RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Mining Engineering, VI-Semester

MI- 601 Mining Environment - II

UNIT 1: VENTILATION SYSTEMS AND PLANNING
Calculation of pressure and quantity requirements, network problems, Hardy-Cross method, Ventilation planning and economic analysis, central and boundary ventilation, ascensional and descensional ventilation, antitropal, homotropal ventilation.

UNIT 2: MECHANICAL VENTILATION - I
Theory of mine fans, Types of mine fans, their characteristics & suitability, Process for selection of mine fans

UNIT 3: MECHANICAL VENTILATION - II
Auxiliary and booster fans, series and parallel operation of fans, fan drift and evasee, forcing and exhaust ventilation, fan reversal, ventilation in long headings.

UNIT 4: VENTILATION SURVEY
Object of ventilation survey, instruments for the measurement of pressure, velocity, and quantity of air.

UNIT 5: MINE DUST
Classification, physiological effects, measurement of dust concentration, dynamics of small particles, sampling of air borne dust, prevention and suppression of dust

Reference Books:
1. Mine Environment - G.B. Mishra
2. Elements of Mining Technology, Vol.2, D. J. Deshmukh
3. Underground Mine Environment, M. Mcpherson
4. Subsurface Mine Ventilation, H.L. Hartman

List of Experiments:
1. Study of installation of axial flow fan.
2. Study of installation of centrifugal flow fan.
3. Study of installation and positioning of booster fan.
4. Study of characteristic curve of different fans and their comparison
5. Study of principal and working of vane anemometer
6. Study of principal and working of velometer.
7. Study of principal and working of pitot tube.
8. Study of central and boundary ventilation system.
9. Study of gravimetric dust sampler
10. Study of thermal precipitator dust sampler

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Mining Engineering, VI-Semester

MI602- Mining Machinery- II

UNIT 1. Aerial ropeways
Different types, their constructions & installation, operation & maintenance, design calculation, their layout including rope-tensioning arrangements.

UNIT 2. Conveyors - I
Different types of belt conveyors, their construction, installation, maintenance & design.

UNIT 3. Conveyor - II
Shaker conveyor, scraper chain conveyor and armored chain conveyor, their installation & construction maintenance. Safety Devices; Pit top and pit bottom arrangements.

UNIT 4. Skip & Koepe Winding
Skip types & construction, pit top & pit bottom arrangements, advantages and disadvantages, Types of Koepe Winder, Koepe wheel, Floating platforms, Two winders working in the same shaft, Winding with side by side and up and down sheaves, advantages and disadvantages. Multi-rope winding. Calculation of H.P.

UNIT 5. HYDRAULIC TRANSMISSIONS
Fundamental of hydrostatic compression, hydraulic fluids, hydraulic pumps, motors, cylinders and accumulators, different types of valves, hydraulic coupling and torque converters, Application in mines, Advantages of hydraulic transmission.

Reference Books:
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

List of Experiments:

1. Study of Monocable aerial Ropeway.
2. Study of Bicable aerial Ropeway.
3. Study of Loop take-up and tensioning arrangement of a belt conveyor.
4. Study of pit top and pit bottom arrangements for a belt conveyor.
5. Study of Belt Conveyor
6. Study of an Armoured face Conveyor.
7. Study of Various Koepe Arrangements
8. Study of various types of skips.
9. Study of pit top and pit bottom arrangements for a Skip.
10. Study of hydraulic Couplings and Torque Converters.

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Mining Engineering, VI-Semester

Departmental Elective MI603 (A)- Mining Legislation & Safety-II

01. Principal Provisions of Mines & Minerals (Regulation & Development) Act - 1957

02. Coal Mines Conservation & Development Act. - 1960

03. Mineral Concession Rules, Indian Electricity Rules related to mining activity.

04. Byelaws & D.G.M.S. Circulars.

05. Mines Rescue Rules - 1985

06.Mine Accident, their classification and analysis, Causes & preventive measures, Cost of accident, Preparation of Accident report, Court of Enquiry.

07. Safety Campaign, Causes of major mining accidents which occurred in India & Suggested remedial measures. National Safety Conferences.

Reference Books:

1. Legislation in Indian Mines (A critical Appraisal) Vol. I & II, S. D. Prasad & Prof. Rakesh
2. Coal Mines Conservation & Development Act Mines & Minerals (Development and Regulation) Act Vocational Training Rules
3. Mine Accidents : B. K. Kejariwal
4. Mines Rescue Rules
5. Indian Electricity Rules
6. Mineral Concession Rules.
7. D.G.M.S. Circulars and Bylaws

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Mining Engineering, VI-Semester

Departmental Elective MI603 (B) - IPR (Intellectual Property Rights)

Course Objective

Acquaint the students with the basic concepts of Intellectual Property Rights; and sensitize the students with the emerging issues in IPR and the rationale for the protection of IPR.

UNIT I Introduction

Introduction and Justifications of IPR, Nature of IP, Major forms of IP- *Copyright, Patent, Trade Marks Designs, Geographic indication, layout design of Semi conductors, Plant varieties, Concept & Meaning of Intellectual Property.*

Major international documents relating to the protection of IP - *Berne Convention, Paris Convention, TRIPS*. The World Intellectual Property Organization (WIPO).

UNIT II Copyright

Meaning and historical development of copyright , Subject matter , Ownership of copyright, Term of copyright, Rights of owner, Economic Rights, Moral Rights. Assignment and licence of rights, Infringement of copyright, Exceptions of infringement, Remedies, *Civil, Criminal, Administrative*, Registration Procedure.

UNIT III Patents

Meaning and historical development,. Criteria for obtaining patents, Non patentable inventions, Procedure for registration, Term of patent, Rights of patentee, Compulsory licence, Revocation, Infringement of patents, Exceptions to infringement, Remedies, Patent office and Appellate Board.

UNIT IV – Trade Marks, Designs & GI

Trade Marks: Functions of marks, Procedure for registration, Rights of holder, Assignment and licensing of marks, Infringement, Trade Marks Registry and Appellate Board.

Designs: Meaning and evolution of design protection, Registration, Term of protection, Rights of holder, unregistered designs.

Geographical Indication: Meaning and evolution of GI, Difference between GI and Trade Marks, Registration, Rights, Authorised user.

UNIT V Contemporary Issues & Enforcement of IPR

IPR & sustainable development, The Impact of Internet on IPR. IPR Issues in biotechnology, E-Commerce and IPR issues, Licensing and enforcing IPR, Case studies in IPR

Course Outcome:

1. Students will be able to understand Primary forms of IPR
2. Students will be able to asses and critique some basic theoretical justification for major forms of IP Protection
3. Students will be able to compare and contrast the different forms of IPR in terms of key differences and similarities.
4. Students will be able understand the registration procedures related to IPR.
5. Students will be exposed to contemporary issues and enforcement policies in IPR.

References:

1. P. Narayanan, Intellectual Property Law, Eastern Law House

2. . Neeraj Pandey and Khushdeep[Dharni, Intellectual Property Rights, PHI, 2014

3. N.S Gopalakrishnan and T.G. Agitha, Principles of Intellectual Property, Eastern Book Co. Lucknow, 2009.

4. Anand Padmanabhan, Enforcement of Intellectual Property, Lexis Nexis Butterworths, Nagpur, 2012.

5. Managing Intellectual Property The Strategic Imperative, Vinod V. Sople, PHI.

6. Prabuddha Ganguli, " Intellectual Property Rights" Mcgraw Hill Education, 2016.

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Mining Engineering, VI-Semester

Open Elective MI604 (A) - Underground Metal Mining

UNIT 1: General
Status and scope of Underground metal mining methods; Definitions of important terms used in underground metal mining methods. Classification of mining methods; Factors affecting the choice of mining methods

UNIT 2: Development
Mode of access; Variables affecting the choice of mode of access; Crosscuts, Levels, Raises, Winzes, Ore passes; Their method of drivages with the description of various unit operations; Introduction to Raise boring and introduction to tunnel boring .

UNIT 3: Stoping Methods-I
Overhand, Underhand and Breast stoping methods; Open stoping; Vertical Crater Retreat method; Sub level stoping Room and Pillar method., Resuing method.

UNIT 4: Stoping Methods-II
Shrinkage stoping; Cut and fill stoping, Introduction to Square set stoping, Sub level caving, Block caving, Top slicing.

UNIT 5: Support Systems
Pillars; Back fill, Cable bolting, Steel Rock bolting, Grouting, Shotcreting etc.,Code of timbering rules.

Reference Books:
1. Elements of Mining Tech. Vol II by D. J. Deshmukh
2. S M E Handbook
3. Underground mining methods, Hustrulid
4. Introduction to Mining, H. L. Hartman

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Mining Engineering, VI-Semester

Open Elective MI604 (B) – Innovative Mining Systems

UNIT I

Technological innovations: Technology, invention, innovation, research and development technology life cycle.

UNIT II

System concepts: System concepts for innovative mining, methods for stimulating creativity in an organisation and current technological needs; Basics of system dynamics, value engineering and just in possible applications.–time (JIT)

UNIT III

Innovations in mining operations: Innovations in unit operations in surface and underground mining including high speed shaft sinking method; Developments in hard rock mining; New developments in longwall mining and Developments in mine ventilation systems.

UNIT IV

New frontiers of mining: Mining in deep sea, outer space and Antarctica; Oil mining; Extraction of coal bed methane. Remote monitoring of longwall support performance using telemonitoring device.

UNIT V

Automation and robotic: Development of robotic systems, different types and possible contributions.

Reference books

1. Introductory Mining Engineering by H.L. HARTMAN

2. SME Handbook

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Mining Engineering, VI-Semester

MI- 605 Numerical Modeling Practical

Being totally computer based numerical modeling techniques have a special touch of glamour and sophistication compare to other approaches in rock mechanics and ground control techniques. The results of the modern software packages are presented in attractive and convincing fashions.

Numerical modelling using softwares:

1. Design of openings & pillars
2. Design of supports for bord & pillar and longwall workings.
3. Design of pit slopes & dumps and estimating their stability in case of oprncast mines.
4. Analysis of shield support interaction in case of longwalls.
5. Analysis of long term stability of permanent mine excavations.
6. Prediction of surface subsidence over mine excavations.
7. Simulating effects of blasting on stability of mine workings in underground as well as in opencast mines.

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Mining Engineering, VI-Semester

MI- 606 Fuel Technology

1. Proximate analysis of coal;
2. Free swelling index of coal;
3. Caking index of coal;
4. Determination of total sulphur;
5. Determination of viscosity of oil.