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

**(A State Government University)**

FOURTH SEMESTER PAPERS/SUBJECTS

1. MINE ECONOMICS

**SEMESTER : IV**

**COURSE TITLE : MINE ECONOMICS**

**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 |  |

RATIONAL:

A good

engineer

should

be a

good

economist

also.

The

back

bone

of any

industry is

economics

and

such

industrial

economics

is included as

a subject in

many

branches of

engineering.

In mining industry economics is not applied only to higher level ie planning level but also at the lowest level ie planning of faces in the district for production. It is necessary for a

diploma

pass

out

in mining to

have

the

elementary

knowledge of

economics,

its

general

terminology and definitions and their applications to mining operations.

In this

paper

basic

topics of

economics

are

included

with

mine

economics

and

beneficiation, to make a diploma holder perfect on the supervisory cadre.

DETAILED COURSE CONTENTS:

CHAPTER- 1 GENERAL ECONOMICS:

* 1. Economics terms -
     1. Wealth
     2. Value:
        1. value in use and.
        2. value in exchange.
     3. Goods.
     4. Price.
     5. Income.
     6. Investment.
     7. Saving.
  2. Consumption and its importance
  3. 1.3

1. consumption- satisfaction-needs.
2. Types of consumption.
3. importance of Consumption .

Wants- wants and

economic activities, classification of wants-

* 1. Law of diminishing utility
  2. Law of equi-marginal utility.
  3. 1.4

Utility- Meaning measurment, marginal and total

utility.

* 1. Demand- definition, demand schedule and demand curve.
  2. 1.6

a)

b)

c)

d) Supply. a)

b)

c)

d)

e)

f)

Law of Demand.

Extension and contraction in demand. Increase and decrease in demand.

Elasticity of demand.

Supply of price. Supply schedule. Supply curve Supply function. Law of supply. Elasticity of supply.

* 1. Capital- Meaning, definition-
     1. Characterstics of capital.
     2. Wealth and Capital.
     3. Capital and labour.
     4. Capital and lands.

e) 1.8 Money:

Importance

and function of Capital.

1. Definition of money.
2. function of money.
3. Classification of money.

CHAPTER -2

MINE

ECONOMICS-

* 1. Mineral industry - its role in national economy.
     1. Indian mineral resources and their statistics.
     2. Mineral policies.
     3. Conservation of minerals including coal company.
  2. Constitution of companies under companies act.
     1. Types of companies.
     2. Private and public sector , merits and demerits.
        1. Govt. undertakings .
     3. Nationalization of coal industry formation of CIL and its subsidiaries.
     4. Elementary introduction of the following companies:

## CIL and Subsidiaries, SCCL, TISCO, SAIL, NLC, HZL, HCL,

## MOIL, NMDC, NALCO and ULTRATECH.

* + 1. Labour
       1. Efficiency of labour.
       2. Labour welfare.
       3. Social securities.
       4. Trade unions.

CHAPTER -3 SAMPLING-

* 1. a. Methods and importance of sampling.
     1. Size of samples.
     2. Class of samples.
     3. Different methods of sampling.
     4. Surface sampling.
     5. Under ground sampling.
     6. sampling of alluvial
     7. Errors in Sampling.

deposits.

* 1. Salting

CHAPTER – 4

a.

b.

c.

d.

VALUATION

Method of salting

safe gaurds against salting. Sampling records .

Computation for tonnage –

* Average assay value
* Average sloping width
* Clear width
* Willing width
* Length average
* Average of block and total average
* Prismoidal averaging
  1. a) Methods of valuation

1. Cases requiring valuation risk in calculation of mines
2. Calculation of life of a mine
3. Valuation reports
4. Mine as a wasting assets
5. Redemption of capital depreciation
   1. Valuation of mineral property and preparation of report
   2. London Metal Exchange (LME).

## Role of cut off grade and mineral valuation economics

## Cost of mining v/s value of ore

## Net Present Value (NPV) of mineral properties.

\*\*\*\*\*

## Reference Book

|  |  |  |
| --- | --- | --- |
| Sl.No. | Title | Author, Publisher, Edition and Year |
| 1. | Industrial economics | V.C.Sinha and Pushpa Sinha |
| 2. | Mineral economics | R.K.Sinha and N.L.Sharma |
| 3. | Mineral and mine economics | R.T.Deshmukh |

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

**(A State Government University)**

1. MINE FIRES EXPLOSION INUNDATION RESCUE AND RECOVERY

**SEMESTER : IV**

**COURSE TITLE : MINE FIRES EXPLOSION INUNDATION**

**: RESCUE AND RECOVERY**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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| **L** | **ESE** | **CT** | **TOTAL** | **ESE** |
|  | 4 | 2 | 3 | 80 | 20 | 100 | 100 | 200 |  |

RATIONALE:

Mining industry is one of the industries causing environmental pollution and chances of sever accidents. Certain bindings are imposed through regulations on mining industry for safe workings and to control hazards associated with mines. student are required to be more acquainted with the major Problems associated for mine worker in connection with comfortable working conditions and various sources of problem creating agents.

This

paper

deals

with

common

causes

of accidents

arising

due

to noxious

and

inflammable

gases;

dust

and

water ;

apart

from

this

the

knowledge

of rescue

and

recovery of mine workers after an accident is more essential for a student to overcome with the problem. knowledge of these hazards and their prevention will be imparted through the teaching and appreciation of the following topics in details ;

mine fires, gas explosion, coal dust explosion, inundation and rescue and recovery work.

DETAILED COURSE CONTENT

CHAPTER- 1 MINE FIRES:

* 1. Factors responsible for mine fire.
  2. Causes of mine fire.

Accidental fire, spontaneous heating; factors responsible for spontaneous heating.

* 1. Incubation period, crossing point, ignition point.
  2. Precaution against spontaneous heating.

Preventive measures against mine fires

e fires.

* 1. Fire stopings-purpose, constructional details.
  2. Opening of a sealed off area.

# Automatic/continuous fire detection and warning system

# Automatic fire suppression system

# Emergency rescue and recovery

# Fires in HEMMs, Electrical equipments, batteries and cables,

CHAPTER- 2 GAS EXPLOSION:

* 1. Types of gas explosion.
  2. Causes of fire damp explosion.
  3. Upper and lower limit of fire damp explosion ; coward’s diagram.
  4. Precaution against fire damp explosion.
  5. Precaution against explosion while extracting underground developed pillars by opencast
  6. Sulphide dust explosion in metal mines of ore containing excessive sulphur
  7. Study of some important gas explosion in Indian coal mines.

CHAPTER- 3 COAL DUST EXPLOSION

* 1. Upper and lower limit of inflammability of dust, Index of inflammability
  2. Causes of formation of dust and coal dust explosion, Study of some important dust explosion cases in Indian coal mines.
  3. Precaution & preventive measures against dust explosion.
  4. Stone dust, Quantity of stone dust, application of dust, stone dusting; stone dust barriers.
  5. Water barriers, handling of stone dust.

Use of chemicals and chemical foams against coal dust hazards, health hazards due to coal dust, Measurement of coal dust concentration in general body of air.

CHAPTER- 4 INNUNDATION

* 1. Sources of dangerous accumulation of water in mines.
  2. Factors responsible for inundation in mines.
  3. Inundation due to pot holes and subsidence.
  4. Precautions and preventive measures for inundation.
  5. Precaution for approaching water logged areas and working below water logged area.
  6. Dams – Purpose, site of dam, types of dam and their constructional details.
  7. Study of some important inundation cases in Indian mines.

Additional precaution in rainy season in the mines located near by the rivers.

CHAPTER -5 MINE RESCUE AND RECOVERY WORK

Objectives of Mines rescue, Rescue Organization, Rescue station, Rescue Rooms

Rescue apparatus, self breathing apparatus, reviving apparatus, Drager

BG – 4 self contained breathing apparatus, Maxaman- reviving apparatus, self contained, self rescuer – Fenzy biocell, Oxybocks, RZ-25,

Universal tester for testing of drager BG-174 and BG-4, Quester-II

|  |  |  |
| --- | --- | --- |
| Sl.No. | Title | Author, Publisher, Edition and Year |
| 1. | Elements of mining technology –Vol-II | D.J. Deshmukh |
| 2. | Mine Environment & Ventilation 1993 | G.B. Misra |
| 3. | Mine Disaster and Mine rescue | M.A.Ramlu |

II and

Quester-III, Computerised testing machines, Drager power pump. Rescue stations – equipments used in rescue station, rescue organisation and working, training of officials.

Method of rescue and recovery work Emergency organisation and Rescue plan

Recovery of mines after explosion, fire and inundation, Sealing of fire area (u/g fire)

# Reference BookS

## Mine Fires Explosion Inundation Rescue and Recovery Lab

LIST OF PRACTICALS:

1. To study, sketch and explain different types of fire stoppings and their constructional details.
2. To study crossing point and ignition point temperature and susceptibility of coal to fire
3. To study detection of fire by ratios.
4. To study, sketch and describe about stone dust and stone dust barriers.
5. To study, sketch and describe different types of dams.
6. To visit Rescue Station, study and explain different types of rescue apparatus.
7. To study, sketch and describe First Aid Station and Fresh Air Base.

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

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3. ADVANCED MINING METHODS

**SEMESTER : IV**

**COURSE TITLE : ADVANCE MINING METHODS**

**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 | - | 3 | 80 | 20 | 100 | - | 100 |  |

RATIONALE:

DETAILED COURSE CONTENT

CHAPTER-1 THICK AND THIN SEAM WORKING: Problem in mining thick seam, 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. French method of working thick seam, working contiguous thick seams, working below ponds, rivers, railways.

Multi section working with stowing (ascending order), in descending order and with thick coal partings and caving.

Modified methods of working, including steeply inclined seam, working of seams liable to spontaneous heating.

Mining of thin seams: Problems in mining thin seams; equipment and methods for thin seam extraction.

## CHAPTER-2: Extraction of underground developed coal pillars by opencast method. Hazards, precautions and advantage.

CHAPTER-3 Horizon mining: Conditions, suitability and limitation, methods of working, cross-cuts, laterals, their intervals, methods of drivage, application of the system of mining. Study of some horizon mining cases of India.

CHAPTER-4 Hydraulic Mining: Principles and applications, plants and layouts operations and control, advantage.

CHAPTER-5 Underground Coal Gasification: Basic principal; methods of gasification; scope of application.

CHAPTER-6 Deep Mining: Problems of deep mining and remedial measures; design and layout of stopes in rock burst prone mines.

CHAPTER-7 Development of mine for underground mining, development of declines for transport by HEMMs, advance stoping methods by caving and Vertical Cater Retreat (VCR),. Stoping/extraction of ore body beneath an opencast mine.

CHAPTER-8 Special Methods: Stoping by hydraulic rock/paste fill, hydro-chemical and biochemical method; nuclear device mining system, scope of application for mining of deep seated low grade mineral deposits; offshore/underwater/sea-bed mining current status; sea shore mining by dredging, different methods of winning manganese nodules from the ocean-floor. Ore mining by leaching.

## CHAPTER-9: Introduction to radars and drones for slope monitoring, design, selection of site and maintenance of overburden dumps and tailing dams-up and down stream, disposal of treated mill tailings and environmental issues.

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

**(A State Government University)**

1. DIMENSIONAL STONE MINING

**SEMESTER : IV**

**COURSE TITLE : DIMENSIONAL STONE MINING**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

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

RATIONALE:

DETAILED COURSE CONTENT

Resources of marble, granite, slate, sandstone and limestone as dimensional stones in India

vis-à-vis world, uses, marketing export.

Allotment of lease and other legal aspects.

Geological, mineralogical and physic-mechanical properties of dimensional stones, criteria for selection of dimensional stone deposit.

Mining: Conventional mining of sandstone, limestone, marble and granite.

Wire saw, chain saw, hydraulic splitting, flame jet cutting, water channeling etc.

Blasting in dimensional stone mine, development of mine, mine layout, block yield.

Processing: Dressing, sawing, gang saw, circular saws, preparation and mounting of blade/discs and segments.

Polishing: Manual, mechanical and various types of polishing machines.

Abrasive: Type, use and selection, shaping.

Tile preparation, automatic tiling plant.

Environmental impact: Environmental impact of mining and processing of dimensional stones, secondary use of quarried land and waste of the industry.

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DIMENSIONAL STONE MINING LAB

LIST OF PRACTICAL

1. Sketch and diagram various types of stone crushers.
2. Layout of crushing plant
3. Sketch and diagram mechanical loaders.
4. Sketch and diagram tippler and dumpers.
5. Layout of mines deployed with loaders, machines and dumpers.
6. Sketch and diagram blasting pattern in hard rock building stone mines.
7. Sketch and diagram blasting pattern of controlled blasting
8. Sketch and diagram wire saw.
9. Sketch and diagram gang saw cutter.
10. Sketch and diagram polishing unit.

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# REFERENCE BOOKS

1. Surface Mining By Samir Das
2. Elements of Mining Volume I, II & III By D. J. Deshmukh
3. Surface Mining By G. B. Mishra

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

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5. MINE MANAGEMENT LEGISLATION & GENERAL SAFETY

**SEMESTER : IV**

**COURSE TITLE : MINE MANAGEMENT LEGISLATION**

**: & GENERAL SAFETY**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

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

RATIONALE:

DETAILED COURSE CONTENT

1. MANAGEMENT PROCESS :

Planning, organizing, directing, motivating, controlling, coordinating and communicating. Role of manager. Staffing : Jobs analysis, manpower planning and recruitment. Performance appraisal. Manpower development and planning.

1. ORGANISATION :

Principles of organization. Departmentation : Levels of management, organizational chart.

1. Introductory idea of PERT and CPM. Work Study and Time Study.
2. MANAGEMENT INFORMATION SYSTEM :

Introduction, concepts, design, implementation and case study.

1. HUMAN RESOURCE DEVELOPMENT :

Management, development and training of personnel. Role of human factors, Workers participation, Trade Union

1. Introduction: Mining laws of India; National Mineral Policy.
2. Mineral Conservation and Development Laws:

Introduction to the Mines and Minerals (Regulation & Development) Act 1957 and Mineral Conservation and Development Rules, 1988.

Salient Provision of Indian Explosive Act and Rules

1. HEALTH & SAFETY LAWS:

The Mines Act, 1952, The Mines Rule, 1955, The Coal Mines Regulations, 2017, The Metalliferous Mines Regulations, 1961, The Mines Vocational Training Rules, 1966, The Mines Rescue Rules, 1985; An idea of The OSHAWC Code, 2020.

1. SAFETY IN MINES

Occupational hazards of mining; Accidents and their classification; causes and prevention of accidents, Emergency measures and organization, accident enquiry report, cost of accidents and measures for improving safety in mines.

Legislative requirement of Safety Management Plan

Risk based safety management system – Objectives, Elements, Hazard Identification, Risk assessment, Risk Controls,

Accident investigation

Review and Audit of SMS

Emergency Plan

Introduction to Refuge Chambers

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REFERENCE BOOKS

1. Legislation in Indian Mines By Rakesh & Prasad
2. The Coal Mines Regulations, 2017 Geeta Book Store, Dhanbad
3. Mining Manual Pub. Dimonion Law Depot, Dhanbad
4. The Metalliferrous Mines Regulations, 1961 Geeta Book Store, Dhanbad
5. The Indian Explosive Act, 1984 Pub. Eastern Book Comp. Lucknow
6. The Central Electricity Authority Geeta Book Store, Dhanbad

Regulations, 2010

1. The Mines and Mineral Development and Regulation Act- 1957
2. The Mines Act, 1952 Geeta Book Store, Dhanbad
3. Mine’s Management Legislation and General By S. Ghatak

Safety

1. The Mines Rules, 1955 Geeta Book Store, Dhanbad
2. The Vocational Training Rules, 1966 Geeta Book Store, Dhanbad
3. The Mines Rescue Rules, 1985 Geeta Book Store, Dhanbad

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

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7. PROJECT & PRESENTATION

**SEMESTER : IV**

**COURSE TITLE : PROJECT & PRESENTATION**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

|  |  |  |  |  |  |  |  |  |  |
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| **L** | **ESE** | **CT** | **TOTAL** | **ESE** |
|  | - | 4 | 3 | - | - | - | 100 | 100 |  |

RATIONALE: To provide opportunity for students to develop understanding of the interrelationship between different courses learnt in the entire diploma programme and to apply the knowledge gained in a way that enables them to develop & demonstrate higher order skills.

DETAILED COURSE CONTENT

**PROJECT & SEMINAR PAPER TO BE INDUCTED IN BEIGNING OF THE III SEMESTER AND PRESENTATION TO BE MADE AT THE END OF THE IV SEMESTER.**

Objective: Sl. No. 1. The basic objective of a project class would be to ignite the potential of students’ creative ability by enabling them to develop something which has social relevance, aging and it should provide a taste of real life problem that a diploma-holder may encounter as a professional in their future life in Industry.

Pre-Requisite: Sl. No. 1. Knowledge in details in Mining Engineering, Electrical Engineering, Mechanical Engineering , Surveying etc. Preparation of Project and presentation in seminar

Project Work is conceived as a group work through which the spirit of team building is expected to be developed. Students will be required to carry out their Project Works in groups under supervision of a Faculty of their core discipline who will work as a Project Guide. Number of students per group may vary with the strength of the student and topics provided. The course shall include preparation of a Project Report which, among other things, consists of technical description of the project. The Report should be submitted in two copies, one to be retained in the library of the institute. The project work will be based mainly on Mining Engineering subjects. Seminar on Project Work is intended to provide opportunity for students to present the Project Work in front of a technical gathering with the help of different oral, audio and visual communication aids which they have learnt. In the Seminar, students are not only expected to present their Project Work, but also to defend the same while answering questions arising out of their presentation.

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8. INDUSTRIAL TRAINING

**SEMESTER : IV**

**COURSE TITLE : INDUSTRIAL TRAINING**

**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** |
|  | - | 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.

DETAILED COURSE CONTENT

**Note: Student will undergo on industrial practical training for 8 weeks including study tours, industrial visits and survey/mining/geology camps in India, after/before end of semester examination**

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 seminarwill

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.

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

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ELECTIVE SUBJECTS

1. ADVANCE MINING GEOLOGY

**SEMESTER : IV**

**COURSE TITLE : ADVANCE MINING GEOLOGY**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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|  | 3 | 2 | 3 | 80 | 20 | 100 | 100 | 200 |  |

RATIONALE: After Understanding the basic knowledge of contents covered in applied geology of second year is essential for a Mining student to know how the depositions of various modes of coal and other metal deposits which are to be considered for mining operations.

In final year student will be made acquainted with the various method of prospecting of mineral deposits, their mode of formation, common deposits of mineral in India ; various economical sources of deposits like petroleum and coal; for a mining student it is a very much essential to go through the technical aspect of the deposits in

the

Earth

before

its

extraction to

cope-up

with

the

problems

associated

for

mining

extraction methods.

The

course is

designed

to suit

the

level

of student

knowledge

and it is

expected that student will be able to carry out the best of the course content.

DETAILED COURSE CONTENTS:

CHAPTER – 1 INDIAN STRATIGRAPHY

* 1. Geological Time scale, Principles of stratigraphy, Principle of correlation, Stratigraphic classification of Indian rock formations.
  2. Physiographic division India, peninsular India, Indo-gangetic plan and extra peninsular India.
  3. Archaean system – A brief account of the Dharwar system, Sausor

group, Iron-ore group, Archaean rocks of Rajasthan, economic minerals of Archaean rocks.

* 1. Cuddapah system – Cuddapah rocks of cuddapah basin Andhra nviron, Delhi system, economic minerals of cuddapah rocks.
  2. Vindhyan system – A brief account of the vindhyan rocks of North India, economic minerals of vindhyan rocks.
  3. Gondwana system – A brief account of the gondwana rocks of India, economic minerals of gondwana rocks.
  4. Deccan traps – A brief account of the deccan traps of India, economic importance of deccan traps.
  5. Fossils – Definition, mode of occurrence, use of fossils.

CHAPTER-2 ORE DEPOSIT

* 1. Concept of mineral, Gangue and Tenor of ores, a brief outline of the classification of ore deposits.
  2. Magmatic ore deposit – Early magmatic, Late magmatic.
  3. Pegmatic deposits, Sublimation deposits, Contact metasomatic deposits,
  4. Hydrothermal deposits – classification of hydrothermal deposits, cavity filling deposits, types of cavity filling deposits, replacement deposits, types of replacement deposits.
  5. Sedimentation deposits, Evaporation deposits, Residual deposits, Mechanical concentration deposits (Placer deposits), types of placer deposits.
  6. Oxidation and super gene enrichment deposits, metamorphic deposits.
  7. Control of ore deposition – Structural controls, stratigraphic control, physical and chemical controls.

CHAPTER -3 COAL AND PETROLEUM

* 1. Rank of coal, classification of coal – Peat, Lignite, Bituminous, Anthracite and Cannel

coal.

* 1. Bended constituents of coal, chemical properties of coal, structural features of coal seams.
  2. Origin of coal – In situ theory, Drift theory, formation of coal preservation, Biochemical change, Carbonization and metamorphism.
  3. Occurrence of coal in India, A brief outline of the lower gondwana fields.
  4. Petroleum, origin of petroleum, migration of petroleum, oil traps, types of oil traps, petroleum deposits of India.

CHAPTER- 4 ORES AND MINERAL DEPOSITS OF INDIA

4.1 A brief account of the origin, occurrence, distribution in India and economic use of the following ores and minerals – Gold, Iron-ore, Manganese ore, Copper ore, Lead and Zinc ore, Aluminum ore, Chromite and Mica.

CHAPTER – 5 GROUND WATER

5.1 Elementary idea of ground water, occurrence of ground water, zone of aeration, saturation, star table, hydrological properties of rocks porosity and permeability, Aquifer.

CHAPTER – 6 PROSPECTING METHODS

* 1. Ground prospecting methods – A brief outline of the various prospecting methods, surface prospecting methods, Geological mapping, and Trenching, Pitting, Auguring and wash boring and drilling.
  2. Geophysical prospecting methods – Elementary study of gravity, magnetic, electrical resistively and seismic methods of geophysical prospecting.

CHAPTER – 7 REMOTE SENSING

7.1 Remote sensing an introduction, application in various fields, G.P.S.(Global Positioning System), G.I.S.(Geographic Information System).

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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. | A text book of Geology | K.M.Banger |
| 2. | Engineering and general Geology | Prabin Singh |
| 3. | Ore deposits of India | Gokhle and Rao |
| 4. | Geology of India and Burma | Krishnan M.S. |
| 5. | Ground water and tube well | S.P.Garg |
| 6. | Mineral Economics | Sinha and Sharma |

|  |  |  |
| --- | --- | --- |
| 7. | Industrial minerals | R.K.Sinha |
| 8. | Geology of India | D.N.Wadia |
| 9. | Ground water hydrology | Todd |
| 10. | Economic mineral deposits | A.M Batteman |
| 11. | Ground water | Tolman |
| 12. | Geology of Petroleum | A.I.Levorsen |
| 13. | Petroleum resources and development | Khan |
| 14. | Hydrology | G.Mahajan |
| 15. | Petroleum Geology | North F.K. |
| 16. | A text book of Geology | P.K.Mukharjee |
| 17. | A text book of Remote sensing | S.S.Agrawal |
| 18. | Dictionary of Remote sensing | S.M.Rashid |

Others:

* + VCDs
  + Video cassettes
  + Learning packages

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## Advance Mining Geology Lab

LIST OF PRACTICALS

1. Sketching and describing various geomorphological and structural models.
2. Constructing the geological cross section from geological maps
   1. Maps showing unconformity
   2. Maps showing Folds
   3. Maps showing Faults
   4. Maps showing Igneous intrusions
3. At least three exercises on maps of completion of outcrops.
4. Study of common ore minerals in hand specimen – Al, Fe, Cr, Mg, Mn, Zn, Pb, Sn, Sb, Cu, and Arsenic.

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

**(A State Government University)**

1. Environmental Engineering and Safety

**SEMESTER : IV**

**COURSE TITLE : Environmental Engineering and**

**: Safety**

**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 |  |

DETAILED COURSE CONTENTS:

## CHAPTER I - INTRODUCTION TO ENVIRONMENT

The biosphere, biotic and abiotic, an aquatic ecosystem, types of pollution, impact of human being on environment, impact of environment on human being, basic approach to improve environmental qualities, role of an environmental engineer.

## CHAPTER II - AIR POLLUTION SOURCES AND EFFECTS

Standard definition of air pollution, Composition of natural air, Names of air pollutants, Classification of air pollutants, primary and secondary pollutants, Classification of source of air pollutants on different bases, Definition of different types of aerosols, Effect of air pollution on: human health, material properties, vegetation, Major toxic metals and their effects, Major environmental phenomenon e.g., acid rain, global warming, green house effect, ozone layer depletion, air quality standards, brief description of air pollution laws.

## CHAPTER III - METEOROLOGICAL ASPECTS OF AIR POLLUTANT DISPERSION

Meteorological parameters influencing air pollution, environmental laps rate, temperature inversion, atmospheric stability and adiabatic loss rate, turbulence, topographical effects, plume behavior, looping, coning, fanning fumigation, lofting , trapping.

## CHAPTER IV - AIR POLLUTION CONTROL METHODS AND EQUIPMENTS

Natural purification processes of air, Artificial purification methods of air, Brief description of following control equipments along with sketch e.g, gravitation settling chamber, cyclone, scrubber, bag house filter, electrostatic precipitator, Brief description of following processes for the control of gaseous pollutants e. g., absorption, adsorption, condensation, combustion etc.

## CHAPTER V - WATER POLLUTION SOURCES AND CLASSIFICATION.

Water resources, Uses of water, Classification of water, Origin, composition and characteristics of domestic waste water as well as industrial waste water, Biochemical oxygen demand, Water pollution laws and standards, Uses of waste water, Classification of waste water, Chemical oxygen demand.

## CHAPTER VI - WASTE WATER TREATMENT METHOD

Basic processes of water treatment. meaning of primary, secondary and tertiary treatment. flow chart of a simple effluent treatment plant, theory of industrial waste treatment, volume reduction, neutralization and proportioning.

## CHAPTER VII - SOLID WASTE MANAGEMENT.

Sources and classification of solid waste, public health aspects, disposal methods – open dumping, sanitary, land fill. Incineration, compositing, potential methods of disposal, recovery and recycling of paper, glass, metal and plastic.

## CHAPTER VIII - NOISE POLLUTION AND CONTROL

Sources of noise pollution, Units of Noise pollution measurement, Allowable limits for different areas, Problems of noise pollution and measures to control it, Noise pollution control devices brief discussion.

## CHAPTER IX - SAFETY PRACTICES

Responsibility of employees and employers regarding health and safety, Fire hazards, prevention and precautions, Industrial hazards prevention and protection, Protection from air and noise pollution.

CHAPTER X - Environment Management Plan (EMP) and Environmental Impact Assessment (EIA) .

## \*\*\*\*\*

## Reference Books

1. Environmental pollution control Engineering by C.S. Rao.
2. Air pollution and control by Seth.
3. Air pollution by M.N Rao.

Environmental Engineering and Safety LAB

## List of Experiments

**GROUP A AIR POLLUTION** (Any one experiment may be selected from this group)

1. Air monitoring and determination of SPM , CO, NOX, SO2 with high volume sampler.
2. Monitoring of stack gases and determination of SPM , CO, NOX, SO2 with slack monitoring kit.

### GROUP B NOISE POLLUTION

1. Determination of sound pollution in (a) Auditorium (b) Factories (c) Busy roads (d) Theatre (e) TV rooms ( select any three situations)

**GROUP C INDUSTRIAL WASTE WATER** (Any Two experiment may be selected from this group)

1. Determination of BOD/COD ratio in industrial waste water.
2. Determination of Ph and alkanity/ acidity in industrial waste water.
3. Determination of solids in industrial

**GROUP D POLLUTION STANDARDS** (Any Two experiment may be selected from this group)

1. Study of drinking water standards.
2. Study of effluent standards for water disposal.
3. 9. Study of air pollution standards.

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

**(A State Government University)**

1. ROCK SLOPE ENGINEERING

**SEMESTER : IV**

**COURSE TITLE : ROCK SLOPE ENGINEERING**

**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 |  |

DETAILED COURSE CONTENTS:

Introduction, Basic Mechanics rock and spoil slope failures, Geological data collection. Geophysics for open pit sites, Shear Strength, Groundwater flow.

Design of slopes, Principles and scope. Slope design of plane wedge and circular failures. Stability analysis.

Support and reinforcement of rock slopes.

Monitoring of slopes. Blasting practice for rock slopes.

Factors influencing site selection of overburden dump, dump failure and its causes, factors affecting dump stability.

Economics and Planning consideration.

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

**(A State Government University)**

4. TUNNELING

**SEMESTER : IV**

**COURSE TITLE : TUNNELING**

**THEORY CODE :**

**BRANCH/DISCIPLINE : MINING ENGINEERING**

DETAILED COURSE CONTENTS:

CHAPTER I - Tunneling

Introduction about tunnels, Functions, Advantages and disadvantages of tunnels compare to open cuts, Criteria for selection of size and shape of tunnels, Consideration in tunneling, Geological investigation, Tunnel alignment, Tunnel shafts, Pilot tunnels, Advantages of twin tunnels and pilot tunnels, Portal and adits.

CHAPTER II - Conventional methods of Tunneling

Drilling, Blasting, Loading and transportation of muck, Supports, Ventilation and Drainage and Equipments, Drivage work in varying ground conditions using conventional methods

CHAPTER III - Fast Tunneling

Drill jumbos, Trackless mucking and transportation units, Tunnel boring machine (TBM)

CHAPTER IV - Tunneling in Soft Ground

General characteristics of soft ground, Shield methods, Needle beam method and NATM method of tunneling in practice.

Tunneling (rock bolting and guniting), Ventilation in tunneling, Lighting and Drainage.

CHAPTER V – HAZARDS AND SAFETY

Hazards in tunneling, mitigation and safety measures to be adapted.

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

**(A State Government University)**

5. ENTERPRENEURSHIP DEVELOPMENT

**SEMESTER : IV**

**COURSE TITLE : ENTERPRENEURSHIP**

**: DEVELOPMENT**

**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** |
|  | 3 | 2 | 3 | 80 | 20 | 100 | 100 | 200 |  |

RATIONALE:

It has

been

experienced in

most

parts

of the

world

that

entrepreneurship

development

is a

means

of rapid

economic

development

vis-à-vis

creation of

gainful

employment of

masses.

The

myth

that

entrepreneurs

are

born

and

not

made no longer holds good. Experiences of last few decades in India show that it

is possible to

develop

entrepreneurs

through

planned

efforts.

These

designed

efforts

are

more

essentially

required

in polytechnics

where

increasing

unemployment has necessitated promoting self-employment/entrepreneurship as career option thereby creating more job providers than job seekers. This course focuses on inputs required for students to undertake entrepreneurial activities as career option.

DETAILED COURSE CONTENTS:

CHAPTER-1 Entrepreneurial Development

Definition of entrepreneurship,

* + Characteristics of entrepreneurs,
  + Factors influencing entrepreneurship,
  + Need for promotion of entrepreneurship and small business
  + Entrepreneurial Environment
  + Environmental analysis.
  + Government policies for setting up new small enterprises
  + Opportunities in service industries.

### CHAPTER – 2 Forms of Business Organization

Forms of ownership

* + Sole Proprietorship
  + Partnership
  + Cooperative society
  + Joint – stock company
  + Private Limited Companies
  + Public Limited Companies

CHAPTER – 3 Institutional support to SSI

Institutional set up

Industries centers,

* + Industrial estates
  + Institutional support at National level
  + Institutional support at State level
  + Commercial banks and financial institutions

CHAPTER – 4 Planning a SSI

What is planning?

* + Types of planning
  + Importance of planning
  + Steps in planning
  + Steps in planning a SSI
  + Technical dimensions for setting up an enterprise

CHAPTER-5 Management of Small Business Firm

Functional areas of small business firm

* + Fundamentals of Management
  + Managerial effectiveness
  + Essential data for effective control of small business
  + Resource management
  + Office management
  + Employees Welfare & safety
  + Factory rules and Labour Laws related to SSIs
  + Sales Tax and Income Tax laws related to SSIs

CHAPTER-6 Project selection, Formulation & Appraisal

Project selection & formulation

* + Scope of project report
  + Content & Format of Project report
  + Need of Project Appraisal
  + Steps of Project Appraisal

CHAPTER-7 Problems of Small industries

Power shortages

* + Project planning
  + Finance
  + Raw material
  + Production constraints
  + Marketing
  + Personal constraints

Regulations

CHAPTER-8 Entrepreneurial Motivation Training

Achievement Motivation

* + Creative thinking
  + Risk taking abilities

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### SUGGESTED INSTRUCTIONAL STRATEGIES:

* Lecture Method.
* Industrial visits.
* Simulation
* Role play
* Interaction with successful entrepreneurs
* Demonstration.
* Games

Reference Books :

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Title** | **Author, Publisher, Edition & Year** |
| 1. | Starting your own Business, A step-by-step  Blue print for the First-time Entrepreneur | Stephen C. Harper,  Mc Craw-Hill |
| 2. | Harward Business Review on  Entrepreneurship | Harvard Business  School Press |
| 3. | Entrepreneurship Development in small scale proceedings of National Seminar,  DCSSI, New Delhi | Patel V.G. |
| 4. | Entrepreneurship : Strategies & Resources | Abrams Grant Pass,  Oregon: Oasis Press |
| 5. | The Business Planning Guide | David H. Bangs  Upstart Publishing Company, In Chicago |
| 6. | Entrepreneurship development in India | Dr. C.B. Gupta  Dr. N.P. Srinivasan |

|  |  |  |
| --- | --- | --- |
|  |  | Sultan Chand & Sons |

LIST OF TEAM WORK

Team Work will consist of collecting following information by the students:

1. Collect State industrial policy
2. Report of interaction with successful entrepreneurs/industrial visits
3. Prepare list of opportunities for business, service and industrial ventures
4. Whom to approach for What?
5. Facilities and incentives available from various support