.

D. U/G curve ranging methods.

* 1. 3.8

Super Elevation.

i)

ii)

chord and off set methods Chord and angle methods

3.9 Numerical Problems on simple circular curve.

CHAPTER- 4

TRIANGULATION SURVEY

* 1. Definition & principle of Triangulation

survey.

* 1. Classification of Triangulation survey
  2. Fixing of
  3. Selection

Stations. of site for

Base line.

* 1. Sequence of operation before base line measurement.
  2. Equipments required for base line measurement.
  3. measurement of base line
  4. Correction required in base line measurement.
  5. Prolongation of a base line .
  6. Adjustment of horizontal angles.
  7. Colliery Triangulation
  8. Precautions in Measuring angles and base line.
  9. Triangulation and Precise traversing.
  10. True north determination (App. Method)
  11. 4.15

Methods

of determining true north astronomical

Method.

* 1. 4.16

determination

of True north in day time by observing sun.

station

Method of determining latitude and longitude of

a survey

determination

Definition of

astronomical survey and

Important

terms ,

of azimuth by astronomical observation.

CHAPTER- 5 STOPE SURVEYING

5.1 Definition and Introduction, purpose of stope survey.

5.2

Methods of stope surveying for steeply inclined ore deposits.

flat, moderately inclined and

5,3 Modern technology to measure volume – use of software

* 1. Volume of stocks,
  2. Introduction to 3D scanners.

CHAPTER- 6 OPEN CAST MINE SURVEYING

* 1. fixing of stations around boundary.
  2. fixing of stations on benches.
  3. taking techeometric observation to check the position of stations.
  4. 6.4

Levelling operation to

determine the R.L. of Station

points.

* 1. to conduct traverse survey to determine the exact position of stations.
  2. To conduct off set survey to determine the position of bench.

CHAPTER- 7 CORRELATION SURVEY

* 1. Purpose of correlation survey.
  2. classification of methods of orientation.
  3. Direct methods of traversing .
  4. Assumed bearing method ( Two shaft method).
  5. Exact alignment method.
  6. Approximate alignment method.
  7. 7.7

Wiessqudrilateral

method.

* 1. Special chain of tape method.
  2. Precise magnetic method.
  3. Gyrotheodolite method.
  4. Correlation with national grid and local scale factor.

CHAPTER- 8

DRIFT AND FAULT PROBLEM

* 1. Definition , fault, normal, reverse and trans current fault, fault plane hade

of fault , throw, want heave, excess.

* 1. Numerical problems on drift and fault.

CHAPTER- 9 INTRODUCTION TO MODERN SURVEY TECHNIQUES

9.1 Digital theodolite , electronic distance measuring equipment , Geodimeter; Tellurometer, Total station , Diatomite, software’s

CHAPTER- 10

related to

mine surveying.

INTRODUCTION TO AERIAL PHOTOGRAPHY

* 1. General Principle; Phototheodolite; Stero photographic surveying; aerial
  2. surveying- field of application ; Vertical and oblique

photographs; aerial photography; preparation of photographical maps by simple methods;

Aerial survey by Drones and GPS,

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## Reference Books:

|  |  |  |
| --- | --- | --- |
| Sl.No. | Title | Author, Publisher, Edition and Year |
| 1. | Mining Suveying Vol-I& II | S.Ghatak |
| 2. | Surveying and leveling Vol-II | Kanetkar and Kulkarni |
| 3. | Surveying Vol-II | B.C. Punamia |
| 4. | Advance Surveying | Alam chand |
| 5. | Advance mine Surveying | D.C. Clark |
| 6. | Surveying Vol-I& II & III | Arora |

### SUBJECT: ADVANCE MINE SURVEYING LAB

LIST OF PRACTICAL

1. To
2. To
3. To

traverse an area by included angle method. traverse an area by deflection angle method. traverse an area by Continuous azimuth method.

measuring

1. To

determine the height of an electric

pole / building tower by

vertical angle from a single station.

measuring

1. To

determine the height of an electric

pole/building tower by

given

vertical angle from a Two station.

1. To determine the constant of given a teacheometer.
2. To determine the distances from the Instrument stations to the stations.

intercept.

1. To

traverse an area by measuring horizontal angles and staff

1. To range a curve by successive bisection of arc.
2. To range a curve by taking perpendicular off sets from tangents.
3. To range a curve by taking perpendicular off sets from long chord.
4. To range a curve by chord of off sets method.
5. 13.

To range a curve by chord

and angle method.

1. To range a curve by measuring from single station.
2. To range a curve by measuring angles from two stratification.
3. To prolong a given base line up to a given length.
4. 17.

To Measure

a given base line and apply necessary correction on it.

1. To Conduct a triangulation survey in an given area.
2. To Conduct correlation survey by exact alignment method.
3. To Conduct correlation survey by direct method of traversing.
4. To Conduct correlation survey by approximate alignment method.

necessary traverse by

1. 23.
2. 25

To Conduct correlation survey by quadrilateral method.

To calculate the coordinate of given station points by taking

observation and plot the same by rectangular coordinate system. To calculate the length and bearing of closing line of given

taking necessary observations.

To calculate the area of a given closed traverse by total

coordinate method

1. 26.

by taking necessary observations.

Demonstration of modern survey equipments ,EDM, Tacheomate,

**RAJASTHAN ILD SKILL UNIVERSITY (RISU) JAIPUR**

**(A State Government University)**

1. MINING LAB

**SEMESTER : III**

**COURSE TITLE : MINING LAB**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Periods per week** | | **HRS OF EXAM** | **scheme of examination** | | | | **TOTAL** | **CREDIT** |
| **THEORY** | **P** | **THEORY** | | | **PRACTICAL** |
| **L** | **ESE** | **CT** | **TOTAL** | **ESE** |
|  | - | 2. | 3 | - | = | - | 100 | 100 |  |

RATIONALE:

DETAIL COURSE CONTENT

Study and sketch:

A - COAL:

Pit top and pit bottom lay outs,

A panel under development and depillaring by Board and Pillar method showing ventilation circuit, barrier pillar, preparatory stoppings, rib, slice and split, goaf edge supports, cogs, two pillar advance supports. Mechanised board and pillar working With SDL / tub combination LHD/Tub combination, Continuous miner-road headers, dint headers layouts.

Electric coal drills & Jumbo drill, drill rod, drill bits. Coal cutting machines - different types.

Advancing and retreating Longwall working panel layout with conveyors, Layout of single unit and double unit faces, roof support in the system, Single and Double drum Shearers.

Stowing panel with drainage.

* 1. Power supports

B - METAL

Stope layouts of different stoping methods. Open stoping method-Room and Pillar, Sub-level, Shrinkage, Blast Hole and Vertical Crater Retreat. Schematic diagram of slurry transportation and back fill stopes; Top slicing, sub-level caving and block caving stopes. Study and sketch AVOCA and narrow vein mining.

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**RAJASTHAN ILD SKILL UNIVERSITY (RISU) JAIPUR**

**(A State Government University)**

1. INDUSTRIAL TRAINING

**SEMESTER : III**

**COURSE TITLE : INDUSTRIAL TRAINING**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Periods per week** | | **HRS OF EXAM** | **scheme of examination** | | | | **TOTAL** | **CREDIT** |
| **THEORY** | **P** | **THEORY** | | | **PRACTICAL** |
| **L** | **ESE** | **CT** | **TOTAL** | **ESE** |
|  | - | 1. | 3 | - | = | - | 100 | 100 |  |

RATIONALE:

Industrial Training is one of the most essential components for a diploma graduate in

Mining

and

Mine

Surveying.

The

sole

purpose

of industrial

training is

to expose

the

students to “real life” situations. Different aspect of mining such as geology, exploration, selection of method of working, selection of machines for mining, environmental controls and measures, safety in mines and various statutory provisions can only be understood when the students are exposed to different mine workings. Students will cover different coal and metal mines both underground and opencast in such a way that at the end of the completion of diploma programme, they are conversant with different mining conditions. Industrial training also opens avenues of new learning to the students and apply them during their project and industrial training presentations.

DETAIL COURSE CONTENT

**Note:** Student will undergo on industrial practical training for 2 months after/before end of semester examination. Student’s choice of mines/institutes for training shall be considered before deputing them for training..

Before going for training, the students will prepare various formats for data collection

based on

the

topic of

training

assigned to

them.

The

students

will

be given

specific

assignments

for

the

period

of training.

During

the

course

of training

students

will

complete

weekly

report,

assignments

and

keep

weekly

attendance

updated. On

completion

of training

each

student

will

submit

a report of

training

and

make a

presentation before the group of students. Teacher assessment will be done during the training, on presentation of training and at the end of semester examination. A seminar will be organized on specific topics identified by the teacher and the students will present their experiences earned during the training on the specific tasks. End of the semester examination will be an external exam.

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