

## National Institute of Technology, Raipur (C.G.)

### Course of Study & Scheme of Examination

### B.Tech. VI Semester

Branch: Mining Eng..

S.No.	Board of Studies	Sub. Code	Subject Name	Periods/week			Examination Scheme					Total Marks	Credits L+(T+P)/2
				L	T	P	TA	FE	SE	T.C.A.	ESE		
1	Mining Engg.	MI20611(MI)	Mining Environment-II	3	1	-	20	15	15	50	70	120	4
2	Mining Engg.	MI20612(MI)	Mineral Processing	3	1	-	20	15	15	50	70	120	4
3	Mining Engg.	MI20613(MI)	Mining Machinery-II	3	1	-	20	15	15	50	70	120	4
4	Mining Engg.	MI20614(MI)	Mining Legislation & Safety - II	3	1	-	20	15	15	50	70	120	4
5	Mining Engg.	MI20615(MI)	Mining Economics	3	1	-	20	15	15	50	70	120	4
6	Mining Engg.	MI20616(MI)	Mining Management	4	1	-	20	15	15	50	70	120	5
7	Mining Engg.	MI20621(MI)	Mining Environment-II Lab	-	-	3	30	-	-	30	20	50	2
8	Mining Engg.	MI20622(MI)	Mineral Processing Lab	-	-	3	30	-	-	30	20	50	2
9	Mining Engg.	MI20623(MI)	Mining Machinery II Lab	-	-	3	30	-	-	30	20	50	2
10	Humanities	HS20624(MI)	Value Education	-	-	2	25	-	-	25	-	25	1
11	Mining Engg.	MI20625(MI)	Discipline	-	-	-	25	-	-	25	-	25	1
<b>Total</b>				<b>19</b>	<b>6</b>	<b>11</b>	<b>260</b>	<b>90</b>	<b>90</b>	<b>440</b>	<b>480</b>	<b>920</b>	<b>33</b>

**Note :1)** For attendance of a student in every theory and practical class, the teachers are supposed to keep records ultimately in the following format which will be included in the semester mark-sheets.

**2)** The students of B.Tech. VI th Sem have to undergo 4 weeks Practical Training at Mines.

Format for attendance				
Attendance				Category
> 85			----->	High "H"
> 70 & < 85			----->	Medium "M"
> 60 & < 70			----->	Low "L"
< 60			----->	Detained "D"

# NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)

L T P  
3 1 0

Semester: B.Tech. VI Sem.  
Subject: Mining Environment - II

Code: MI20611(MI)  
Branch : Mining Engg

## 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

# NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)

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3 1 0

Semester: B.Tech. VI Sem.  
Subject: Mineral Processing

Code: MI20612(MI)  
Branch : Mining Engg

## UNIT 1: COMMINUTION

Introduction, definition, scope and economic justification, main steps in ore dressing operations, comminution, crushing, principles of crushing , jaw crushers, gyratory crushers, cone crushers, roll crushers, gravity stamps their classifications and applications, grinding-principles of grinding, application and classification of ball mills, rod mills, tube mills and pebble mills.

## UNIT 2: SIZING

Object of sizing, scale of sizing, laboratory sizing, screening and classification , different type of screens, their mode of operations and application and limitation, classification-principles of classification, movement of solids through fluids, different types of classifiers, hydraulic and pneumatic classifiers, sampling-importance of sampling and methods used.

## UNIT 3: GRAVITY CONCENTRATION

Jigging, Flowing film concentrators like spirals and shaking tables, heavy media separation, applications and limitations of methods.

## UNIT 4: FLOTATION

Physico-chemical principles, function of various flotation reagents, important machines, their principles, and working, flotation of sulphide, oxide and non sulphide ores.

## UNIT 5: PROCESSING METHODS OF SOME COMMON MINERALS

Electrostatic and Magnetic Separation - Principle operation and field of application, Pelletisation of low grade iron ore, Drying and dewatering - thickening, filtration and drying. Coal washing; Simplified flow sheets for beneficiation of coal and typical ores of copper, lead, zinc, iron and manganese with special reference to Indian deposits.

### Reference Books:

1. Ore Dressing by Gaudin
2. Ore Dressing by B. A. Wills

# NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)

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3 1 0

**Semester:** B.Tech. VI Sem.  
**Subject:** Mining Machinery- II

**Code:** MI20613(MI)  
**Branch :** Mining Engg

## **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

# NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)

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**Semester:** B.Tech. VI Sem.

**Code:** MI20614(MI)

**Subject:** Mining Legislation & Safety-II

**Branch :** Mining Engg

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

# NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)

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**Semester:** B.Tech. VI Sem.  
**Subject:** Mining Economics

**Code:** MI20615(MI)  
**Branch :** Mining Engg

**UNIT 1.** Sampling- Methods of sampling, Errors in sampling, analysis of samples, estimation of grade and reserves, Different types of reserves. Salting, precautions against salting.

**UNIT 2.** Mine Valuation - Different methods, Depreciation, Amortization and Redemption of capital, life and present value of a mine.

**UNIT 3.** Financial Management - Methods of framing and financing industrial enterprises, Memorandum and articles of association, shares, debentures, dividends and interest. Break even chart and inventory control.

**UNIT 4.** Investment Decisions - discounted cash flow methods, non-discounted cash flow methods, advantages and disadvantages of them, Internal rate of return, Net Present Value.

**UNIT 5.** Book Keeping, Preparation of Balance sheet, Profit and Loss Account.

## **Reference Books:**

1. Mineral Economics , R.T. Deshmukh
2. SME Handbook, Vol. I
3. Mineral Economics , Sinha and Sharma

# NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)

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**Semester:** B.Tech. VI Sem.  
**Subject:** Mining Management

**Code:** MI20616(MI)  
**Branch :** Mining Engg

**UNIT 1: Evolution of Management Theory** - Principle of Scientific management, Elements of management functions, Planning, Organizing and Control, Levels of Management. Structure and design of organization for mining enterprises.

**UNIT 2: Personnel Management** - Selection, training and development of human resources, Job evaluation, job analysis, incentive and theories of motivation, Productivity, its concept and measurement, Leadership and Communication.

**UNIT 3: Production Management** - Determination of norms and standards of operations by work study, work measurements, production planning, Scheduling and control, Queuing theory, short and long term planning, Quality control, introduction to MIS, Material Management

**UNIT 4: Industrial Psychology** - Its relation with other branches of knowledge, studies of physical factors and their effect on man, Industrial relations, Human relations, trade union movements in India

**UNIT 5: Industrial Act and Laws** - Industrial Dispute Act, Industrial Trade Union Act, Analysis of industrial disputes, Prevention and settlement of industrial disputes, Payment of wages act, Workmen's compensation act, Contract labour laws.

## Reference Books:

1. Mine Management :V. N. Singh
2. Management & Administration : S.K.Gupta
3. Introduction to Management : O.P. Khanna

## NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)

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Semester: B.Tech. VI Sem.

Code: MI20621(MI)

Subject: Mining Environment – II Lab

Branch : Mining Engg

### 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

## NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)

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0 0 3

Semester: B.Tech. VI Sem.

Code: MI20622(MI)

Subject: Mineral Processing Lab

Branch : Mining Engg

### List of Experiments:

1. Study of Jaw crusher
2. Study of Roll crusher
3. Study of Grinding mills
4. Study of Akin's classifier
5. Study of Shaking table
6. Study of Mineral jig.
7. Study of Spiral concentrator
8. Study of Flootation cell
9. Study of Thickners
10. Study of Washability curves

# NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR (C.G.)

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**Semester:** B.Tech. VI Sem.

**Code:** MI20623(MI)

**Subject:** Mining Machinery – II Lab

**Branch :** Mining Engg

## 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.