

## **BEA-401 Energy, Ecology, Environment and Society**

### **UNIT-I**

Sources of Energy : Renewable & Non Renewable, Fossil fuel, Biomass Geothermal, Hydrogen, Solar, Wind, hydal, nuclear sources.

### **UNIT-II**

Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: Threats and conservation

### **UNIT-III**

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain. Sound Pollution: Causes, controlling measures, measurement of sound pollution (deciblage), Industrial and non – industrial.

### **UNIT-IV**

Water Pollution– Water Pollution: Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent. Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

### **UNIT-V**

Society, Ethics & Human values– Impact of waste on society. Solid waste management Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study. Preliminary studies regarding Environmental Protection Acts , introduction to value education, self exploration, sanyam & swasthya.

### **REFERENCES:**

1. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
2. Raynold, GW "Ethics in information Technology"; Cengage.
3. Svakumar; Energy Environment & Ethics in society; TMH
4. AK De "Environmental Chemistry"; New Age Int. Publ.
5. BK Sharma, "Environmental Chemistry" ; Goel Publ. House.
6. Bala Krishnamoorthy; "Environmental management"; PHI
7. Gerard Kiely, "Environmental Engineering" ; TMH
8. Miller GT JR; living in the Environment Thomson/cengage
9. Cunningham WP and MA; principles of Environment Sc; TMH
10. Gandhiji M.K.- My experiments with truth

# **MIA-402 Drilling & Blasting**

## **UNIT-I**

**DRILLING OF ROCKS IN UNDERGROUND AND SURFACE MINES**- Principles of rock drilling. Classification of drilling system. Rock drilling methods, parameters affecting the choice of drilling system, long hole drilling, ring drilling and rotary drilling methods for underground mines. Drilling bits.

## **UNIT-II**

**BLASTING IN UNDERGROUND MINES** - Explosives. Initiation systems and accessories for blasting in the underground mines. Blasting off the solid. Blasting of cut faces. Mass-blasting system for heavy blasting in hard rock mines.

## **UNIT-III**

**BLASTING IN SURFACE MINES** - Principles of blast round design for single and multi-row. Blast round design in surface mines. Bulk explosives Initiation systems and accessories

## **UNIT-IV**

**EVALUATION METHODS**, Evaluation of drilling and blasting methods for underground and surface mines by use of state-of-art techniques and gadgets.

## **UNIT-V**

**NUISANCES AND MITIGATION** -Blasting nuisances and their mitigation for underground and surface mines.

### **REFERENCE:**

1. Coal Mine Ground Control by Syd S Peng.
2. Mining and rock construction technology.
3. Mining and Blasting Techniques by Partha sharma.
4. SME Handbook: Hartman.
5. Surface Mining, by Dr T.N.Singh, Lovely Prakashan, Dhanbad
6. Surface Mining Technology, by Prof S.K.Das, Lovely Prakashan, Dhanbad.
7. Surface Mining, by Prof G.B.Mishra, available at Lovely Prakashan, Dhanbad.
8. Explosives & Blasting Techniques, by Prof G.K.Pradhan, Mintech Publication, Bhubaneswar.
9. Advanced Surface Mining, by Prof G.K.Pradhan & Manoj Pradhan, Mintech Publication, Bhubaneswar.

### **LIST OF EXPERIMENT:**

1. Drawing of schematic diagram showing different types of surface mining methods adopted in Coal, Lignite and non-coal mineral mining.
2. Designing an approach road/ramp to open a deposit by surface mining.
3. Various techniques used in over cast from cost benefit point of view.
4. Designing various layouts for hilly deposits of vein and bedded formation.
5. Designing various types of layouts for deposits below the general ground level.
6. Designing of various types of layouts for placer deposits.
7. Designing a deposit by opencast mining, which has been partially excavated by underground mining.
8. Performance and choice of drilling equipment in surface mine working. (Mine visit to assess rate of drilling, blast hole drilling usage from drill movement to positioning and final hole completion stages).

## **MIA-403 Underground Coal Mining**

### **UNIT-I**

**INTRODUCTION** Origin of Coal, Theories of Coal Formation, Classification of Coal, Coaking Coal, Coal Seam and its Classification, Coal Seam Structures and Abnormalities like Faults, Joints, Cleats, Folds etc., Coal Measuring Rocks and Their Characteristics, Distribution of Coal in India, Indian Coal Mining Industry; Choice of Coal Mining Methods.

### **UNIT-II**

**BOARD AND PILLAR METHOD** Important Terminology, Development Size and Shape of The Pillar, Galleries, Panel System and Without Panel System of Development, Size of Panel, Cycle Of Operation, Depillaring, Problems in Depillaring, Preparatory Arrangements, Depillaring by Stowing, Depillaring by Caving Methods, Pillar Extraction Techniques, Dangers Associated With Depillaring.

### **UNIT-III**

**LONGWALL MINING** Important Terminology, Types of Longwall Faces and Their Choice, Merits and Demerits of Longwall Mining, Development of Longwall Panels and Faces, Longwall Advancing Method, Longwall Retreating Method, Length of Longwall Faces, Rate of Face Advance, Double Unit Longwall Faces, Face organization and material supply.

### **UNIT-IV**

**THICK SEAM MINING** Problem in Mining of Thick Seams, Choice of Thick Seam Mining Methods, Inclined Slicing, Horizontal Slicing, Diagonal Slicing, Transverse Slicing, Sublevel Caving, Blasting Gallery Method, Cable-Bolting Method of Thick Seam Extraction.

### **UNIT-V**

**ROOM AND PILLAR MINING** Vermelles Method, Slant Method, Sublevel Method, Coal Saw Method, Mining of Contiguous Seams, Mining of Steeply Inclined Seam, Mining Under Water, Mining of Seams Prone to Spontaneous Heating, Bumps, Air blast etc.

### **REFERENCE:**

1. Principle and practices of modern Coal Mining –R.D. Singh.
2. Coal Mining in India – S.P. Mathur
3. Mining & working coal – R.T. Deshmukh
4. U/G winning of Coal – T.N. Singh

### **LIST OF EXPERIMENT:**

1. Study of layouts of Board and Pillar development working by without panel system.
2. Study of layouts of Board and Pillar development working by panel system.
3. Study of layout of Longwall Advancing system.
4. Study of layout of Longwall Retreating system.
5. Study of various line of extraction used for pillar extraction.
6. Study of stook extraction method under difficult roof conditions.

# MIA-404 Mining Machinery – I

## UNIT-I

Wire ropes used in Mines and their installation, Application of wire ropes in Mines, Testing of wire Ropes, Factor of safety, Examination of Wire ropes, Care of wire ropes. Ropes splicing: Rope capels.

## UNIT-II

**HAULAGE** Different systems of rope haulage, rope haulage calculations, safety devices, tubs, haulage road and manholes, locomotive haulage and calculations based on it, track laying, mine cars.

## UNIT-III

**WINDING – I** Head gear arrangement, shaft fittings, safety devices, cages & skips, their suspension arrangements. Location of winding engine.

## UNIT-IV

**WINDING – II** Electric winders, winding drums, types of construction, duty cycle, mechanical & electrical breaking, safety devices on winders, Electrical & Electronic methods of speed control, Multilevel winding; automatic winding, Torque- time & power- time diagram; calculation for winding. Pit top and pit bottom arrangements.

## UNIT-V

**PUMPING** Sources of mine water, types of pumps, design calculations, characteristics, operation, maintenance and selection, pump fittings, special types of pumps used in mines.

### REFERENCE:

1. Elements of Mining Tech. Vol I & Vol III by D. J. Deshmukh
2. Mining Machinery By S. C. Walker
3. Coal Mining Practice By Stathum
4. Heavy Earth Moving Machinery, by Prof. Amitosh Dey, Available at Lovely Prakashan, Dhanbad
5. Principles & Practices of Modern Coal Mining, Prof R.D.Singh, New Age International Pvt.Ltd. New Delhi.
6. Mining Machinery Maintenance and Capacity Utilization, by Prof Khanindra Pathak, Published by Cygnus Publication, Kolkata

### LIST OF EXPERIMENTS:

1. Study of Different types of Rope Capels.
2. Study of Rope Splicing.
3. Study of Clifton pulley.
4. Study of various safety devices on rope haulages
5. Study of Exhaust Conditioner on a diesel locomotive
6. Study of Cage Suspension Gear
7. Study of Detaching Safety Hook
8. Study of Lilly Controller

## **MIA-405 Geology –II**

### **UNIT-I**

**INDIAN GEOLOGY** History of geology, major geomorphic division of India, general review of India, stratigraphy, description of important Indian geology formation, Archeans, Vindhya, Gondwanas and tertiary.

### **UNIT-II**

**STRUCTURAL GEOLOGY** Study of topographic maps, attitude of planar and linear structures, effects of topography on outcrops, Unconformities, folds, faults and joints – their nomenclature, classification and recognition, Forms of igneous intrusion – dyke, sill and batholith, effect of folds and fractures on strata and their importance in mining operations, principles of stereographic projection of linear and planar features of rocks.

### **UNIT-III**

**PETROLEUM GEOLOGY AND COAL** Rank characteristics and important constituents of coal, classification and origin of coals, geology of the principal coal field of India, concept of organic constituents of petroleum origin, migration, accumulation, concept of traps and important petroliferous basins of India.

### **UNIT-IV**

**ECONOMIC GEOLOGY** Economic geology mode of Occurrence, origin, distribution, association and industrial uses of important Metallic (Au, Al, Cu, Fe, Mn, Sn, Pb And Zn) and Non-Metallic (Diamond, mica, Radioactive Minerals, Gypsum, Dolomite, Fire-clay, Magnesite, talc, asbestos, Graphite, Kyanite, Sillimanite, corundum, Fluorite, phosphorite, Precious and Semi-precious stones).

### **UNIT-V**

Exploration and prospecting geology definition and classification of method; elementary method of geology, geophysical, geochemical prospecting, ringed targets intersection loci, exploration-mineral concept and viz surface and subsurface; exploration strategy and design; stage exploration; resource and reserves.

### **REFERENCE:**

1. Engineering geology-Prabin singh
2. Engineering geology- P.k. Mukherjee
3. Mineralogy-Dana
4. Courses in mining geology –Arogyaswamy
5. Geology of India and (vol 1 and 2) R.Vaidyanadhan and M.Ramakrishnan

### **LIST OF EXPERIMENT:**

1. Study of topography maps
2. Study of stereographic projection
3. Standard tensile test on MS and CI Specimen
4. Identification of rocks.
5. Identification of simple rocks forming minerals and important ores

## **MIA-406 Computer Programming (Java)**

### **UNIT-I**

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods, Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes.

### **UNIT-II**

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees.

### **UNIT-III**

Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

### **UNIT-IV**

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI, Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

### **UNIT-V**

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

### **REFERENCES:**

1. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
2. E. Balaguruswamy, "Programming In Java"; TMH Publications
3. The Complete Reference: Herbert Schildt, TMH
4. Peter Norton, "Peter Norton Guide To Java Programming", Techmedia.
5. Merlin Hughes, et al; Java Network Programming , Manning Publications/Prentice Hall

**LIST OF PROGRAM:**

1. Installation of J2SDK
2. Write a program to show Concept of CLASS in JAVA
3. Write a program to show Type Casting in JAVA
4. Write a program to show How Exception Handling is in JAVA
5. Write Programs to show Inheritance and Polimorphism.
6. Write a program to show Interfacing between two classes
7. Write a program to Add a Class to a Package
8. Write a program to demonstrate AWT.
9. Write a Program to show Data Base Connectivity Using JAVA
10. Write a Program to show “HELLO JAVA ” in Explorer using Applet
11. Write a Program to show Connectivity using JDBC
12. Write a program to demonstrate multithreading using Java.
13. Write a program to demonstrate applet life cycle.

## **MIA-407 Industrial Training –I**

Duration:- 2 weeks after the IV semester in the summer break, Assessment in V semester.

Students must observe following to enrich their learning during industrial training:

- Industrial environment and work culture.
- Organizational structure and inter personal communication.
- Machines/ equipment/ instruments - their working and specifications.
- Product development procedures and phases.
- Project planning, monitoring and control.