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

SCHEME OF TEACHING AND EXAMINATION

B.E.V SEMESTER MINING ENGINEEERING

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	TA		
1	Computer Sc. & Engg.	**339551 (22)**	Numerical Analysis & Computer Programming	3	1	-	80	20	20	120	4
2	Mining Engg.	**339552 (39)**	Mine Survey - II	3	1	-	80	20	20	120	5
3	Mining Engg.	**339553 (39)**	Mine Legislation – I	3	1	-	80	20	20	120	4
4	Mining Engg.	**339554 (39)**	Under ground Metal Mining	4	-	-	80	20	20	120	5
5	Mining Engg.	**339555 (39)**	Surface Mining - I	4	1	-	80	20	20	120	5
6	Mining Engg.	**339556 (39)**	Mine Machinery – I	3	1	-	80	20	20	120	4
7	Mining Engg.	**339561 (39)**	Mine Machinery - I Lab	-	-	2	40	-	20	60	1
8	Computer Sc. & Engg.	**339562 (22)**	Numerical Analysis & computer Programming Lab	-	-	4	40	-	20	60	2
9	Mining Engg.	**339563 (39)**	Surface Mining - I Lab	-	-	2	40	-	20	60	1
10	Mining Engg.	**339564 (39)**	Mine Survey- II Lab	-	-	4	40	-	20	60	2
11	Humanities	**300565(46)**	Personality Development	-	-	2	-	-	20	20	1
12	Mining Engg.	**339566 (39)**	*Practical Training/Library	-	1	-	-	-	20	20	1
Total				**20**	**5**	**15**	**640**	**120**	**240**	**1000**	**35**

L: Lecture **T:** Tutorial **P:** Practical

ESE: End Semester Examination **CT:** Class Test **TA:** Teacher's Assessment

**** Industrial Training of eight weeks is mandatory for B.E. student. It is to be completed in two parts. The first part will be in summer after IV sem. after which students have to submit a training report which will be evaluated by the college teachers during B.E. V sem.***

Branch:	**Mining Engineering**	Semester:	**V**
Subject:	**Numerical Analysis and Computer Programming**	Code:	**339551(22)**
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 solve the various numerical problems which are related with mining field
- To make programmes with c or c++

Course outcomes:

- Apply knowledge of Numerical analysis and computer programming for understanding, formulating and solving mining engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in the development of surveying and design of blast hole and mine management systems.

UNIT I **ERROR'S, SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATION:** Approximations and round of error's , truncation error, Regula – falsi method, Bisection Method, Newton- Raphson Method, Birge- Vieta Method . Bairstow's Method, acceleration of convergence.

UNIT II **SOLUTION OF SIMULTANEOUS ALGEBRAIC EQUATION:** Gauss- Jordan Method, triangularization Method, Jacobi's Method, Gauss- Seidal Iteration Method, ill- conditioned equations.

UNIT III **FINITE DIFFERENCE:** Difference operator, equal & unequal interpolation, Inverse interpolation, Numerical differentiation & Integration.

UNIT IV **NUMERIAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATION:** Taylor's Series method, Euler's Modified Method, Runge-Kutta Method of fourth order, Milne's Method, Adams -Bashforth Method, simultaneous fist order differential equation.

UNIT V **CURVE FITTING:** Principle of least square, fitting a straight line, filling a parabola, exponential function, Method of group averages.

Note: **All the questions pertaining to the above units should be programmed through C or C++ Languages.**

Text Books:

1. Grewal B.S. , Numerical Method with Computer Application, Khanna Publication.
2. Jain Iyengar Jain, Numerical Method for scientific and Engineering computation, New Age International Publication.

Reference Books:

1. Scarborough James B., Numerical Mathematical Analysis, oxford & IBH publishing CDM, PVT. LTD.
2. Gupta & Malik , calculus of finite difference & Numerical Analysis, Krishna Prakashan Media (P)
3. E. Balagurusaumy, Numerical Method, Tata McGraw –Hill publishing company Limited.
4. Sastry S. S. , Introductory Methods of Numerical Analysis, Prentice Hall of India Pvt. Ltd.

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Branch:	**Mining Engineering**	Semester:	**V**
Subject:	**Mine Surveying – II**	Code:	**339552(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 method of surveying for any surveying assignment.
- To set out simple curve on surface and in underground.
- To determine the distance and elevation of any point on the surface & in underground.
- To find out magnitude of error in various surveying.

Course outcomes:

- Apply knowledge of surveying for understanding, formulating and solving surveying problems.
- Identify, analyze and solve surveying problems.

UNIT I **Theodolite Surveying:**

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

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 Curves:**

Setting out simple curves on surface and in underground; Elementary knowledge of compound and transition curves; joint boundary survey; 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
4. Surveying &Levelling by R. Agor

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Branch:	**Mining Engineering**	Semester:	**V**
Subject:	**Mine Legislation – I**	Code:	**339553(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 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 General Principles of Mining Law, Development of mining legislation in India.

UNIT II Mines Act – 1952 & Mines Rules – 1956

UNIT III Coal Mines Regulations –1957 &Metalliferous Mines Regulation-1961

UNIT IV Mine crèche Rules & Pit Head Bath Rule

UNIT V 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		by	L. C. Kaku.
3	Mines Act-1952 & Mines Rules-1955		by	L. C. Kaku.
4	Vocational Training Rules		by	L. C. Kaku.
5	Mine Accidents		by	S. J. Kejeriwal

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Branch:	**Mining Engineering**	Semester:	**V**
Subject:	**Under Ground Metal Mining**	Code:	**339554(39)**
Total Theory Periods:	**48**	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 choose proper extraction methods to different mineral deposits depending on their geo-mining conditions.
- To learn how to develop a metal mine.
- To choose proper support system for the metal mines.
- To learn the various metal mining methods.

Course outcomes:

- Apply knowledge of metal mining for understanding metal mining problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of metal mine.
- Apply knowledge of metal mining for designing a metal mines

UNIT I **General:**

Status and scope of Underground metal mining methods; Various types of ore deposit; Definitions of important terms used in underground metal mining methods. Comparison between coal mining &metal mining

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 stoping methods; Open stoping; Vertical Crater Retreat method; Sub level stoping ;Room and Pillar method.

UNIT IV **Stoping Methods – II:**

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

UNIT V **Support Systems:**

Pillars; Back fill, Cable bolting, Steel Rock bolts, Grouting, Shotcretingetc.,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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Branch:	**Mining Engineering**	Semester:	**V**
Subject:	**Surface Mining – I**	Code:	**339555(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 surface mining methods to different mineral deposits depending on their geo-mining conditions.
- To design and analyze basic elements of surface mine.
- To learn various methods of surface mining.
- To choose various methods of transportation in any opencast mine.
- To learn the construction & working of various machineries used in open cast mine.

Course outcomes:

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

UNIT I **Open Pit Design and Layouts:**
Important parameters of Open pit design; Design of Benches, Ultimate pit design, Stripping ratio, Break even 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 opencast mining.

UNIT II **Rock Breakage:**
Theory of Rock Drilling,Different Types of Drill Machines Used in Open Pits; Rotary, Percussive and Rotary Percussive Drilling, Selection of Drill Machines; Computation of Productivity of Drill Machines; Inclined Drilling; Their Advantages and Disadvantages. Introduction to Different Types of Explosives Used in Open Cast 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 applicability, limitation& Computation of Their Productivity. Land Reclamation and its Methods.Application of Computer 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

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Branch:	**Mining Engineering**	Semester:	**V**
Subject:	**Mine Machinery - I**	Code:	**339556(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 shaft, incline and roadways in underground 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.
- To learn the construction and working of various pumps.

Course outcomes:

- Apply knowledge of mine machinery for understanding, formulating and solving transportation problems in underground 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 **Wire Rope:**
Application of wire ropes in opencast mine & underground Mines, construction & testing of wire ropes, Factor of safety of wire ropes, Examination of Wire ropes, Care & maintenance of wire ropes. Ropes splicing, Rope caples& its types .process of changing the ropes.

UNIT II **HAULAGE:**
Different systems of rope haulage, safety devices, haulage road and manholes, locomotive haulage and its type, track laying and maintenance of haulage , mine cars & tubs. Calculation of productivity & power of different haulage systems.

UNIT III **WINDING:**
Head gear arrangement, shaft fittings, safety devices, cages & skips, their suspension arrangements. Location of winding engine.

UNIT IV 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, 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
3. Coal Mining Practice By Stathum

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Branch:	**Mining Engineering**	Semester:	**V**
Subject:	**Mine Machinery – I Laboratory**	Code:	**339561(39)**
TotalLab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

List of experiments to be performed:

1. Study of Different types of Rope Capels.
2. Study of Rope Splicing.
3. Study of Clifton pulley.
4. Study of various safety devices on rope haulages
5. Study of Exhaust Conditioner on a diesel locomotive
6. Study of Cage Suspension Gear
7. Study of Detaching safety Hook
8. Study of Lilly Controller
9. Study of Turbine Pump
10. Study of a Balancing Disc.

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Branch:	**Computer Sc. & Engg.**	Semester:	**V**
Subject:	**Numerical Analysis & Computer Programming Laboratory**	Code:	**339562 (22)**
TotalLab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

Note:- All programs should be made in C/C++ Languages. At least 15 experiments are to be performed by the students in the semester.

1. WAP for solving the algebraic and transcendental equations by using
   (i) Newton-Raphson Method
   (ii) Regula-Falsi Method
   (iii) Bisection Method
   (iv) Bairstow's Method

2. WAP for solving the system of simultaneous linear equation by using
   (i) Gauss-Jarden Method
   (ii) Jacobi's Method
   (iii) Gauss Seidal Iteration Method
   (iv) Triangularization Method

3. WAP for interpolate the value of 'y' by using
   (i) Newton's Forward Interpolation Method
   (ii) Newton's Backward Interpolation Method
   (iii) Lagrange's Interpolation Method.
   (iv) Trapezoidal rule
   (v) Simpson's Rule.
   (vi) Weddle's Rule

4. WAP for solving any differential equation by using
   (i) Taylor's Series Method
   (ii) Eular's Modified Method
   (iii) Runge- Kutta Method
   (iv) Milne's Method
   (v) Adams Bashforth Method

5. WAP for fitting the following curves
   (i) Straight Line
   (ii) Parabola
   (iii) Logarithmic & Exponential curves

Reference Books:-

1. Grewal B.S., Numerical Methods with Computer Application, Khanna Publication.
2. E. Balagurusaumy, Numerical Method, Tata McGraw –Hill publishing company Limited.
3. Jain Iyengar Jain, Numerical Method for Scientific and Engineering computation, New Age International Publication.
4. C. Xavier, C Language and Numerical Methods, New Age International Publishers.

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Branch:	**Mining Engineering**	Semester:	**V**
Subject:	**Surface Mining – I Laboratory**	Code:	**339563(39)**
TotalLab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

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 by manual 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 operated face.
7. Study of Dragline side casting 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

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Branch:	**Mining Engineering**	Semester:	**V**
Subject:	**Mine Survey – II Laboratory**	Code:	**339564(39)**
TotalLab Periods:	**36**	Batch Size:	**30**
Maximum Marks:	**40**	Minimum Marks:	**20**

List of experiments to be performed:

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

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Name of Program:	**Bachelor of Engineering**		
Branch:	**Common to All Branches**	Semester:	**V**
Subject:	**Personality Development**	Code:	**300565 (46)**
No. of Lectures:	**2/Week**	Tutorial Period:	**NIL**
Total Marks in ESE:	**NIL**	Marks in TA:	**20**
Minimum number of Class Tests to be conducted:	**Two**		

Objective: The course is introduced to develop one's outer and inner personality tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Personality Development is essential for overall 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 understand the concept of personality and image;
- To develop leadership, listening and interacting skills;
- To develop attitudinal changes;
- To develop decision-making qualities; and
- To communication skill.

UNIT I **Personality concepts:** What is Personality – its physical and psychic aspects. How to develop a positive self-image.How to aim at Excellence.How to apply the cosmic laws that govern life and personality.How to improve Memory – How to develop successful learning skills.How to develop and effectively use one's creative power.How to apply the individual MOTIVATORS that make you a self-power personality.

UNIT II **Interpersonal Skills:** Leadership: Leaders who make a difference, Leadership: your idea, What do we know about leadership? If you are serious about Excellence. Concepts of leadership, Two important keys to effective leadership, Principles of leadership, Factors of leadership, Attributes.Listening: Listening skills, How to listen, Saying a lot- just by listening, The words and the music, How to talk to a disturbed person, Listening and sometimes challenging.How to win friends and influence people, How to get along with others.How to develop art of convincing others. How can one make the difference.How to deal with others particularly elders.Conflicts and cooperation.

UNIT III **Attitudinal Changes: Meaning of attitude,** benefits of positive attitudes, How to develop the habit of positive thinking.

Negative attitude and wining: What is FEAR and how to win it.How to win loneliness.How to win over FAILURE.How to win over PAIN.How to win over one's ANGER and others anger. What is stress and how to cope up with it? The art of self-motivation.How to acquire mental well-being.How to acquire physical well-being.

UNIT IV **Decision Making:** How to make your own LUCK. How to plan goals/objectives and action plan to achieve them.How to make RIGHT DECISION and overcome problems.How to make a Decision. Decision making: A question of style. Which style, when? People decisions: The key decisions. What do we know about group decision making?General aids towards improving group decision making.

UNIT V **Communication Skills: Public Speaking:** Importance of Public speaking for professionals. The art of Speaking - Forget the fear of presentation, Symptoms of stage fear, Main reason for speech failure, Stop failures by acquiring Information; Preparation & designing of speech, Skills to impress in public speaking & Conversation, Use of presentation aids & media.

Study & Examination: How to tackle examination, How to develop successful study skills.

Group discussions: Purpose of GD, What factors contribute to group worthiness, Roles to be played in GD.

Course Outcomes:

- The students will be able to develop inner and outer personality exposure;
- The students will be able to develop effective leadership qualities and interacting skills;
- The students will be able to develop positive attitude, motivating skills and develop winning philosophies;
- The students will be able to develop decision-making tools; and
- The students will be able to develop group presentation, public speaking and impressive conversation.

Text Books:

1. Basic Managerial Skills for all by E. H. McGrawth, 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, 2000
2. How to Succeed by Brain Adams, Better Yourself Books, Mumbai, 1969
3. Personality: Classic Theories & Modern Research; Friedman ; Pearson Education, 2006
4. How to Win Friends and Influence People by Dale Carnigie, A. H. Wheeler 2006