School of Engineering & I.T.

MATS University

Raipur

Syllabus Scheme

(IIIrd Semester)

For

Bachelor of Technology

Mining Engineering

Subject Code for School of Engineering & I.T. Deptt.

IIIrd Semester (Mining)

S. No.	Subject Code	Subject Name
1	**BE360**	Mechanics of Solids & Fluid Mechanics
2	**BE361**	Mathematics III
3	**BE362**	Computer Programming
4	**BE363**	Mine Surveying-I
5	**BE364**	Mining Geology I
6	**BE365**	Introduction to Mining
7	**BE366**	Computer Programming Lab
8	**BE367**	Mining Geology I Lab
9	**BE368**	Mine Surveying I Lab
10	**BE369**	MOS & FM Lab

School of Engineering & I.T.
MATS University, Raipur
Scheme of Teaching & Examination
III[rd] Semester
Mining Engineering

S. No.	Course code	SUBJECT	Periods per week		Evaluation Scheme		Total Marks
			L	P	IM	ESE	
THEORY							
1	BE360	Mechanics of Solids & Fluid Mechanics	5	0	30	70	100
2	BE361	Mathematics III	5	0	30	70	100
3	BE362	Computer Programming	5	0	30	70	100
4	BE363	Mine Surveying-I	5	0	30	70	100
5	BE364	Mining Geology- I	5	0	30	70	100
6	BE365	Introduction to Mining	5	0	30	70	100
PRACTICAL							
7	BE366	Computer Programming Lab	0	3	20	30	50
8	BE367	Mining Geology -I Lab	0	3	20	30	50
9	BE368	Mine Surveying- I LAB	0	3	20	30	50
10	BE369	Mech. of Solids & FM Lab	0	3	20	30	50

L-Lecturer, P-Practical, ESE- End Semester Examination, IM-Internal Marks

MATS UNIVERSITY
GULLU, ARANG,RAIPUR

Semester: **B.Tech. III Sem.** **Branch**: - **Mining Engineering**
Subject:-MATHEMATICS--III **Code: - BE361**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam:**100**
Minimum Number of Class test to be conducted: **02**

UNIT - I Fourier Series
Euler's Formula, Functions having points of discontinuity, Change of interval, Even & OddFunctions, half range series, Harmonic analysis.

UNIT - II Special Function
Series solution of differential equations, the method of frobenius , Bessels's differential equations, Bessel's function of first & second kind , Recurrence relation, orthogonality Legendre's differential equation , Legendre's polynomial , Rodriguez's formula, generating function, recurrence relation, Orthogonality.

UNIT - III Partial Differential Equation
Formation, Solution by direct integration method, Linear equation of first order, HomogeneousLinear equation with constant coefficients, Non-homogeneous linear equations, Method of separation of variables. Laplace , heat & wave equations.

UNIT - IV Complex Variable
Derivative, Cauchy-Riemann equations, Analytic functions, Harmonic functions, Flow problems,Complex integration, Cauchy theorem, Cauchy integral formula, Taylor & Laurent series,Singularity,Residue,Evaluation of real definite integrals.

UNIT – V Statistics
Random variables, Discrete & continuous probability distributions, Expectation, Mean & Standard Deviation, Moments & moment generating function, Distributions- Binomial, Poisson and Normal distributions.

TEXT BOOKS: -

1. Higher Engg. Mathematics by Dr. B.S. Grewal– Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig – John Wiley & Sons.

REFERENCE BOOKS: -

1. Advanced Engg. Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
2. Applied Mathematics by P.N.Wartikar& J.N. Wartikar. Vol- II– Pune Vidyarthi Griha Prakashan,Pune
3. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.
4. Higher Engineering Mathematics by B.V.Ramana , Tata McGraw Hill

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech.III Sem.** **Branch**: - **Mining Engineering**
Subject:- MOS & FM **Code: - BE360**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT-I Concept of Stress and Strain
Stress and strain at a point; Axial and shear stresses' Ultimate an working stresses; Relation between stress and strain' Poisson's Ratio; Two dimensional state of strain 'Principle stresses and Principle planes' Mohr's Circle' Two state of strain' Principle strains and principle axis of strain; Determination of Principle strain from strain measurements; Calculation of Principle stresses from; Principle strains; Composite bars in tension and Compassion; Thermal stresses in composite bars.

UNIT-II Bending Stresses in Beams and plates
Pure bending' Bending Stresses' Section Modulus of rolled and built up sections Composite beams' Distribution of normal and shear stresses across the section of a simple beam with vertical section of symmetry; Theory of plates.

UNIT-III Deflection of beams
Slope and deflection of beams by deflection methods; Area moment and conjugate beamMethods' propped cantilever and fixed beams.

UNIT-IV Introduction to Fluid Mechanics & Fluid Statics
Physical properties of fluids; Compressible and Incompressible fluids; Newtonian and Non-Newtonian fluids. Pressure, density and height relationships; manometer pressure on curved and plane surfaces; Centre of Pressure; Buoyancy; Stability of Immersed and Floating bodies; Fluids in relative equilibrium.
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UNIT-V Fluid Kinematics
Classification of flow: Uniform and Non-Uniform; Steady and Non- Steady; Laminar andTurbulent; One, Two, Three dimensional flows; Stream lines; Streak lines; Path lines;Stream Tubes; Elementary Explanation of stream function and velocity potential; Basicidea of flow nets.

TEXT BOOKS: -

1. Strength of Materials – R.K. Rajput (S. Chand & Co.)
2. Mechanics of Materials – B.C. Punmia (Laxmi Publication)
3. A text book of fluid mechanics by R. K. Bansal (Luxmi publication)
4. A text book of fluid mechanics and Hydraulic mechanics in SI Units by R. K. Rajput(S. Chand and company)

MATS UNIVERSITY
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Semester: **B.Tech. III Sem.** **Branch**: - **Mining Engineering**
Subject:- Computer Programming **Code:- BE362**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Unit – 1
Introduction to C Language : history and development .C compilers. Data types, types of instructions, input/output functions. Operators with its types, precedence and associativity of operators. Type casting, developing simple programs, compilation, debugging and testing of programs. Relevance of C language.

Unit – II
Decision making statement : if statement , if-else statements , nested if-else ,forms of if. Conditional operator, Switch case construct. Loop control structures, nested loops, break and continue statements. goto statement. Arrays : Syntax and definition, one and multidimensional arrays, reading and writing an array. Pointers and arrays.

Unit – III
Functions : Declaring and defining functions ,storage classes ,call by value, introduction to pointer data type ,call by reference, using library functions in programs, macro definitions. Preprocessor directives - #if, #elif, #define etc. Passing arrays into functions. Recursion.

Unit – IV
Strings: Initializing string , reading and writing strings, passing a string into a function, using library functions to manipulatestrings. Array of strings.Structures: Declaring and using structures. Array of structures, passing structures into function. Unions and enums, Pointers to structures Bit fields.

Unit – V
File Handling : reading and writing text files through C programs . File manipulating functions : fputc, fgetc, fgets, fputs, fseek, ftell etc. Working with Binary files , fread and fwrite. Command line arguments.

Name of Text Books:

1. Let us C – YashwantKanetkar BPB Publication

2. Programming in ANSI C – E. Balaguruswamy Tata Mc-Gcraw Hill

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. III Sem.** **Branch**: - **Mining Engineering**
Subject:- Mine Surveying I **Code: - BE 363**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: Chain Survey
Linear Measurements; Types of chains; Tapes; Errors in chaining and corrections inlinear measurements; Direct and indirect Ranging; Principles of chain surveying offsets; Limiting length of offsets; Booking field notes; Obstacles in chaining; Instruments forsetting out right angles.

UNIT II: Compass Survey
Theory of Magnetism; Dip of Magnetic needle; Prismatic Compass; Surveyor's Compass; Bearings; Designation of Bearings; Calculation of Included Angles; Local Attraction; Magnetic Declination.

UNIT III: Plane Table Surveying
Principles of Plane Tabling; Working operations; Methods of Plane Table Surveying; Two and Three point problems.

UNIT IV: Miner's Dial
Construction; Use; Tests and Adjustments; Loose and fast Needle surveying; Common Sources of errors in Dial surveying; Methods of elimination and compensation.

UNIT V: Leveling
Definitions of important terms used in leveling; Development in leveling Instruments; Types and Constructional details; Temporary and Permanent Adjustments; Methods of leveling; Straight edge leveling; Fly leveling; Check leveling; Reciprocal leveling; Longitudinal Sections; Cross- Sectioning; Trigonometric leveling; Methods of booking and reduction of levels; Leveling through drifts and shafts (Including steeply inclined shafts) ; Plumbing measurements of depth of shaft and subsidence.

References:

1. Metalliferous Mine Surveying : Frederick Winniberg
2. Surveying and levelling :Kanetkar and Deshpande
3. Surveying Vol. I by B.C. Punmia& Ashok Jain
4. Suverying Vol. II by B.C.Punmia& Ashok Jain
5. Surveying Vol. I by S.K.Duggal
6. Surveying Vol II by S.K.Duggal
7. Mine Surveying Vol I by Ghatak
8. Mine Surveying Vol II by Ghatak

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. III Sem.** **Branch**: - **Mining Engineering**
Subject:- Mining Geology I **Code : - BE 364**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: The Earth in Space and Time
Solar System; Size, Shape, Mass and Density of Earth; A Brief idea of the origin and the age of the Earth; Interior of the Earth- seismic data, Density and Pressure within the Earth; The internal structure and composition of Earth;; Elementary knowledge of Diastrophism, earthquakes and volcanism, Volcanic and earthquake belts, and their relationship with plate tectonics.

UNIT II: Mineralogy
Physical Properties of Minerals; Classification of various Rock forming Minerals; Introduction and preliminary study of principle Rock forming Mineral groups - Garnet, Pyroxene, Amphibole, Mica, Feldspar and Felspethoid, Megascopic properties of Economically important non Silicate minerals.

UNIT III: Igneous and Metamorphic Petrology
Elementary knowledge of Magma and its Crystallization; Classification of Igneous Rocks; Textures and Structures of Igneous Rocks; Petrographic Description of Common Igneous Rocks; Agents and Types of Metamorphism; Depth zones, Facies and Grades of Metamorphism and Petrographic Description of Common Metamorphic Rocks
.

UNIT IV: Sedimentary Petrology
Textures and Structures of Sedimentary Rocks**;** Sedimentary Processes- Weathering, Transportation and Deposition; Classification and Petrographic Description of Common Sedimentary Rocks.

UNIT V: Structural Geology
Concept of Deformation; Primary and Secondary Planer and Linear structure of Rocks; Topography and its representations; Altitude of strata- Dip and strike; Outcrop patterns; Width of Outcrop and thickness of beds; Structural Contours; Geological Maps; Study of Unconformity; Folds, Joints, Faults and their influence in Mining Operations.

References:

1. Engineering And General Geology : Parbin Singh
2. Physical And Engineering Geology : S.K. Garg
3. Rutley's Elements of Mineralogy : H.H.Read
4. Principles Of Petrology : G.W.Tyrell
5. Structural Geology : M.P.Billings
6. Geological Maps : G.W.Chiplonkar
7. A Text Book of Geology : P.K. Mukherjee
8. Applied Geology : S. Banger

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. III Sem.** **Branch**: - **Mining Engineering**
Subject: - Introduction to Mining **Code : - BE 365**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: Exploratory Drilling
Drilling machines used for exploratory drilling viz. Rotary & Percussive, their attachments; Core Barrels; Conditions of applicability of drilling methods; Borehole Survey, Directional drilling, Underground methods of exploratory drilling.

UNIT II: Drivage of Inclines/Drifts/Adits
Types of Openings; Choice of Openings; Location of Openings; Drilling, blasting, loading and transportation of muck during drivage of inclines/adits/drifts, Ventilation, lighting and drainage, Extension of center line; Organization and cycle of operations; Mechanized methods of drivages of inclines/adits/drifts.

UNIT III: Shaft Sinking
Drilling, blasting, loading and transportation of muck, Ventilation, lighting and drainage, Extension of center line; Shaft lining and its design; Special methods of shaft sinking; Shaft boring; Deepening and widening of shafts. Upward drivage; Organization and cycle of operations.

UNIT IV: Introduction to Underground Mining
Definition of important terms, Mine development, Activities involved in development of a mine, Stages in the life of a mine, Introduction to unit operations in underground mining. Choice of method of mining, Introduction to various Underground Mining methods Introduction to various types of machineries used in Underground mining.

UNIT V: Introduction to surface Mining
Definition of important terms, Advantages and disadvantages of surface mining, mineral deposits amenable to surface mining, Various surface mining methods, Introduction to unit operations in surface mining. Introduction to various types of machineries used in surface mining.

References:
1. Surface Mining : G.B. Misra
2. Mining Engineer's Handbook Vol. 1&2, 2nd Edition : Edited by Harold Hartman
3. U.M.S. Notes :
4. Elements of Mining Technology Vol. 1&3 : D.J.Deshmukh
5. Mining of Mineral Deposits : Shevyakov
6. Modern Coal Mining : Samir Das
7. Coal Mining : R.D.Singh
8. Mining : Boki
9. Introduction to mining: Hartman

Department of Mining Engineering
List of Experiment

Subject: **Computer Programming Lab.**
Code: **BE-366**
Maximum Marks 50

(1) Write a program to add 2 numbers?

(2) Write a program to print digit in reverse order?

(3) Write a program to find if a number is even or odd?

(4) Write a program to find greatest number using if statement?

(5) Write a program to find greatest number using nested if else?

(6) Write a program to find if number is perfect number or not?

(7) Write a program to find prime number?

(8) Write a program for Lucas series?

(9) Write a program for Fabonary series?

(10) Write a program to print Armstrong number?

Department of Mining Engineering
List of Experiment

Subject: **Mining Geology I lab.**
Code: **BE-367**
Maximum Marks 50

Megascopic Description of Rock Forming Minerals.

Megascopic Description of important Igneous, Sedimentary, Metamorphic Rocks.

Basic Concept of Contours, Attitude of Beds, Width of Outcrop, True and Apparent Dips.

Study of Geological Maps and Preparation of Cross Sections.

Department of Mining Engineering
List of Experiment

Subject: **Mining Surveying I lab.**
Code: **BE-368**
Maximum Marks 50

List of Practical's to be performed (minimum 10)

1. Ranging and chaining of line of 50 Meter.

2. Determination of width of an obstacle which can be seen across but can't be chained.

3. Determination of area of a field by Cross staff survey.

4. Study of various types of chained.

5. Determination of included angle with the help of a Prismatic Compass.

6. Plotting a closed traverse and elimination of errors.

7. Determination of width of an inaccessible obstacle by intersection.

8. Determination of location of instrument station by two point problem.

9. Determination of location of instrument station by two point problem.

10. Determination of location of instrument station by three point problem.

11. Study of Miner's dial.

12. Study of Dumpy level.

13. Determination of difference in elevation and gradient between two stations using dumpy level.

14. Fly leveling by Tilting level.

15. Longitudinal sectioning by Level.

Department of Mining Engineering
List of Experiment

Subject: **MOS & FM Lab.**
Code: **BE-369**
Maximum Marks 50

1. Determination of compressive strength of cement cube.
2. Determination of tensile strength of cement cube.
3. Determination of fineness of cement by sieving method.
4. Determination of fineness of cement by Blain Apparatus.
5. To determine Uniaxial tensile test of mild steel.
6. To determine IzodCharpy Value of given mild steel.
7. To determine the Rockwell Hardness of given material.
8. To determine Compressive strength of wood: (a.) Along the fiber and (b.) Across the fiber.
9. To study the cupping test machine and determination of Ericheser value of mild steel sheet.
10. To determine the meta-centric height of a ship model.
11. To calibrate an orifice-meter.
12. To determine the head loss in various pipe fittings.
13. To determine the coefficient of discharge of a mouthpiece.
14. To study the variation of friction factor for pipe flow.
15. To verify the bernoulli's theorem.

School of Engineering & I.T.

MATS University

Raipur

Syllabus Scheme

(IVth Semester)

For

Bachelor of Technology

Mining Engineering

Subject Code for School of Engineering & I.T. Deptt.

IVth Semester (Mining)

S.No.	Subject Code	Subject Name
1	**BE460**	Mine Surveying II
2	**BE461**	Engineering Materials
3	**BE462**	Advance Electrical Engineering
4	**BE463**	Mining Geology II
5	**BE464**	Underground Coal Mining
6	**BE465**	Advance Electronics & Instrumentation
7	**BE466**	Mining Geology II Lab
8	**BE467**	Mine Surveying II Lab
9	**BE468**	Advance Electrical Engg. Lab. LAB
10	**BE469**	Underground Coal Mining Lab

School of Engineering & I.T.
MATS University, Raipur
Scheme of Teaching & Examination
IVth Semester
Mining Engineering

S. No.	Course code	SUBJECT	Periods per week		Evaluation Scheme		Total Marks
			L	P	IM	ESE	
THEORY							
1	BE460	Mine Surveying II	5	0	30	70	100
2	BE461	Engineering Materials	5	0	30	70	100
3	BE462	Advance Electrical Engineering	5	0	30	70	100
4	BE463	Mining Geology II	5	0	30	70	100
5	BE464	Underground Coal Mining	5	0	30	70	100
6	BE465	Advance Electronics & Instrumentation	5	0	30	70	100
PRACTICAL							
7	BE466	Mining Geology II Lab	0	3	20	30	50
8	BE467	Mine Surveying II Lab	0	3	20	30	50
9	BE468	Advance Electrical Engg. Lab.	0	3	20	30	50
10	BE469	Underground Coal Mining Lab.	0	3	20	30	50

L-Lecturer, P-Practical, ESE- End Semester Examination, IM-Internal Marks

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. IVth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Surveying II **Code : - BE 460**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: Theodolite Surveying
Types of Theodolites; Description of various parts of a varneir 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 andtheir prevention.

UNIT II: Tacheometry
Principles of Stadia Methods; Determination of constants; Theory of anallactic lens; Distance and elevation formulae Subtense and Tangential Methods; Reduction of stadia Notes; Beaman stadia bar;Auto-reduction Tacheometer.

UNIT III: 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 IV: 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 V: 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. Mines Regulations concerning above topics.

Text Books

1. Mine surveying by S. Ghatak
2. Surveying &Levelling by B. C. Punamia
3. Surveying &Levelling by Kanetkar&Kulkarni

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. IVth Sem.** **Branch**: - **Mining Engineering**
Subject: - Engineering Materials **Code : - BE 461**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: General
Introduction, Classification of engineering materials, Structure of Metals and Alloys, Iron-carbon phase diagram.

UNIT II: Heat Treatment Of Iron & Steel
Different Types Of Steels, Their Properties and Uses, Different Types of Heat Treatment Techniques viz. Hardening, Annealing, Normalizing & Tempering and Their Uses in Mining Industry.

UNIT III: Wire Rope
Types and Construction, Wire Rope Lays, Non- Stranded Ropes, Selection of Wire Ropes, Ropes Used For Different Purpose, Mass & Strength Of Wire Ropes
.
UNIT IV: Construction Materials
Cements – Classification & Properties, Quick Setting Cement, R.C.C., Shotcreting, Brick & Stone Masonries, Application Of Fly Ash In Mining.

UNIT V: Engineering Behavior of Some Materials
Stress-Strain Curves of Typical Engg. Materials, Elastic And Plastic Deformation, Fracture, Fatigue And Creep.

Text Books:

1. Introduction to Engineering Materials by B.K. Agrawal
2. Elements of Mining Technology by D.J. Deshmukh, Vol.I

Reference Books:

1. Engineering Materials by Surendra Singh
2. Concrete Technology by M.L.Gambhir.

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B. Tech. IVth Sem.** **Branch**: - **Mining Engineering**
Subject: - Advance Electrical Engg. **Code : - BE 462**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: POLYPHASE CIRCUITS
Generation of three phase power, Three Phase connection- star & delta, different types of power, phasor diagram, power factor, importance , effect of low power factor, power factor correction, measurement of power.

UNIT II: TRANSFORMERS
Definition, Importance, Construction, Principle of operation, equivalent circuit, phasor diagram, regulation and losses and efficiency, open circuit and short circuit tests. Auto transformers and introduction to three phase transformers & its application.

UNIT III: D.C. MACHINES
construction , principle of operation and characteristics of D.C. Generators, losses and efficiency, Types of D.C. Motors and their characteristics, starters, speed control and industrial applications. Choice of motors for specific and based on characteristics of loads and motors.

UNIT IV: A.C. MACHINES
General principles and construction of alternators, induction motors and synchronous motors, induction motors types, equivalent circuits, torque slip characteristics. Application of induction motor Electric Braking – types, and speed control, synchronous condenser, use of synchronous and induction motors for rope sequence control, various motors enclosures.

UNIT V: POWER DISTRIBUTION & PROTECTION
Difference between AC & DC , Advantage & disadvantages, Compare between overhead & underground transmission & distribution, D.C. two wire and three wire system, A.C. three wire and four wire system, Types of cable, laying of cable, Underground distribution schemes, Electrical signaling in mines, Circuit Breaker, definition, types of circuit breaker used in mines, different fault protection, Intrinsically safe apparatus, simplified connection diagram AC switch board. Switch gear for coal machinery.

Textbook

1. Electronic instrumentation (2nd edition) – H.S. Kalsi, TMH
2. Power system protection-Badri Ram
3. Electrical Machinery-Dr. P.S. Bimbhra, Khanna Pbs.
4. Electrical devices and circuits-A.P. Godse & U.A. Bakshi
5. Power Electronics-Dr. P.S. Bimbhra

Reference
Books:

1. Electrical and Electronic measurements & Instrumention-A.K. Sawhney, DhanpatRai Pbs.
2. Electrical Instrumentation & measurement techniques-copper & Helfrick, PHI
3. Electrical Power system-C.L. Wadhwa, New age international Pbs.
4. Principle of Electronics-V.K. Mehta, S. Chand Pbs.

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. IVth Sem.** **Branch**: - **Mining Engineering**
Subject:- Mining Geology II **Code : - BE 463**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: Stratigraphy
Introduction, Definitions and Basic Principles Of Stratigraphy; Units of Stratigraphy; Criteria for Stratigraphic Classification and Correlation; Standard Geological Time Scale; Fossils-Elementary Idea about Their Conditions, Modes of Their Preservation and Their Uses; Broad Palaeontological Groups of Animals and Plants; Brief Palaeontological Study of Gondwana Fields.

UNIT II: Indian Geology
Major Geomorphic Divisions of India; General Review of Indian Stratigraphy; Descriptions of important Indian Geological formations – Archeans ,Cuddapahs , Vindhyans , Gondwanas and teriaries.

UNIT III: Economic Geology-I
Introduction and Scope of the subject; Fundamental Terms and Their Definitions; Distribution and Morphology of Minerals Deposits; Brief Review of the Processes of Mineral Formation and the Genetic classification of mineral deposits.

UNIT IV: Economic Geology-II
Mode Of Occurrence, Origin, Distribution, Association and Industrial Uses of Important Metallic(Au, Al, Cu, Fe, Mn, Sn, Pb And Zn) and Non Metallic (Diamond, Mica, Radioactive Minerals, Gypsum, Dolomites. Fire-Clay, Magnesite, Talc, Asbestos, Graphite, Kyanite, Sillimanite, Corundum, Fluorite, Phosphorite, precious and semi-precious stones, minerals, petroleum deposits of India.

UNIT V: Prospecting and Exploration
Prospecting and Exploration -Their Definitions and Classification Of Methods; Elementary Methods Of Geological, Geophysical, Geochemical Prospecting; Guides To Ores- Ringed Targets, Intersection Loci, Physiographical, Mineralogical, Stratigraphical and Structural Guides To Ores.

References:

1. Fundamentals of Historical Geology and Stratigraphy of India:Ravindra Kumar
2. Geology Of India and Burma :M.S. Krishnan
3. Economic Mineral Deposits :M.L.Jensen&A.Batman
4. India’s Mineral Resources :S. Krishnaswamy
5. Geophysical Prospecting :M.Dorbin& B. Miller
6. Courses in Mining Geology :Arogyaswamy
7. Applied Geology : S. Banger

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. IVth Sem.** **Branch**: - **Mining Engineering**
Subject: - Underground Coal Mining **Code : - BE 464**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: INTRODUCTION
Origin of Coal, Theories of Coal Formation, Classification of Coal, Coaking Coal, Coal Seam and its Classification, Coal Seam Structures and Abnormalities like Faults, Joints, Cleats, Folds etc., Coal Measuring Rocks and Their Characteristics, Distribution of Coal in India, Indian Coal Mining Industry; Choice of Coal Mining Methods.

UNIT II: BOARD AND PILLAR METHOD
Important Terminology, Development Size and Shape of The Pillar, Galleries, Panel System and Without Panel System of Development, Size of Panel, Cycle Of Operation, Depillaring, Problems in Depillaring, Preparatory Arrangements, Depillaring by Stowing, Depillaring by Caving Methods, Pillar Extraction Techniques, Dangers Associated With Depillaring.

UNIT III: LONGWALL MINING
Important Terminology, Types of Longwall Faces and Their Choice, Merits and Demerits of Longwall Mining, Development of Longwall Panels and Faces, Longwall Advancing Method, Longwall Retreating Method, Length of Longwall Faces, Rate of Face Advance, Double Unit Longwall Faces, Face organization and material supply.

UNIT IV: THICK SEAM MINING
Problem in Mining of Thick Seams, 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.

UNIT V: ROOM AND PILLAR MINING
Vermelles Method, Slant Method, Sublevel Method, Coal Saw Method, Mining of Contiguous Seams, Mining of Steeply Inclined Seam, Mining Under Water, Mining of Seams Prone to Spontaneous Heating, Bumps, Air blast etc.

Text
Books:

1. Principle and practices of modem Coal Mining – R.D. Singh
2. Coal Mining in India – S.P. Mathur

Reference
Books:

1. Wining & working coal – R.T. Deshmukh
2. U/G winning of Coal – T.N. Singh

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. IVth Sem.** **Branch**: - **Mining Engineering**
Subject: - Advance Electronics & Instrumentation **Code : - BE 465**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I : Semiconductor Diodes
Construction & Characteristics of PN Junction dioes, Rectifier : Half wave, Full Wave & Bridge (Circuit and operation), Zener diode: construction, characteristics, specifications, Voltage regulator circuit using Zener diode.

UNIT II : Transistors
Junction Transistor : Construction, Various current components inside a transistor, circuit symbol of PNP and NPN transistors, transistor amplifier, input and output characteristics, relation between and of a transistor, CB, CE & CC configuration. Field Effect Transistor: construction, principal of operation andCharacteristics of JFET. Construction, principle of operation and characteristics of MOSFET 0 enhancement and depletion type MOSRET.

UNIT III : Basics of Transducers
Active & Passive Transducers, Analog & Digital Transducers, Classification of transducers according to Applications. Selection of a transducer. Construction, Principles of operation and applications of : Wire wound Potentiometer, Strain gauge, LVDT, Thermistor, Solar cell Transducer, Piezo-electric crystals

UNIT IV : Signal Conditioning Circuits
Operational Amplifiers: Terminal characteristics, Ideal characteristics, OPAMP as Inverting amplifier, Non-inverting amplifier, Adder, Difference amplifier, differentiator, Integrator, Comparator, Instrumentation amplifier. Passive Filters: High Pass, Low Pass and Band Pass filter using RC- expression for their Gain – BW Product. Wheatstone bridge. Diode Clipper and clamper (only qualitative analysis, no mathematical derivation is required).

UNIT V : Basic Instrumentation System & Components
Block diagram of basic measurement systems: Distortion due to Mechanical loading, Distortion due to Impedance loading, Distortion due to change in signal frequency, Distortion due to electrical noise. Data Acquisition System: Objective of DAS, Single & Multi channel DAS, Computer based DAS. Data Loggers,(Only introductory idea is expected no detail analysis is required).

Text Books :

1. Electronic Instrumentation (2nd Ed.) by H S Kalsi, TMH
2. Elements of Electronic Instrumentation by J. Jha, M.Puri, R. Sukesh Kumar & M. Kowar, Narosa Publishing House.
3. Electronics & Instrumentation by B.R. Gupta, S. Chand & Co.

Reference Books :

1. Electrical & Electronics Measurement & Instrumentation by A.K. Sawheny, DhanpatRai Publishing company
2. Electronic Instrumentation & Measurement Techniques by Copper &Helfrick, PHI.

Department of Mining Engineering
List of Experiment

Subject: **Mining Geology II Lab.**
Code: **BE-466**
Maximum Marks: 50

Megascopic Description and Distribution of Ore Forming Minerals and Industrial Minerals.

Study of Plant Fossils.

Study of Advance Geological Maps and Preparation of Cross Sections.

Department of Mining Engineering
List of Experiment

Subject: **Mine Surveying II Lab.**
Code: **BE-467**
Maximum Marks: 50

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 tachometric 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 /Eidograph.

Department of Mining Engineering
List of Experiment

Subject: **Advance Electrical Engg.Lab.**
Code: **BE-468**
Maximum Marks: 50

1. Magnetization Characteristics of a separately excited DC Machine.

2. Speed Control of a DC Shunt Motor.

3. Load Test on a DC Shunt/Compound Motor.

4. Load test on a DC Shunt / Compound Generator.

5. Connection, Starting Reversing and load Test on a 3 phase Induction motor.

6. Study of Electromagnetic Induction Disc Relay.

7. Study of Star- Delta Starter.

8. Measurement of 3 phase power by 2wattmeter method.

9. Open Circuit and short circuit Test single phase Transformer and prediction of performance.

10. Load Test on single phase Transformer and calculation of performance.

Department of Mining Engineering
List of Experiment

Subject: **Underground Coal Mining Lab.**
Code: **BE-469**
Maximum Marks: 50

1. Study of layouts of Board and Pillar development working by without panel system.
2. Study of layouts of Board and Pillar development working by panel system.
3. Study of layout of Logwall Advancing system.
4. Study of layout of Logwall Retreating system.
5. Study of various line of extraction used for pillar extraction.
6. Study of stook extraction method under difficult roof conditions.
7. Study of surface arrangement required for stowing.
8. Study of sublevel caving method of thick seam mining.
9. Study of layout of Blasting gallery method.
10. Study of layout of Double Unit Longwall Faces.

School of Engineering & I.T.

MATS University

Raipur

Syllabus Scheme

(Vth Semester)

For

Bachelor of Technology

Mining Engineering

Subject Code for School of Engineering & I.T. Deptt.

Vth Semester (Mining)

S.No.	Subject Code	Subject Name
1	**BE560**	Element of Management
2	**BE561**	Mine Environment I
3	**BE562**	Mine Legislation I
4	**BE563**	Underground Metal Mining
5	**BE564**	Surface Mining I
6	**BE565**	Mine Machinery I
7	**BE566**	Mine Machinery I Lab
8	**BE567**	Surface Mining I Lab
9	**BE568**	Mine Environment I Lab
10	**BE569**	Practical Training

School of Engineering & I.T.
MATS University, Raipur
Scheme of Teaching & Examination
Vth Semester
Mining Engineering

S. No.	Course code	SUBJECT	Periods per week		Evaluation Scheme		Total Marks
			L	P	IM	ESE	
THEORY							
1	BE560	Element of Management	5	0	30	70	100
2	BE561	Mine Environment I	5	0	30	70	100
3	BE562	Mine Legislation-I	5	0	30	70	100
4	BE563	Underground Metal Mining	5	0	30	70	100
5	BE564	Surface Mining-I	5	0	30	70	100
6	BE565	Mine Machinery-I	5	0	30	70	100
PRACTICAL							
7	BE566	Mine Machinery-I Lab	0	3	20	30	50
8	BE567	Surface Mining-I Lab	0	3	20	30	50
9	BE568	Mine Environment I Lab	0	3	20	30	50
10	BE569	*Practical Training	0	3	20	30	50

L-Lecturer, P-Practical, ESE- End Semester Examination, IM-Internal Marks
*To be completed after IV semester. (At least 6 week)

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. Vth Sem.** **Branch**: - **Mining Engineering**
Subject: - Element of Management **Code : - BE 560**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT – I Evolution of Management

Definition of Management, Nature and Basics concepts of Management, Management and Administration, Functions of Manager in Information age, Science, Theory and practice of Management, Managerial objectives and role, Business environment, Social attitudes beliefs and values, Social responsibilities of business.

UNIT – II Function of Management

Function of management, planning, nature and important, Organizing and process of organizing, Staffing, Directing, Controlling and process of controlling, Decision making.

UNIT – III Motivation & HRM

Motivation – Meaning, Need for motivation, Theories of motivation.Leadership – Meaning and styles, Group and team working.Human resource management.

UNIT – IV Marketing & Finance

Marketing function –Market and marketing environment, Consumer/buyer behavior, Marketing mix, Advertisement and sales promotion. Financial management, Introduction to book keeping and financial statements, Break even analysis.

UNIT – V Disaster Management

Concept of disaster management, Types of disasters, Overview of Disaster situations in India, Tsunami, Land slide, Earthquake and its impact. Role of remote sensing, science & technology. Prevention and mitigation, Preparedness and response, Institutional framework.

Text Book:

1. Disaster Management and Preparedness by Ministry of Home affairs
2. Industrial Management by V.N. Singh Print Press
3. Industrial Engineering and management by O.P. Khanna Dhanpat Rai Publication

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. Vth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Environment I **Code : - BE 561**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: MINE ATMOSPHERE

Pollution of Mine Atmosphere, Mine Gases, Their Origin, Occurrence,Effects and Detection, Methane Drainage. Monitoring System for Mine environment, Analysis of Mine air.

UNIT II: Mine Heat & Humidity

Heat & humidity in mine , atmosphere and its effects , Cooling power of mine air , Assessment of comfort conditions , Air conditioning of Mines , Surface , Underground and divided installations , Spot coolers.

UNIT III: Mine Dust

Classification, physiological effect, measurement of dust concentration, dynamics of small particles, sampling of air borne dust, prevention and suppression of dust.

UNIT IV: Mine Illumination

Types of portable lamps, maintenance and examination, Lamp room design and organization, Percentage and accumulation tests , Lighting from mains , Photometry and illumination surveys , standard of illumination for Underground and open cast workings.

UNIT V: Safety& Health

Occupational Safety and Health Acts, Safety procedures, Type of Accidents, Chemical and Heat Burns, Prevention of Accidents involving Hazardous substances, Human error and Hazard Analysis. Hazard Control Measures in integrated steel industry, Petroleum Refinery,

TEXT BOOKS

1. V.S.Vutukuri and R.D.Lama, Environmental Engineering in Mines, Trans Tech Publishers.
2. M.J.McPherson, Subsurface Ventilation and Environmental Engineering, Chapman & Hall Publication, London.
3. G.B.Mishra, Mine Ventilation and Environment, Oxford University Press.

REFERENCE BOOKS

1. H.L.Hartman, Mine Ventilation and Air Conditioning, Wiley Publication, 1999.
2. D.J.Deshmukh, Elements of Mining Technology Vol II, VidyasewaPrakashan, Nagpur.
3. A.Skochinsky and Komorov V., Mine Ventilation, MIR Pub., Moscow
4. B.B.Dhar and A.K.Ghose, Mining Challenges for 21st Century, Ashish Publications New Delhi.
5. D. Pennman, J.S. Penman, The principles and practice of Mine Ventilation, Charles Griffin
6. H. Rabia, Mine Environmental Engineering, Entrac Software Pub.

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. Vth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Legislation I **Code : - BE 562**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

_ General Principles of Mining Law, Development of mining legislation in India.
_ Mines Act – 1952 & Mines Rules – 1956
_ Coal Mines Regulations –1957 &Metalliferous Mines Regulation-1961
_ Mine crèche Rules & Pit Head Bath Rule
_ Mine Vocational- training Rules.

References: -

1) Legislation in Indian Mines (A critical Appraisal) Vol. II & I By- 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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GULLU, ARANG, RAIPUR

Semester: **B.Tech. Vth Sem.** **Branch**: - **Mining Engineering**
Subject: - Underground Metal Mining **Code : - BE 563**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: General

Status and scope of Underground metal mining methods; Definitions of important terms used in Underground metal mining methods.

UNIT II: Development

Mode of access; Variables affecting the choice of mode of access; Crosscuts, Levels, Raises; Their method of drivages with the description of various unit operations; Introduction to Raise boring and Introduction to tunnel boring.

UNIT III: Stoping Methods-I

Classification of mining methods; Factors affecting the choice of mining methods; Overhand, Underhand and Breast stopping methods; Open stoping; Vertical Crater Retreat method; Sub level stoping Room and Pillar method.

UNIT IV: Stoping Methods-II

Shrinkage stoping; Cut and fill stoping, Introduction to Square set stopping, Sub level caving, Block caving, Top slicing.

UNIT V: Support Systems

Pillars; Back fill, Cable bolting, Steel Rock bolts, Grouting, Shotcreting etc.,code of timbering rules.

Text Books

1. Elements of Mining Tech. Vol II by D. J. Deshmukh
2. S M E Handbook

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GULLU, ARANG, RAIPUR

Semester: **B. Tech. Vth Sem.** **Branch**: - **Mining Engineering**
Subject: - Surface Mining I **Code : - BE 564**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: Open Pit Design and Layouts

Important parameters of Open pit design; Design of Benches, Ultimate pit design, Stripping ratio, Breakeven stripping ratio, Different methods of opening up the deposits; Box cuts, internal and external box cut,Methods of driving Box cuts; Layout of open pits; Layout of waste dumps, unit operations in opencastmining.

UNIT II: Rock Breakage

Theory of Rock Drilling, Different Types of Drill Machines Used in Open Pits; Rotary, Percussive and RotaryPercussive Drilling, Selection of Drill Machines; Computation of Productivity of Drill Machines; InclinedDrilling; Their Advantages and Disadvantages. Introduction to Different Types of Explosives Used in OpenCast Mining.

UNIT III: Site preparation

Dozers, Scrapers, Front-End Loaders etc.; Their Construction, Operation, Suitability and Applicability; Calculation of Their Productivity;

UNIT IV: **Loading and Excavation**

Different Types of Excavators used in Open Pits; Shovel, Dragline, Hydraulic Excavators, Multi Bucket Excavators, Their Construction, Operation, Suitability and Applicability; Calculation of Their Productivity.

UNIT V: Transport in open pits

Automobile Transport, Rail Transport and Conveyors; Their Suitability; Computation of Their Productivity; Land Reclamation and its Methods. Application of Computers in Open Pit Mining.

References:

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

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. Vth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Machinery I **Code : - BE 565**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: Wire Rope

Wire ropes used in Mines, Application of wire ropes in Mines, Testing of wire ropes, Factor of safety, Examination of Wire ropes, Care of wire ropes. Ropes splicing: Rope capples and changing the ropes.

UNIT II: 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 III: WINDING

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

UNIT IV: SPEED CONTROL

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 V: PUMPING

Sources of mine water, types of pumps, design calculations, characteristics, operation, and maintenance and selection, pump fittings, special types of pumps used in mines.

Text Books

1. Elements of Mining Tech. Vol I &Vol III by D. J. Deshmukh
2. Mining Machinery By S. C. Walker

Department of Mining Engineering
List of Experiment

Subject: **Mine Machinery Lab**
Code: **BE-566**
Maximum Marks: 50

List of experiments:

1. Study of different types of Rope cable.
2. Study of Rope slicing.
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.

Department of Mining Engineering
List of Experiment

Subject: **Surface Mining Lab**
Code: **BE-567**
Maximum Marks: 50

List of experiments:

1. Study of Drivage of Internal and External Box Cut
2. Determination of Ultimate Pit Slope, Overall Ramp slope and Interramp slope and Design of Ultimate pit bymanual methods
3. Study of Constructional features of Scrapers and the machine operation
4. Study of Constructional features of Electric Rope Shovel and the machine operation
5. Study of Constructional features of Dragline and the machine operation
6. Determination of Productivity of shovel dumper combination and synchronization of shovel dumper operatedface.
7. Study of Dragline sidecasting operation and drawing of layout of Dragline operated faces
8. Study of Constructional features of Multi bucket Excavators and the machine operation
9. Study of working of Jack Hammer Drilling Machine
10. Study of working of Down the hole Drilling Machine

Department of Mining Engineering
List of Experiment

Subject: **Mine Environment I Lab**
Code: **BE-568**
Maximum Marks: 50

List of Practical to be performed: 10

1. Detection of presence and accumulation of firedamp in mine atmosphere.
2. Detection of presence and accumulation of CO in mine atmosphere
3. Study of various techniques of methane drainage.
4. Study of surface air conditioning plant.
5. Study of Underground air conditioning plant.
6. Study of different types of ventilation devices.
7. Study of cap lamp used in underground mine.
8. Design of a cap lamp room for a large underground coal mine.
9. Study of gravimetric dust sampler.
10. Study of thermal precipitator dust sampler.
11. Study of Flame safety lamps used in underground mine.

Department of Mining Engineering

Subject: **Practical Training (at least 6 week)**
Code: **BE-569**
Maximum Marks: 50

Course Objective:

Whatever may be the research and developments in Rock Mechanics, the behaviour of rock is less predictable accurately. Mining Engineering is hence said to be an art more than engineering and the knowledge gained through experience is more valuable.

Instructional Objective:

The training enables the students to experience with the practical applications of the theoretical learning. The outcome at the place of work is always much more than what can be learned in the class room.

Teaching Scheme:

The industrial training phase I will be organised during summer vacation after IV semester examinations for a minimum duration of six weeks. The class shall be divided into batches of 4 or 5 students and sent to pre-determined mines from where the permissions are obtained. Students may camp at the mines or elsewhere and undergo training as per the direction of mine management. Notional teaching scheme: 4 hrs /week Practical for guidance of students.

Examination Scheme:

Students shall maintain a Daily Diary to record their daily activities. They shall collect the necessary data and prepare a detail training report within two months of completion of training. The training Report neatly typed and attached with sketches, diagrams and maps shall be submitted to the department for evaluation and record.

Oraganisation of Training:

The training places are grouped into four as below and training at any one mine each of two different groups is compulsory.

1. **Mechanised Opencast Metal Mines:**

Iron ore mines in Goa, Malanjkhand Copper Mines of HCL(Madhya Pradesh), Kudremukh Iron Ore Mine(Karnataka), RampuraAgucha Mines of HZL (Rajasthan), Bailadilla Mines of NMDC (Chattisgarh), any other mechanised opencast mines.

2. **Mechanised opencast mines in Coal:**

Neyveli mines of M/s Neyveli Lignite Corporation, Kusmunda Mines of South Eastern Coalfields Ltd (Bilaspur, M.P.), Ramagundem mines of Singreni collieries co Ltd, mines of Central Coalfields Ltd., any similar mines.

3. **Underground Metalliferous Mines:**

Mines of Manganese Ore India Ltd., Khethri or Kolihan mines of HCL (Rajasthan), Surda or Rakha mines of HCL (Jharkhand), Dariba or Zawar mines of HZL, Hutti Gold Mines Ltd, any similar underground metal mines.

4. **Underground Coal Mines:**

Mines of Singreni Collieries Co Ltd (Andhra Pradesh), Mines of Western Coalfields Ltd, Mines of South Eastern Coalfields Ltd.

Essential Contents of Training Report:

1. Name of the mine along with names of owner, agent, manager and other senior officials.
2. Location and a brief history of the mine.
3. Brief geological description along with characteristics of the ore and its marketing scenario.
4. The surface features including mine entries, loading & transport arrangement of ore, disposal of waste, ore beneficiation.
5. Method of working including strata control in underground mines and dump management in opencast mines.
6. Sampling, survey, training and rescue sections.
7. Acknowledgements.

School of Engineering & I.T.

MATS University

Raipur

Syllabus Scheme

(VIth Semester)

For

Bachelor of Technology

Mining Engineering

Subject Code for School of Engineering & I.T. Deptt.

VIth Semester (Mining)

S.No.	Subject Code	Subject Name
1	**BE660**	Blasting Technology
2	**BE661**	Mine Ventilation
3	**BE662**	Mine Machinery II
4	**BE663**	Mine Legislation II
5	**BE664**	Mineral Dressing
6	**BE665**	**Elective I**
7	**BE666**	Blasting Engineering Lab
8	**BE667**	Mine Ventilation Lab
9	**BE668**	Mining Machinery II Lab
10	**BE669**	Mineral Dressing Lab

S.No.	Subject Code	Subject Name
Elective I		
1	**BE6651**	Mine Management
2	**BE6652**	Small scale dimension stone mining

School of Engineering & I.T.
MATS University, Raipur
Scheme of Teaching & Examination
VIth Semester
Mining Engineering

S. No.	Course code	SUBJECT	Periods per week		Evaluation Scheme		Total Marks
			L	P	IM	ESE	
THEORY							
1	BE660	Blasting Technology	5	0	30	70	100
2	BE661	Mine Ventilation	5	0	30	70	100
3	BE662	Mine Machinery-II	5	0	30	70	100
4	BE663	Mine Legislation-II	5	0	30	70	100
5	BE664	Mineral Dressing	5	0	30	70	100
6	BE665	**ELECTIVE-I**	5	0	30	70	100
PRACTICAL							
7	BE666	Blasting Technology Lab	0	3	20	30	50
8	BE667	Mine Ventilation Lab	0	3	20	30	50
9	BE668	Mine Machinery-II Lab	0	3	20	30	50
10	BE669	Mineral Dressing Lab	0	3	20	30	50

L-Lecturer, P-Practical, ESE- End Semester Examination, IM-Internal Marks

Table- 1		
Elective-1		
S. No.	**Course Code**	**SUBJECT**
1	BE6651	Mine Management
2	BE6652	Small scale dimension stone mining

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIth Sem.** **Branch**: **- Mining Engineering**
Subject: - Blasting Technology **Code : - BE 660**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: COMMERCIAL EXPLOSIVES

Commercial Explosives and their properties, Bulk Explosive Systems, Selection of explosive. Transportation and Handling of explosives & related regulations.

UNIT II: INITIATION SYSTEM & BLASTING ACCESSORIES

Detonators of various types, Detonating cord, Safety fuse, Detonating relays, Non electric initiation and Blasting accessories

UNIT III: SURFACE BLAST DESIGN

Factors affecting blast design, Selection of various blast parameters Burden, Spacing, Stemming distance, Sub-grade drilling, Depth of hole, Bench height, Diameter of hole, Safe charge calculation, Deck Charging, Drilling patterns, Inclined hole drilling, Secondary blasting.

UNIT IV: UNDERGROUND BLAST DESIGN

Various cut patterns, U/G blast design, Series & Parallel connection of detonators, Precautions during blasting

UNIT V: ROCK BREAKAGE MECHANISM

Breakage mechanism, rock fragmentation, Factors affecting rock fragmentation, Back break,over break, Fly rock, Ground Vibration, Noise, Control Blasting Techniques

References:

1. Explosives and Blasting Technology: G.K.Pradhan
2. Surface Blast Design: C.J.Konya
3. Rock Blasting: SushilBhandari
4. Indian Explosive Act 1884
5. Legislation in Indian Mines – A Critical Appraisal: Rakesh and Prasad

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GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Ventilation **Code : - BE 661**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: Theory of Ventilation

Objects and standard of ventilation , Flow of air in ducts and mine roadways, Resistance of air ways, Laws of ventilation, Chezy's and Atkinson's euations, Equivalent resistance and equivalent orifice of mine, Regulations related with above topics .

UNIT II: Natural Ventilation

Definition, Natural Ventilation and its Measurements, Thermodynamics of Natural Ventilation, Distribution and Control of air Current, Doors, Regulators, Stopping's and Their Types, air Crossings, Airlocks.

UNIT III: Mechanical Ventilation

Theory of mine fans, Types of mine fans, their characteristics &suitability, Selection of fans. Auxiliary and booster fans, series and parallel operation of fans, mine characteristic and selection of mine fans, fan drift and ease, forcing and exhaust ventilation, reversal of ventilation, ventilating of headings.

UNIT IV: Ventilation Survey

Objects of ventilation survey, Instruments for the measurement of pressure, velocity and quantity of air.

UNIT V: Ventilation Systems & Planning

Calculation of pressure and quantity requirements, network problems, Hardy-cross method, Ventilation planning and economic analysis, central and boundary ventilation, accessional and declensional ventilation, antitropal , homotropal ventilation

Text Books:
1. Mine Environment . By G.B. Mishra
2. Elements of Mining Tech. Vol.2 by D. J. Deshmukh

Reference Books:
1. H. L. Hartman, Mine Ventilation and Air Conditioning, John Wiley, Paperback edition, 1989.
2. H. L. Hartman, J. M. Mutmansky, R. V. Ramani and Y. J. Wang, Mine Ventilation And Air Conditioning,Wiley-interscience, 3rd
3. Edition, 1997
4. S. P. Banerjee, Mine Ventilation, Lovely Prakashan, 1st Edition, 2003
5. M. A. Ramlu, Mine Disaster and Mine Rescue, Oxford & IBH, 1999.

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Machinery II **Code : - BE 662**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: Arial ropeways

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

UNIT II: Conveyors I

Different types of belt conveyors, their construction, installation, maintenance & designcalculations.

UNIT III: Conveyors II

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

UNIT IV: 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 sameshaft, winding with side by side and up and down sheaves, advantages and disadvantages. Multi rope winding. Calculation of H.P.

UNIT V: HYDRULIC 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.

Text 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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GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Legislation II **Code : - BE 663**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Principal Provisions of Mines & Minerals (Regulation & Development) ActCoal Mines onservation& Development Act. Mineral Concession Rules, Indian Electricity Rules related to mining activity.
Byelaws & D.G.M.S. Circulars.Mines Rescue RulesMine Accident, their classification, and causes & preventive measures, Cost of accident,Preparation of Inquiry report.Safety Campaign, Causes of major mining accidents those have occurred in India &Suggested remedial measures.

References: -

1) Legislation in Indian Mines (A critical Appraisal) Vol. II & I
By- 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
6) Mines Rescue Rules
7) Indian Electricity Rules

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mineral Dressing **Code : - BE 664**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: CRUSHING & GRINDING

Introduction, definition, scope and economic justification, main steps in ore dressing operations, general preliminary mineralogical investigations, comminuation-crushing-principles of crushing, reduction jaw crushers, gyratory crushers, cone crushers, rolled crushers, gravity stamps their classifications and applications, grinding-principles of grinding units, application andclassification of ball mills, rod mills, tube mills and pebble mills.

UNIT II: 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, Stoke's law, Reynold's Number, different types of classifiers, hydraulic and pneumatic classifiers, sampling-importance of sampling and methods used.

UNIT III: GRAVITY CONCENTRATION

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

UNIT IV: FLOATATION

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

UNIT V: ELECTROSTATIC AND MAGNETIC SEPARATION

Principle and operation and field of application, Pelletisation of low grade iron ore, Drying and dewatering - thickening, filtration and drying. Coal washing- Simplified flow sheets forbeneficiation of coal and typical ores of copper, lead, zinc, iron and manganese ores withspecial reference to Indian deposits.

Text Books

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

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Management **Code : - BE 6651**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: WORK STUDY & MODERN TOOL OF MANAGEMENT
Definition, phases in work study, Micromotion study, motion economy factor, Time study, O & M, Aims of time & motion study.
Planning, scheduling & control, Bar chart system, deficiencies of bar chart, Network techniques, merits of network techniques, CPM/PERT techniques, rules for developing network.

UNIT II: SAFETY MANAGEMENT
Accidents, causes of accidents, losses due to accidents, classification of accidents, management safety policies, mine safety organization, external, allied & internal function of pit safety, function of safety officer, function of company, emergency organization, nature of emergency, formation of emergency plan.

UNIT III: PRODUCTION MANAGEMENT

Determination of norms and standards of operations by workstudy, work measurements, production planning, scheduling and control, Queing theory, shortand long term planning, Quality control, introduction to MIS.

UNIT IV: INDUSTRIAL PSYCHOLOGY

Definition & concept, industrial psychology Vs personal management, aims & objective of industrial psychology, scope of industrial psychology, individual & group, individual differences & group, individual differences in behavior.
Relation of industrial psychology with other branches of knowledge, studies of physical factors and their effect on man, Industrial relations, Human relations.

UNIT V: INDUSTRIAL RELATION , ACT & TRADE UNION

Meaning of industrial relations, Trade Union Movement of India, types of trade union in India, industrial dispute act, industrial trade union act, contract labor laws, prevention & settlement of industrial disputes, Payment of wages act, Strike & lockout, Illegal strikes & Lock out.

References :

1. Mine Management: V. N. Singh , Print Press Dhanbad
2. Management & Administration: S.K.Gupta
3. Introduction to management: O.P. Khanna , Dhanpat Rai Publication

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Small Scale Dimension Stone Mining **Code : - BE 6652**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I:

A Scenario of small scale mining in India, Definition of small mine, strength and weaknesses of small scale mining, Problems and difficulties of small scale mine owners, minerals- major &minor, royalty, dead rent, cess etc.

UNIT II:

Development of small scale mine, preparation of mine plan, extraction, development of benches, drilling & blasting practice in small scale mining, cutting techniques & transportation.

UNIT III:

Small scale mining of limestone, sandstone, gypsum, talc, soapstone etc., extractiontechniques and procedure.

UNIT IV:

Dimensional stone mining of granite, marble, black stone etc., extraction techniques andprocedure.

UNIT V:

Environmental Impact of small scale mining, Environmental management plan, Env. Protectionmeasures.

Reference Books :

1. An Introduction to Mineral Economics by K.K. Chhaterjee.
2. Proceedings of the National Seminar on Small Scale Mining 2001 By MBM Engg.College, Jodhpur

Department of Mining Engineering
List of Experiment

Subject: **Blasting Engineering Lab**
Code: **BE-666**
Maximum Marks: 50

List of Experiments to be performed:

1. Measurement of ground vibration by seismograph
2. Development of predictor equation from the recorded data
3. Measurement of VOD by VOD mate and its analysis
4. Study of various fragmentation assessment techniques
5. Handling of wipfrag software
6. Design of blast for coal face
7. Design of blast for underground metal mine
8. Design of blast for bench blasting
9. Study of various blasting tools
10. Study of bulk explosive systems

Department of Mining Engineering
List of Experiment

Subject: **Mine Ventilation Lab**
Code: **BE-667**
Maximum Marks: 50

List of Experiments to be performed:

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.

Department of Mining Engineering
List of Experiment

Subject: **Mining Machinery II Lab**
Code: **BE-668**
Maximum Marks: 50

List of Experiments to be performed :

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.

Department of Mining Engineering
List of Experiment

Subject: **Mineral Dressing Lab**
Code: **BE-669**
Maximum Marks: 50

List of Experiments to be performed :

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 floatation cell
9. Study of thickeners
10. Study of washability curves

MATS School of Engineering & Technology

MATS University

Raipur

Syllabus Scheme

(VIIth Semester)

For

Bachelor of Technology

Mining Engineering

Subject Code for School of Engineering & I.T. Deptt.

VIIth Semester (Mining)

S. No.	Subject Code	Subject Name
1	**BE760**	Mine Economics
2	**BE761**	Mine Surveying III
3	**BE762**	Rock Mechanics
4	**BE763**	Mine Environment II
5	**BE764**	**Elective II**
6	**BE765**	Mine Surveying III Lab
7	**BE766**	Rock Mechanics Lab
8	**BE767**	Mine Environment II Lab
9	**BE768**	Minor Project (150Marks)

S. No.	Subject Code	Subject Name
Elective II		
1	**BE7641**	Mine Planning& Development
2	**BE7642**	Industrial Engg.

School of Engineering &I.T.
MATS University, Raipur
Scheme of Teaching & Examination
VIIth Semester
Mining Engineering

S. No.	Course code	SUBJECT	Periods per week		Evaluation Scheme		Total Marks
			L	P	IM	ESE	
THEORY							
1	BE760	Mine Economics	5	0	30	70	100
2	BE761	Mine Surveying-III	5	0	30	70	100
3	BE762	Rock Mechanics	5	0	30	70	100
4	BE763	Mine Environment-II	5	0	30	70	100
5	BE764	**ELECTIVE-II**	5	0	30	70	100
PRACTICAL/DESIGN/DRAWING							
6	BE765	Mine Surveying-III Lab	0	3	20	30	50
7	BE766	Rock Mechanics Lab	0	3	20	30	50
8	BE767	Mine Environment-II Lab	0	3	20	30	50
9	BE768	Minor project (150marks)	0	3	50	100	150

Table- 2		
Elective-2		
S. No.	**Course Code**	**Subject**
1	BE7641	Mine Planning & Development
2	B37642	Industrial Engg.

L-Lecturer, P-Practical, ESE- End Semester Examination, IM-Internal Marks

** To be completed after VI Semester

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Economics **Code : - BE 760**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I

Sampling- Methods of sampling, errors in sampling, analysis of samples, estimation gradeandreserves, salting and precautions against salting. Different types of reserves.

UNIT II

Mine Valuation - Different methods, depreciation, amortization and redemption of capital, life and present value of a mine.

UNIT III

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 IV

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

UNIT V

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

Reference Books :-

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

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Surveying III **Code : - BE 761**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: Triangulation

Principles forming network of triangles; Selection of sites of triangulation stations; Base andCheck base lines; Measurement and adjustment of angles by simple methods; Calculationof Co-ordinates.

UNIT II: Correlation Survey

Methods of correlation of surface and underground surveys through adits, inclines, andshafts; Use of magnetic needle and Gyro theodolites; Different methods of Stope surveyingand open pit surveying;

UNIT III: Astronomical Survey

Definitions of important terms; Determination of azimuth by astronomical observations.

UNIT IV: Photographic Surveying

General Principles; Phototheodolite; Stereo photographic Surveying; Aerial Surveying -Field of application; Vertical and oblique photographs; Aerial photography; Preparation ofphotographical maps by simple methods;

UNIT V: **Modern Surveying Techniques**

Electronic distance measuring equipment; Geodimeter, Tellurometer, Total Station,Distomat, Softwares

Text Books

1. Mine surveying by S. Ghatak
2. Surveying &Levelling by B. C. Punamia
3. Surveying &Levelling by Kanetkar&Kulkarni
4. Mine surveying by Winniberg

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Rock Mechanics **Code : - BE 762**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I:

Application of rock mechanics in mining, Definition of important terms used in Rockmechanics, Classification of rock mass, Parameters of rock mass classification, Importance of rock mass classification, RQD, Q –system and Bieniskiwi's Geomechanics classification of rock mass.

UNIT II:

Rock properties, Physico-mechanical properties of rock, Preparation and testing ofspecimen in the laboratory, ISRM standards, Determination of Physico-mechanical properties of rock as per ISRM standard testing procedures, Strength indices and their importance. Point load, Protodyaknov, Impact and Cone Indenter strength Index.

UNIT III:

Rock as an elastic medium, Principle of elastic analysis, Rheological properties of rock, Importance of rheological models, Different types of rheological models, Dynamic properties of rocks, Anisotropy and Creep.

UNIT IV:

Principal stress and Principal plane, Analytical method of determining the magnitudes and directions of normal and shear stress on failure plane, Mohr's circle, Theories of failure of rock, Coulomb-Navier theory, Mohr's theory, Griffith's theory, Empirical theories of failure ofrock, Different modes of failure of rock.

UNIT V:

Earth stresses, Importance of measurements of in situ stress, measurements of insitu stress by Flat jack, Overcoring and Hydraulic fracturing technique. Design of circular and elliptical openings. Determination of safe span of roof.

Text Books

1. Rock Mechanics By Obertabd Duvall
2. Rock Mechanics By Goodman
3. Rock Mechanics By Jager& Cook
4. Rock Mechanics by B.S. Verma

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIth Sem.** **Branch**: **- Mining Engineering**
Subject: - Mine Environment II **Code : - BE 763**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I : MINE FIRES

Mine fires, fires in quarries and surface storage systems, control of fires and fires extinguishers, study of atmosphere behind sealed off areas, conditions and procedure of reopening a sealed off area, fire fighting organisations.

UNIT II: SPONTANEOUS HEATING

Causes, detection and preventive measures in underground and surface coal mines,stacks and dumps, control of spontaneous heating, fire stopping and sealing off an area.

UNIT III: EXPLOSION

Fire damp and coal dust explosions, their causes and prevention, stone dust and waterbarriers, investigations after explosion.

UNIT IV: RESCUE AND RECOVERY

Types of rescue equipment and their use, rescue stations, first aid appliances, training of personnel, and organisation of rescue and recovery work during mine fires, explosion, inundation.

UNIT V: MINE INNUNDATION

Causes and precautionary measures, bulk head doors, barriers, dams, precautions to be taken while approaching old workings, recovery of flooded mines and de watering of old workings.

Text Books:

1. Mine Env. By G.B. Mishra
2. Elements of Mining Tech. Vol.2 by D. J. Deshmukh
3. U/G Mine Env. by Mcpherson
4. Mine fires by Dr. Ramlu

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mine Planning& Development **Code : - BE 7641**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I:

Coal reserves and their estimation, Geological and technological data needed for mineplanning, Preparation of project and feasibility reports, Planning and scheduling of variousmining operations.

UNIT II:

Planning and scheduling of various mining operations, linear programming, Simplexmethods and transportation problem. Operation Research - Scope of application in mining,Linear programming, formulation and solution, Network planning with special reference toCPM/PERT, System approach for project scheduling.

UNIT III:

Division of mine area into units and sub units, Area, Reserve, Life and Capacity of mine,Panel size, Design of long wall face.

UNIT IV:

Cost of various mining operations, Optimum size of mines, Mode of opening up of deposits,Choice of opening, Location and size of Development openings.

UNIT V: Mine Services

Design of haulage, hoisting and drainage systems, Design of pit top and pit bottom, Coalhandling plants, Railway siding etc.

Books Recommended.

1. Advance Coal Mining by R.T. deshmukh and V.S. Vorobjev
2. Mine Planning by S.P. Mathur
3. Mine Planning by BJ. Bhattacharya

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Industrial Engg. **Code : - BE 7642**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT-I General

Introduction; Definition of industrial Engineering, History & development of industrial Engineering, place of industrial Engineering in an organization, related Discipline; Management, Operation Research, Statistics, Ergonomics, Manufacturing Engineering etc. System approach in industrial Engg.

UNIT-II

Work study; purpose; objectives and application of work-study,Productivity and work-study

(A) Method Study: Introduction to method study, Basic Procedure movement of workers in working area, flow process charts multiple activity charts, movement at the workplace, principles of the motion economy, therbligs, Development of improved methods.

(B) Work Measurement: Definition & purpose of work measurement, Work sampling, time study, selecting & timing the job, rating, scales of rating, allowances, determination of standard time.

UNIT-III

(A) Information systems in Organizations: Role of IS in business, increasing value of information technology, Internet work enterprise, Internet, intranet and extranet, Globlization and IT, competitive advantages with IT.
(B) Business process Reengineering: Definition, Need for reengineering, characteristics of BPR, industrial Engineering and reengineering, Role of ITin reengineering business process advantages of reengineering.

UNIT-IV

(A) Maintenance management: Objectives and need for maintenance, types of maintenance, Breakdown predictive and preventive maintenance.
(B) Equipment Replacement policy: Reasons for replacement, deterioration, obsolescence, depreciation, and methods for depreciation calculation.
(C) Value Analysis: Objectives and scope of value analysis, applications andtechniques of value analysis.

UNIT- V

Inventory Control, Different techniques, ABC Analysis, Ordering of Inventory, ProcurementTechniques

Reference Books :-

1. SME Mining Engg. Handbook Vol. II by Cummins
2. SME Mining Engg. Handbook by Hartman

Department of Mining Engineering

Subject: **Mine Surveying-III Lab**
Code: **BE-765**
Maximum Marks: 50

List of Practical to be Performed

1. Baseline measurement
2. Baseline extension
3. To connect the baseline to main triangulation network
4. Reduction to centre
5. Angle adjustments in triangulation network
6. Plotting the survey by co-ordinate methods
7. Correlation survey by Weisbach triangle method
8. Study of EDM
9. Study of Total station
10. Handling of surveying soft wares

Department of Mining Engineering
List of Experiment

Subject: **Rock Mechanics Lab**
Code: **BE-766**
Maximum Marks: 50

List of Practical to be Performed

1. Determination of moisture content of rock sample by ISRM standard method
2. Determination of porosity of rock sample by ISRM standard method
3. Determination of Density of rock sample by ISRM standard method
4. Determination of slake durability strength index of rock sample by ISRM standard method
5. Determination of point load strength index of rock sample
6. Determination of Proto-dyakonov strength index of rock sample
7. Determination of Uni-axial Compressive strength of rock sample by ISRM standard method
8. Determination of Tensile strength of rock sample by Brazalian method
9. Determination of Single Shear and Double Shear strength of rock sample
10. Determination of Tri-axial Compressive strength of rock sample by ISRM standard method
11. Determination of Young' Modulus of rock sample by ISRM standard method

Department of Mining Engineering
List of Experiment

Subject: **Mine Environment- II Lab**
Code: **BE-767**
Maximum Marks: 50

List of Practical's to be Performed

1. Study of erection of sand bag fire stopping
2. Study of working of soda acid fire extinguishers.
3. Study of working of foam extinguishers.
4. Study of erection of German type stone dust barriers
5. Study of erection of Polish type stone dust barriers
6. Study of erection of Double brick fire stopping
7. Study of principal and working of self contained breathing apparatus Dragger 174-A
8. Study of principal and working of Aero lox Liquid oxygen apparatus.
9. Study of principal and working of self rescuers.
10. Study of various types of water dam constructed in U/G mines

Department of Mining Engineering
List of Experiment

Subject: **Minor Project (150 Marks)**
Code: **BE-768**
Maximum Marks: 50

Allocation of project:

1. Information regarding broad area must be made available to the students well in advance (may be during previous semester).
2. Information must cover following parameters.
   i. **Broad area**: Subject or expertise/application area.
   ii. **Required skills**: Knowledge of subject(s), software, tools & other characteristics.
   iii. **Type of project**: Hardware, software, design, survey, study based etc.
   iv. **Guide available**: Name of Guide (S) from Department & Institute.
   v. **Other related information** depending upon specific branch & institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students and department faculty (HoD) concern.
5. One project group must contain maximum four students.

Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outside person/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students.

Internal Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority. However printing and binding would be as per the conventional format.
3. Evaluation will be based on Live demonstration / presentation and Viva.
4. Final submission of project is expected as:
   (a)One copy to the Institution central library,
   (b)One copy to the department.

External Evaluation:

External assessment of project would be like conduction of practical exams of University, and must be executed as per the norms of practical exams.

School of Engineering & I.T.

MATS University

Raipur

Syllabus Scheme

(VIIIth Semester)

For

Bachelor of Technology

In

Mining Engineering

Subject Code for School of Engineering & I.T. Deptt.

VIIIth Semester (Mining)

S. No.	Subject Code	Subject Name
1	**BE860**	Pollution Control Engg.
2	**BE861**	Mining Machinery III
3	**BE862**	Strata Control
4	**BE863**	Disaster Management
5	**BE864**	**Elective III**
6	**BE865**	Pollution Control Engg. Lab
7	**BE866**	Strata Control Lab
8	**BE867**	Major Project (200Marks)

S. No.	Subject Code	Subject Name
Elective II		
1	**BE8641**	Safety Engineering
2	**BE8642**	GIS & Remote Sensing in Mining
3	**BE8643**	Ecology and sustainable development
4	**BE8644**	Surface Mining II

School of Engineering & I.T.
MATS University, Raipur
Scheme of Teaching & Examination
VIIIth Semester
Mining Engineering

S. No.	Course Code	SUBJECT	Periods per week		Evaluation Scheme		Total Marks
			L	P	IM	ESE	
THEORY							
1	BE860	Pollution Control Engg.	5	0	30	70	100
2	BE861	Mining Machinery-III	5	0	30	70	100
3	BE862	Strata Control	5	0	30	70	100
4	BE863	Disaster management	5	0	30	70	100
5	BE864	**ELECTIVE-III**	5	0	30	70	100
PRACTICAL/DESIGN/DRAWING							
6	BE865	Pollution Control Engg. Lab	0	3	20	30	50
7	BE866	Strata Control Lab	0	3	20	30	50
8	BE867	Major Project(200 marks)	0	3	80	120	200

Table- 3		
Elective-3		
S. No.	**Course Code**	**Subject**
1	BE8641	Safety Engineering
2	BE8642	GIS & Remote Sensing in Mining
3	BE8643	Ecology and Sustainable Development
4	BE8644	Surface Mining-II

L-Lecturer, P-Practical, ESE- End Semester Examination, IM-Internal Marks

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Pollution Control Engg. **Code : - BE 860**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: ENVIRONMENTAL POLLUTION

Introduction and classification of environmental pollution, ecological conservation. Salientfeatures of the environmental laws in India and Occupational disease.

UNIT II: AIR POLLUTION

Air pollution due to various gases and suspended partuculate materials, causes,consequences, prevantive measures, dust sampling equipments.

UNIT III: WATER POLLUTION

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

UNIT IV: LAND POLLUTION

Land scape pollution and land reclamation, methods of land reclamation.

UNIT V: NOISE POLLUTION

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

Reference Books :

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

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Mining Machinery III **Code : - BE 861**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: FACE MACHINERY

Drills for coal and stone, their constructional details, drill jumbos, their applications,operation and maintenance, introduction to coal cutting machines.

UNIT II: LOADER AND TRANSPORTING MACHINE

Rocker shovel, gathering arms loaders, LHD and SDL machines- their construction andoperation and maintenance, cavo loader, shuttle car and underground trucks, itsconstruction, operation and application.

UNIT III: CUTTER LOADERS

Different types of cutter loaders suitable for long wall and short wall faces, their constructions, operation and maintenance, different types of road headers their construction, operation and conditions of applicability, mechanics of rock cutting, rock cutting tools and their performance.

UNIT IV: COMPRESSED AIR

Basic concept, compression process, working and constructional features of single stageand multistage compressor, unloading arrangement of compressor, layout of pipelines, transmission of compressed air, testing of compressor, in bye compressors.

UNIT V: USE OF ELECTRICITY IN MINES

Flame proof apparatus, intrinsically safe circuits, underground cables, drill panel, gateend box, circuit breakers, remote control (pilot circuit), underground substation, Electricalsignaling provisions of IER related to mines.

Reference books:

1. Elements of Mining Vol. III by D. J. Deshmukh
2. UMS Booklet
3. Winning and Working of Coal : R. T. Deshmukh& D. J. Deshmukh
4. ModernCoal Mining Practices : R. D. Singh
5. Longwall Mining : Syd. S. Chaing&Peng

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Strata Control **Code : - BE 862**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: SUPPORTS

Timber & steel supports, Examination of roof, Roof bolting, roof stitching, method of supporting roadways. Supporting under different conditions viz. Pit bottom, crossing, junctions, faulted area, longwall faces, depillaring areas and stoping areas, support loads.SSR, CTR, Support plan, Support withdrawal.

UNIT II: POWERED SUPPORTS

Powered supports - their principles of operation, Classification, designation, constructional features and applications, Hydraulic fluids.

UNIT III : STOWING

Principal methods of stowing, their relative merits and applicability, Hydraulic stowing,Pneumatic stowing, Mechanical stowing, Hand packing, face arrangements, pipe wear,pipe jams.

UNIT IV: STRATA CONTROL

Theories of ground movement, Rock pressure due to Narrow and Wide excavation, Frontabutment and back abutment, Failure of roof and floor, measurement of stratamovement, rock burst, bumps. gas outbursts, pot holes.

UNIT V: SUBSIDENCE

Theories of subsidence, damage and loss due to subsidence, vertical and lateral movements and their estimation, angle of fracture and angle of draw, factors affecting subsidence, subsidence control, protection of surface structures, design of protection pillars including shaft pillars. Pot holes.

References:

1 Strata control in mines : Chaing & Peng

2. Winning and Working of Coal : R. T. Deshmukh& D. J.Deshmukh

3. Modern Coal Mining Practices : R. D. Singh

4. D.G.M.S. Circulars (Tech.) 1995 onwards

5. Longwall Mining : Syd. S.

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Disaster Management **Code : - BE 863**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I:

Nature of disasters – natural and other disasters, Earthquakes, floods, draught, cyclones, fire and other environmental disasters.

UNIT II:

Behaviour of structures in disaster prone areas, Disaster zoning, Hazard assessment,Environmental Impact Assessment.

UNIT III:

Methods of mitigating damage during disasters, disaster preparedness.

UNIT IV:

Management systems during disasters, Construction Technology for mitigation of damage ofstructures.

UNIT V:

Short-term and long-term relief measures.

Name of Text Books:

Design of Earthquake Resistant Buildings – Minoru Wakabayashi (McGraw Hill Publication)Dynamics of Structures: Theory and Application to Earthquake Engineering (2nd edition) – Anil K Chopra (Pearson Education Publication)

Name of Reference Books:

Fundamentals of Vibrations – Anderson, R.A. (McMillan)
IS – 1893 (Part I): 2002, IS – 13920: 1993, IS – 4326: 1993, IS-13828: 1993
Earth quake engineering damage assessment and structural design – S.F. Borg
Disasters and development – Cuny F (Oxford University Press Publication)

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Safety Engineering **Code : - BE 8641**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT – I

Safety Philosophy and principles of Accident prevention Introduction, accident, injury, unsafe act, unsafe condition, reportable accidents, need for safety,break down of accidents, hazardous industries. Theories & Principle of accidentsCasualty, cost of accident, computation of cost, utility of cost data. Accident reporting & InvestigationIdentification of the key facts, corrective actions, classification of facts.RegulationAmerican (OSHA) and Indian Regulation.

UNIT – II

Safety Management Division of responsibility, Location of Safety function, size of safety department, qualification for safety specialist, safety committee – structure and functions.

UNIT – III

Safe Working Condition and Their Development SOP for various Mechanical equipments, Incidental safety devices and methods, statutory of provisions related to safeguarding of Machinery and working condition.

UNIT – IV

Safety in Operation and Maintenance Operational activities and hazards, starting and shut down procedures, safe operation of pumps ,Compressor, heaters, reactors, work permit system, entry into continued spaces.

UNIT – V

Safety in Storage and Emergency Planning Safety in storage, handling of chemicals and gases, storage layout, ventilation, safety in chemical laboratories, emergency preparedness on site plan, off site plan, toxic hazard control.

TEXT BOOKS

Safety and Accident Prevention in Chemical Operation – H.H. Faweett and WoodPersonal Protective Equipment – NSC Bombay

REFERENCE BOOKS

Ergonomics - P. Krishna Murthy
Fire Prevention Hand Book – Derek James

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - GIS & Remote Sensing in Mining **Code : - BE 8642**
Total Theory Periods: - **40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I:

Introduction to Remote Sensing: Terminology In Remote Sensing, Types Of Remote Sensing,Advantages And Disadvantages Of Remote Sensing Data, Electromagnetic Radiation, Atmospheric
Windows, Remote Sensing Platforms And Sensors Systems, Path-Row Referencing System, Remote Sensing Data Product, Procedure For Obtaining Satellite Data. Hardwares and Softwares related to Remote Sensing.

UNIT II:

Image Interpretation And Analysis: Elements of Visual Image Interpretation, Digital Image Pre-Processing, Radiometric Correction, Geometric Correction, Resolution Of Remote Sensing Data, Image Enhancement, Contract Enhancement, Spatial Filtering, Band Ratioing Image Classification, SupervisedAnd Unsupervised Classification. Remote Sensing Applications in Forestry, Geology, Hydrogeology, Landuse and Land Cover Mapping.

UNIT III:

Fundamentals of GIS: Basic Concepts including Definition and History of GIS, Essential Elements of GIS, Uses and Users of GIS, General GIS Applications, Advantages of GIS. Geodesy, Grids, Datum's and Projection Systems, GIS Data Formats, GIS Layers and Digitization. Overview of GPS and its Applications. Hardwares and Softwares related to GIS.

UNIT IV:

Raster and Vector Based GIS: Raster based GIS, Definition and Concept of Raster Based GIS, Spatial Referencing, Definition and Representation of Raster Data. Vector based GIS, Definition and Concept ofVector Based GIS, Data Structures, Data Capture and Basic Operations of Spatial Analysis, Advantages and Disadvantages in Raster and Vector Based GIS, Introduction to Networks in GIS. GIS-ProjectPlanning, Management and Implementation.

UNIT V:

Application of computers in mining

Reference Books

Digital Image Processing - R.C. Gonzalez & R.E. Woods Pearson Edu. Asia
Principles of Geographical Information Systems- P.A. Burrough& R.A. McDonnell Oxford
Text Book of Remote Sensing - C.S.Agawal&P.K.Garg Wheeler
Remote Sensing of The Environment - J.R. Jensen Pearson Education
Dictionary of Remote Sensing - S. M. Rashid
Introduction to GIS - I. Heywood, S. Cornelius & S. Carver Pearson Edu. AsiaIntroduction to GIS - Demers

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Ecology and sustainable development **Code : - BE 8643**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I: Nature of ecology and sustainable development

Definition, scope of ecology an sustainable development, geomorphology, oceanography, climatology and biogeography.

Unit II: Energy and environment

Introduction of energy environment, use of solar cells for heating and operated drills, methane gas digesters, environmentally friendly method of energy conservation, difference between conventional and non-conventional energy sources, future trends of energy systems.

Unit III: Theory of isostasy

Concept of isostasy for sustainable development, discovery of the concept, concept of Hayford and Bowie, Joly, and Holmes, Global isostatic adjustment.

UNIT IV: Physical geography and man human impact on the natural environment

Modification of land forms, direct alternation of land forms, wind deflation, coastal erosion and deposition, modification of the atmosphere, ultration process in eco and energy systems.

UNIT V: Obstacles in sustainable development

Pollution growth, species extinction, restriction of bat lands, desertification, soil erosion, soil pollution, characterisation of contaminated soil, global warming and ozone depletion etc.

Name of Text Books:

Energy and environment – Fowler (McGraw Hill, New Delhi)
Restoration Ecology and sustainable development – Krystyna M. Urbanska et.al. (Cambridge University Press, U.K.)

Name of Reference Books:

Reuniting Economy and Ecology in Sustainable Development – Russ Beaton et.al. (-----)
Theory and implementation of economic models for sustainable development – Jeroen C.J.M. Van Den Bergh (----------)
Economy and Ecology: Towards sustainable development – F. Archibugi et.al. (---------)
Evaluating Sustainable Development: Giving People a voice in their destiny – OkechukwuUkaga et.al. (-------)

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech. VIIIth Sem.** **Branch**: - **Mining Engineering**
Subject: - Surface Mining II **Code : - BE 8644**
Total Theory Periods: **- 40** Total Tutorial Periods: **15**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

UNIT I:

Layouts of open pit mines, Methods of side casting, Sidecasting by Stripping Shovel and Dragline, Range Diagram, calculation of operating radius. Explosive casting, Layouts of waste dumps. Design of Haul roads.

UNIT II:

Introduction to continuous surface mining equipment, Bucket wheel excavators, their construction , basic operation and productivity, Continuous surface miner, their construction, basic operation and productivity. Face Layouts.

UNIT III:

Ultimate pit design, Factors affecting ultimate pit limits; Significance of ultimate pit limits; Manual methods of developing ultimate pit limits. Floating cone technique, Production planning, Some basic mine life and plant size concepts, Mine and Mill plant sizing,

UNIT IV:

Introduction to rock slope engineering, Slopes in surface mines and their formation, Pitslopes and their influence on mine economics, Slope stability, Factors influencing slope stability, Various types of slope failure and their conditions.

UNIT V:

Determination of factor of safety of a slope under plane and circular failure, Planning of slope stability investigations, Stablisation and protection methods for stability of slopes.

References:

1. Surface Mining : G.B. Misra
2. Surface mining equipment : Martin
3. Surface Mining : Pfleider
4. Rock slope engg. : Hoek& Bray
5. SME handbook : Hartman
6. Surface Mine Planning & Design : Hustralid&Kuchha

Department of Mining Engineering
List of Experiment

Subject: **Pollution Control Engg. Lab**
Code: **BE-865**
Maximum Marks: 50

List of Practical to be Performed :

1. Study of Konimeter
2. Study of Dust precipitator
3. Study of gas chromatograph
4. Study of noise measuring instruments
5. Measurement of noise
6. Study of noise controlling techniques
7. Study of vibration measuring instruments
8. Measurement of vibration
9. Study of land reclamation methods
10. Preparation of EIA and EMP for a mining project

Department of Mining Engineering
List of Experiment

Subject: **Strata Control Lab**
Code: **BE-866**
Maximum Marks: 50

List of Practical to be Performed:

1. Study of Conventional support systems.
2. Study of constructional features and working of Friction props
3. Study of constructional features and working of hydraulic props
4. Study of methods to support roof by roof bolts, roof stiching and cable bolts
5. Study of withdrawal of supports by Sylvester prop withdrawer
6. Study of methods to support junctions and faulted area
7. Study of constructional features and working of powered supports
8. Study of Hydraulic stowing System and the arrangement required for it
9. Study of pneumatic stowing System and the arrangement required for it
10. Study of Subsidence measurement techniques.

Department of Mining Engineering
List of Experiment

Subject: **Major Project**
Code: **BE-867**
Maximum Marks: 200

Guidelines

Allocation of project:

1. Information regarding broad area must be made available to the students well in advance (may be during previous semester).
2. Information must cover following parameters.
    I. **Broad area**: Subject or expertise/application area.
    II. **Required skills**: Knowledge of subject(s), software, tools & other characteristics.
    III. **Type of project**: Hardware, software, design, survey, study based etc.
    IV. **Guide available**: Name of Guide (S) from Department & Institute.
    V. **Other related information** depending upon specific branch & institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students and department faculty (HOD) concern.
5. One project group must contain maximum four students, however students can do project individually but it should be approved by department.
6. Compiled list of projects must be submitted to the University within 25 days of start of semester.
7. Compiled list may contain following parameters.

Sr. No.	Title of Project	Name of Students	Name of Guide

Name of HOD
Signature of HOD

Signature of Principal

Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outside person/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students.

Internal Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority. However printing and binding would be as per the conventional format.
3. Evaluation will be based on Live demonstration / presentation and Viva.
4. Final submission of project is expected as,
    - Submission of a copy to the University,
    - One copy to the Institution central library,
    - One copy to the department.

External Evaluation:

External assessment of project would be like conduction of practical exams of University, and must be executed as per the norms of practical exams.

NOTE: Completion of Project outside the department/Institution should not be