

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

Course of Study & Scheme of Examination							B.Tech. V Semester					Branch: Mining Engg.	
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	Applied Mathematics	MA20511(MI)	Numerical Analysis & Computer Prog.	3	1	-	20	15	15	50	70	120	4
2	Mining Engg.	MI20512(MI)	Mining Survey- II	3	1	-	20	15	15	50	70	120	4
3	Mining Engg.	MI20513(MI)	Mining Legislation & Safety - I	3	1	-	20	15	15	50	70	120	4
4	Mining Engg.	MI20514(MI)	Underground Metal Mining	3	1	-	20	15	15	50	70	120	4
5	Mining Engg.	MI20515(MI)	Pollution Control Engg.	3	1	-	20	15	15	50	70	120	4
6	Mining Engg.	MI20516(MI)	Mining Machinery-I	4	1	-	20	15	15	50	70	120	5
7	Mining Engg.	MI20521(MI)	Mining Survey-II Lab	-	-	3	30	-	-	30	20	50	2
8	Mining Engg.	MI20522(MI)	Mining Machinery-I Lab	-	-	3	30	-	-	30	20	50	2
9	Applied Mathematics	MA20523(MI)	Numerical Analysis & Comp. Programming Lab	-	-	3	30	-	-	30	20	50	2
10	Humanities	HS20524(MI)	Value Education	-	-	2	25	-	-	25	-	25	1
11	Mining Engg.	MI20525(MI)	Discipline	-	-	-	25	-	-	25	-	25	1
Total				19	6	11	260	90	90	440	480	920	33

Note : 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.

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

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Semester: B.Tech. V Sem.
Subject: Numerical Analysis & Computer
Programming

Code: MA20511(MI)
Branch: Mining Engg

UNIT –I ERROR'S, SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATION

Approximations and round of error's , truncation error, Regula – falsi method, Bisection Method, Newton- Raphson Method, Birge- Vieta Method . Bairstow's Method, acceleration of convergence.

UNIT-II SOLUTION OF SIMULTANEOUS ALGEBRAIC EQUATION

Gauss- Jordan Method, triangularization Method, Jacobi's Method, Gauss- Seidal Iteration Method, ill- conditioned equations.

UNIT-III FINITE DIFFERENCE

Difference operator, equal & unequal interpolation, Inverse interpolation, Numerical differentiation & Integration.

UNIT-IV NUMERIAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATION

Taylor's Series method, Euler's Modified Method, Runge-Kutta Method of fourth order, Milne's Method, Adams -Bashforth Method, simultaneous first order differential equation.

UNIT-V CURVE FITTING

Principle of least square, fitting a straight line, fitting a parabola, exponential function, Method of group averages.

Reference Books:

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Semester: B.Tech. V Sem.
Subject: Mining Survey -II

Code: MI20512(MI)
Branch: Mining Engg

UNIT 1: Theodolite Surveying

Types of Theodolites; Description of various parts of a Vernier Theodolite; Requirements of Mining type Theodolites; Measurements of height and distances of accessible and inaccessible points; Traversing with Theodolite on surface and underground; Checks on Closed and Open traverses; Balancing of traverses; Temporary & Permanent adjustments of Theodolites; Sources of errors and their prevention.

UNIT 2: Tacheometry

Principles of Stadia Methods; Determination of constants; Theory of anallactic lens; Distance and elevation formulae, Subtense and Tangential Methods; Auto- Reduction Tacheometer.

UNIT 3: Setting Out

Setting out simple curves on surface and in underground; Elementary knowledge of compound and transition curves; joint boundary survey; Equalization of boundaries; Maintenance of direction and gradient of roadways i.e. marking and checking of center line and grade line, transfer of point from roof to floor and floor to roof

UNIT 4: Errors & Problems

Computation of areas and volumes; Earthwork calculation; Problems based on Co-ordinates, faults, Dip-Strike and boreholes; Sources, classification and relative importance of errors, their prevention and elimination, theory of errors, adjustment of errors.

UNIT 5: Plans & Sections

General requirements of mine plans; types of plans; Symbols used in mine plans; preparation of plans & sections; Plotting of traverse; Checking accuracy of old mine plans; Planimeter and its uses; Enlargement & reduction of plans.

Reference Books:

1. Surface Mining: G.B. Misra
2. Surface mining equipment: Martin
3. Surface Mining: Pfeider
4. Mining: Boki
5. SME handbook: Hartman

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Semester: B.Tech. V Sem.

Code: MI20513(MI)

Subject: Mining Legislation & Safety-I

Branch: Mining Engg

1. Introduction to Acts, Rules & Regulation applicable to Mining Industry, Development of mining legislation in India.
2. Mines Act – 1952 & Mines Rules – 1955
3. Coal Mines Regulations –1957, Introduction to draft CMR-2006 & Metalliferous Mines Regulation-1961
4. Mine Crèche Rules 1966
5. Mine Vocational Training Rules- 1966

Reference Books:

1. Legislation in Indian Mines (A critical Appraisal) Vol. II & I, S. D. Prasad & Prof. Rakesh
2. CMR-1957 & MMR-1961 L. C. Kaku.
3. Mines Act-1952 & Mines Rules-1955 L. C. Kaku.
4. Vocational Training Rules L. C. Kaku.
5. Mine Accidents S.J. Kejeriwal

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Semester: B.Tech. V Sem.
Subject: Underground Metal Mining

Code: MI20514(MI)
Branch: Mining Engg

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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Semester: B.Tech. V Sem.

Code: MI20515(MI)

Subject: Pollution Control Engg.

Branch: Mining 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

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Semester: B.Tech. V Sem.
Subject: Mining Machinery -I

Code: MI20516(MI)
Branch: Mining Engg

UNIT 1: Wire Rope

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 2: 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 3: WINDING - I

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

UNIT 4: WINDING – II

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

UNIT 5: 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 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

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Semester: B.Tech. V Sem.
Subject: Mining Survey –II Lab

Code: MI20521(MI)
Branch: Mining Engg

List of experiments:

1. Study of Vernier Theodolites
2. Angle measurement by repetition methods
3. Angle measurement by reiteration methods
4. Measurement of height of accessible and inaccessible point by trigonometric surveying
5. Determination of stadia constant
6. Distance and elevation determination by Tacheometric surveying
7. Setting out of circular curve by chord and offset method
8. Setting out of circular curve by Rankine's method
9. Study of Planimeter
10. Study of Pantagraph / Ediograph.

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Semester: B.Tech. V Sem.

Code: MI20522(MI)

Subject: Mining Machinery –I Lab

Branch: Mining Engg

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
9. Study of Turbine Pump
10. Study of a Balancing Disc

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Semester: B.Tech. V Sem.

Code: MA20523(MI)

**Subject: Numerical Analysis & Computer
Programming Lab**

Branch: Mining Engg