

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

SCHEME OF TEACHING AND EXAMINATION

B.E. VI SEMESTER MINING ENGINEERING

S. No.	Board of Study	Subject Code	Subject	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
				L	T	P	Theory/Practical				
							ESE	CT	T		
1	Mining Engg.	339651 (39)	Blasting Engineering	4	1	-	80	20	20	120	5
2	Mining Engg.	339652 (39)	Mine Health and Safety	3	1	-	80	20	20	120	4
3	Mining Engg.	339653 (39)	Mine Machinery - II	3	1	-	80	20	20	120	4
4	Mining Engg.	339654 (39)	Mine Legislation - II	3	-	-	80	20	20	120	3
5	Mining Engg.	339655 (39)	Mineral Dressing	4	1	-	80	20	20	120	5
6	Refer Table -1		Professional Elective-I	3	1	-	80	20	20	120	4
7	Mining Engg.	339661 (39)	Blasting Engg. Lab	-	-	2	40	-	20	60	1
8	Mining Engg.	339662 (39)	Mine Health and Safety Engg. Lab	-	-	2	40	-	20	60	1
9	Mining Engg.	339663 (39)	Mineral Dressing Lab	-	-	4	40	-	20	60	2
10	Mining Engg.	339664 (39)	Mining Machinery - II Lab	-	-	4	40	-	20	60	2
11	Management	300665 (76)	Managerial Skills	-	-	2	-	-	40	40	1
12			Library	-	-	1	-	-	-	--	-
Total				20	5	15	640	120	240	1000	32

L: Lecture **T:** Tutorial **P:** Practical
ESE: End Semester Examination **CT:** Class Test **TA:** Teachers' Assessment

Note: Industrial Training of eight weeks is mandatory for B.E. students. It is to be completed in two equal parts. The first part must have been completed in summer after IV semester. The second part to be completed during summer after VI semester after which students have to submit a training report which will be evaluated by college teachers during B.E. VII semester.

S. No.	Board of Studies	Code	Name of Subject
1	Mining Engg.	339671 (39)	Mine Management
2	Mining Engg.	339672 (39)	Small Scale & Dimensional Stone Mining

Note (1) – 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a Particular academic session .

Note (2) – Choice of elective course once made for an examination cannot be changed in future examinations.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Mining Engineering** Semester: **VI**
Subject: **Blasting Engineering** Code: **339651(39)**
Total Theory Periods: **48** Total Tutorial Periods: **12**
No. of class Tests to be conducted: **2 (Minimum)** No. of assignments to be submitted: **2 (Minimum)**
ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

Course Objective

- To choose proper explosives to different rock beds.
- To design and analyze basic element of blast holes in open cast mine and underground mine.
- To learn various blasting accessories.
- To learn various blasting nuisances.

Course outcomes:

- Apply knowledge of blasting engg. for understanding, formulating and solving blast hole design problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of blast hole.
- Work effectively with other engineering and science teams as well as with multidisciplinary designs.

UNIT I COMMERCIAL EXPLOSIVES

Type of explosives, Various Commercial Explosives and their properties, Bulk Explosive Systems, Selection of explosive. Testing, Transportation and Handling of explosives. Related regulations.

UNIT II INITIATION SYSTEM & BLASTING ACCESSORIES

Various types of Exploder and Detonators. 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. Adverse effects of Blasting: Back break, over break, Fly rock, Ground Vibration and Noise, Controlled Blasting Techniques and other remedies to the blasting nuisances.

References:

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

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	Mining Engineering	Semester:	VI
Subject:	Mine Health & Safety	Code:	339652(39)
Total Theory Periods:	36	Total Tutorial Periods:	12
No. of class Tests to be conducted:	2 (Minimum)	No. of assignments to be submitted:	2 (Minimum)
ESE Duration:	Three Hours	Maximum Marks in ESE:	80
		Minimum Marks in ESE:	28

Course Objective

- To learn the sampling of dust and physiological effect of the dust to the miner.
- To learn about the various miner occupational diseases and its preventive measures
- To prepare the enquiry report of a mine accident.
- To know the major accident occurred in Indian mines and their causes.

Course outcomes:

- Apply knowledge of Health, Safety and Environmental Engg. to the miners for keeping them safe and improving their efficiency and productivity.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mining engineering in particular.
- Make awareness among the miner to avoid any accident and health hazards.

UNIT I MINE DUST

Classification, physiological effects, measurement of dust concentration, dynamics of small particles, sampling of air borne dust, duration and interval of sampling, different method of sampling, prevention and suppression of dust, Air cleaning methods, design of enclosures for conveyor, transfer points etc.

UNIT II MINE ILLUMINATION

Types of portable lamps, their maintenance and examination, lamp room design and Organization, Percentage and Accumulation test, light from mains, photometry and Illumination survey, standards of illumination for underground and opencast Workings.

UNIT III HEALTH AND MINE OCCUPATIONAL DISEASES

Health of Mine employee, first aid and ambulance, comfort condition. various mine occupational diseases, their causes, nature and preventive measures. Rules related with this topic.

UNIT IV MINE ACCIDENTS

Accident and its classification, various causes of mine accidents in opencast mine and Underground mine, Preventive measure to control these accidents, relation between accident and efficiency, cost of accident: direct and indirect cost. Various major accidents occurred in Indian coal mines.

UNIT V ACCIDENT ENQUIRY

Notice of accident, criteria for preparation of enquiry report, preparation of accident enquiry reports. ie. roof fall, coal dust, explosion, fire damp explosion, fire, inundation and open cast mine accidents

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

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Mining Engineering** Semester: **VI**
Subject: **Mine Machinery – II** Code: **339653(39)**
Total Theory Periods: **36** Total Tutorial Periods: **12**
No. of class Tests to be conducted: **2 (Minimum)** No. of assignments to be submitted: **2 (Minimum)**
ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

Course Objective

- To choose proper transportation system for mines depending on the geo-mining conditions of the mineral deposit.
- To calculate and analyze basic element of haulage system and winding system.
- To learn the construction and working of various haulage system and winding system.

Course outcomes:

- Apply knowledge of mine machinery for understanding, formulating and solving transportation problems in mine.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of transportation systems.
- Work effectively with other engineering and science teams.

UNIT I **Arial Ropeways:**

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

UNIT II **Conveyors:**

Construction, handling & maintenance of belt, Different types of belt conveyors: their construction, installation, maintenance & design calculations. Belt-tensioning Devices. Sequence controlling device.

UNIT III

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

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 same shaft, winding with side by side and up and down sheaves, advantages and disadvantages. , Multi rope winding. Calculation of H.P.

UNIT V **Hydraulic Transmissions:**

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

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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Branch: **Mining Engineering** Semester: **VI**
Subject: **Mine Legislation – II** Code: **339654(39)**
Total Theory Periods: **36** Total Tutorial Periods: **NIL**
No. of class Tests to be conducted: **2 (Minimum)** No. of assignments to be submitted: **2 (Minimum)**
ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

Course Objective

- To know the various rules & regulations applicable in different conditions to the mine workers, managers and mine owner.
- To know the responsibility and duties of the various employee of the mine and owner of the mine

Course outcomes:

- Apply knowledge of legislation in mines for the implementation of rules and regulations during their job.
- Work effectively with other engineering and science teams for suggesting any measures against any mine accidents.

- UNIT I** Principal Provisions of Mines & Minerals (Regulation & Development) Act, Coal Mines Conservation & Development Act.
- UNIT II** Mineral Concession Rules, Indian Electricity Rules related to mining activity.
- UNIT III** Byelaws & D.G.M.S. Circulars.
- UNIT IV** Mines Rescue Rules, Mines Vocational Training Rules.
- UNIT V** Safety Campaign, Safety Week in Mines

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

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: Mining Engineering	Semester: VI
Subject: Mineral Dressing	Code: 339655(39)
Total Theory Periods: 48	Total Tutorial Periods: 12
No. of class Tests to be conducted: 2 (Minimum)	No. of assignments to be submitted: 2 (Minimum)
ESE Duration: Three Hours	Maximum Marks in ESE: 80 Minimum Marks in ESE: 28

Course Objective

- To choose proper method of size reduction and concentration methods for particular ores
- To design and analyze basic element of machine e.g. crushers, mills jigs, tables etc.
- To design and analyze various special methods of separations like HMS, Magnetic Separator etc.
- To prepare flow sheets for the beneficiation of different ores and coal.

Course outcomes:

- Apply knowledge of mineral dressing for understanding, formulating and solving problems related with mineral dressing.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of machines for separating the low grade ore economically.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

UNIT I SIZE REDUCTION

Introduction, definition, scope and economic justification, main steps in ore dressing operations, general preliminary mineralogical investigations, Comminution: crushing-principles of crushing, Types of crusher, reduction jaw crushers, gyratory crushers, cone crushers, roll crushers, their classifications, applications merits & demerits. Grinding; principles of grinding, application and classification 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, Reynolds's Number, different types of classifiers, hydraulic and pneumatic classifiers, Sampling- Importance of sampling and sampling methods.

UNIT III GRAVITY CONCENTRATION

Jigging: - principle & applicability condition of jigging, various types of jigs
Flowing film concentrators: - spirals, shaking table and Wilfley table. Heavy media separation:- Principle, applications and limitations of methods. Various types of HMS separator

UNIT IV SPECIAL SEPARATION METHODS

Froth Flotation Method:- principles of froth flotation, function of various floatation reagents, important machines, their principles, and working, floatation of sulphide, oxide and non sulphide ores.
Electrostatic and magnetic separation method: Principle and field of application, their merits and demerits.

UNIT V DEWATERING

Drying and dewatering: - thickening, filtration and drying. Different types of thickener, filter & drier.
Coal washing- Simplified flow sheets for beneficiation of coal and typical ores of copper, lead, zinc, iron and manganese ores with special reference to Indian deposits, Pelletisation of low grade iron ore.

Text Books

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

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Mining Engineering**
Subject: **Mine Management**
(Professional Elective – I)

Semester: **VI**
Code: **339671(39)**

Total Theory Periods: **36** Total Tutorial Periods: **12**
No. of class Tests to be conducted: **2 (Minimum)** No. of assignments to be submitted: **2 (Minimum)**
ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

Course Objective

- To choose proper techniques for controlling and managing any mine organization.
- To know the personnel behavior and psychology for increasing the productivity of any mine organization.
- To control the quality of products of an organization
- To deal with the various disputes associated with industries.

Course outcomes:

- Apply knowledge of mine management for understanding, formulating and solving mine management problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of mine management.
- Demonstrate creativeness in designing new systems components and processes in the field of mining organization in particular.
- Identify, analyze, and solve industrial problems.

- UNIT I** **Evolution of Management Theory** - Principle of scientific management, Elements of management functions, Planning, Organizing and Control. Structure and design of organization for mining enterprises.
- UNIT II** **Personnel Management** - Selection, training and development of human resources, Job evaluation, job analysis, incentive and motivation, Productivity, its concept and measurement.
- UNIT III** **Production Management** - Determination of norms and standards of operations by work study, work measurements, production planning, scheduling and control, Queing theory, short and long term planning, Quality control, introduction to MIS.
- UNIT IV** **Industrial Psychology** - Its relation with other branches of knowledge, studies of physical factors and their effect on man, Industrial relations, Human relations, trade union movements in India
- UNIT V** **Industrial Act and Laws** - Industrial Dispute Act, Industrial Trade Union Act, Analysis of industrial disputes, Prevention and settlement of industrial disputes, Payment of wages act, Workmen's compensation act, Contract labour laws.

References :

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

Chhattisgarh Swami Vivekanand Technical University, Bilai

Branch: **Mining Engineering**
Subject: **Small Scale and Dimensional Stone Mining**
(Professional Elective – I)

Semester: **VI**
Code: **339672(39)**

Total Theory Periods: **36**

Total Tutorial Periods: **12**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Three Hours**

Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

Course Objective

- To understand small scale mining and problem related with it
- To choose proper method of mine development and the extraction to different mineral deposit depending on the size and depth of the small scale mine.
- To deal with the royalty, cess and dead rent for the minerals
- To understand the environmental aspects o a small scale mine

Course outcomes:

- Apply knowledge of small scale & dimensional stone mining for understanding, formulating and solving problems related with small scale mining.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of small scale mine.

- 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., extraction techniques and procedure.
- UNIT IV** Dimensional stone mining of granite, marble, black stone etc., extraction techniques and procedure.
- UNIT V** Environmental Impact of small scale mining, Environmental management plan, Env. Protection measures.

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

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Branch: **Mining Engineering**
Subject: **Blasting Engineering Laboratory**
Total Lab Periods: **24**
Maximum Marks: **40**

Semester: **VI**
Code: **339661 (39)**
Batch Size: **30**
Minimum Marks: **20**

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 Underground 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

Chhattisgarh Swami Vivekanand Technical University, Bilai

Branch: **Mining Engineering**
Subject: **Mine Health & Safety Laboratory**
Total Lab Periods: **24**
Maximum Marks: **40**

Semester: **VI**
Code: **339662 (39)**
Batch Size: **30**
Minimum Marks: **20**

List of Experiments to be performed:

1. Study of gravimetric dust sampler
2. Study of thermal precipitator dust sampler
3. Study of konimeter / simslin dust sampler
4. Study of portable lamps.
5. Study of lamp room design.
6. Measurement of methane percentage
7. Study of various occupational diseases
8. Study of enquiry report related with inundation of any mine
9. Study of enquiry report related with fire damp explosion of any mine
10. Study of enquiry report related with roof fall / other accident of any mine

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Mining Engineering**
Subject: **Mineral Dressing Laboratory**
Total Lab Periods: **48**
Maximum Marks: **40**

Semester: **VI**
Code: **339663 (39)**
Batch Size: **30**
Minimum Marks: **20**

List of Experiments to be performed:

1. Study of Jaw crusher
2. Study of roll crusher
3. Study of grinding mills
4. Study of Spiral/Rake 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 continuous drum filter

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Branch: **Mining Engineering**
Subject: **Mining Machinery – II Laboratory**
Total Lab Periods: **48**
Maximum Marks: **40**

Semester: **VI**
Code: **339664 (39)**
Batch Size: **30**
Minimum Marks: **20**

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. Studies of Armored face Conveyor.
7. Study of Various Koepe winder Arrangements
8. Study of various types of skips.
9. Study of pit top and pit bottom arrangements for a Skip.
10. Study of hydraulic Couplings and Torque Converters.

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Name of Program:	Bachelor of Engineering	Semester:	VI
Branch:	Common to All Branches	Code:	300665 (76)
Subject:	Managerial Skills	Tutorial Period:	NIL
No. of Lectures:	2/Week	Marks in TA:	40
Total Marks in ESE:	NIL	Minimum number of Class Tests to be conducted:	Two

Objective:

The course is introduced to develop managerial skills tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Managerial skills are essential for overall professional development of an individual apart from gaining technical knowledge in the subject.

Course Objectives

Upon completion of this course, the student shall be able

- To define and explain the concept of managerial, written and oral communication skill;
- To understand the leadership skill;
- To develop self-appraisal and understand distinction between leader and manager;
- To develop positive attitude and thinking; and
- To understand managerial functions and develop creativity.

UNIT I Managerial Communication Skills: Importance of Business Writing: writing business letters, memorandum, minutes, and reports- informal and formal, legal aspects of business communication, oral communication- presentation, conversation skills, negotiations, and listening skills, how to structure speech and presentation, body language.

UNIT II Managerial skills - Leadership: Characteristics of leader, how to develop leadership; ethics and values of leadership, leaders who make difference, conduct of meetings, small group communications and Brain storming, Decision making, How to make right decision, Conflicts and cooperation, Dissatisfaction: Making them productive.

UNIT III Proactive Manager: How to become the real you: The journey of self-discovery, the path of self-discovery, Assertiveness: A skill to develop, Hero or developer, Difference between manager and leader, Managerial skill check list, team development, How to teach and train, time management, Stress management, Self-assessment.

UNIT IV Attitudinal Change: Concept of attitude through example, benefits of right attitude, how to develop habit of positive thinking, what is fear? How to win it? How to win over failure? How to overcome criticism? How to become real you? How to Motivate? How to build up self confidence?

UNIT V Creativity: Creativity as a managerial skill, Trying to get a grip on creativity. Overview of Management Concepts: Function of Management: Planning, organizing, staffing, controlling.

Course Outcome

- The students will be able to develop formal and informal, negotiation, written and oral communication skill;
- The students will be able to develop manage groups, resolve conflicts and leadership skill and decision making qualities;
- The students will be able to develop self-appraisal, teaching, training and managing stress and time;
- The students will be able develop positive thinking, motivating team members and winning race; and
- The students will be able to develop creativity and fundamental management functions.

Text Books:

1. Basic Managerial Skills for all by E.H. Mc Grawth, Prentice Hall India Pvt Ltd,2006
2. Basic Employability Skills by P. B. Deshmukh, BSP Books Pvt. Ltd., Hyderabad, 2014

Reference Books:

1. How to develop a pleasing personality by Atul John Rego, Better yourself books, Mumbai,2006
2. The powerful Personality by Dr. Ujjawal Patni & Dr. Pratap Deshmukh, Fusion Books, 2006
3. How to Success by Brian Adams, Better Yourself books, Mumbai, 1969