Semester VI
MI601- 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

Semester VI
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

Semester VI
MI603 - 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

Semester VI
MI604 - 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

Semester VI

MI605 - Pollution Control Engg.

UNIT 1: ENVIRONMENTAL POLLUTION

Introduction and classification of environmental pollution, ecological conservation. Salient features of the environmental laws in India and Occupational disease. Environmental Impact Assessment, Environmental Management Plan, Environmental Audit.

UNIT 2: AIR POLLUTION

Air pollution due to various gases and suspended particulate materials, causes, consequences, preventive measures, dust measuring equipment.

UNIT 3: NOISE POLLUTION

Pollution due to noise and its consequences, noise produced by different machinery, control and safety, measurement of noise levels.

UNIT 4: WATER POLLUTION

Water pollution, its causes and preventive measures, acid-mine drainage, water pollution in mines and mineral beneficiation plants, water purification schemes in brief.

UNIT 5: LAND POLLUTION

Land pollution and land reclamation, land reclamation techniques, Physical and Biological reclamation, Mine Closure Plan

Reference Books:

1. Air & Water Acts
2. Forest Conservation acts
3. Legislation in Indian Mines - A Critical appraisal by Rakesh and Prasad
4. Environmental Impact of Mining By Down and Stokes

Semester VI

MI601 Mining Environment – II Lab

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

Semester VI

MI602 Mining Machinery – II Lab

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.