

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

SCHEME OF TEACHING AND EXAMINATION

B.E. V 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	TA		
1	Computer Science & Engg.	339511 (22)	Numerical Analysis & Computer Programming	3	1	-	80	20	20	120	4
2	Mining Engg.	339512 (39)	Mine Survey - II	3	1	-	80	20	20	120	4
3	Mining Engg.	339513 (39)	Mine Legislation – I	3	1	-	80	20	20	120	3
4	Mining Engg.	339514 (39)	Under ground Metal Mining	4	-	-	80	20	20	120	5
5	Mining Engg.	339515 (39)	Surface Mining - I	4	1	-	80	20	20	120	5
6	Mining Engg.	339516 (39)	Mine Machinery – I	3	1	-	80	20	20	120	4
7	Mining Engg.	339521 (39)	Mine Machinery - I Lab	-	-	2	40	-	20	60	1
8	Computer Science & Engg.	339522 (22)	Numerical Analysis & computer Programming Lab	-	-	4	40	-	20	60	2
9	Mining Engg.	339523 (39)	Surface Mining - I Lab	-	-	2	40	-	20	60	1
10	Mining Engg.	339524 (39)	Mine Survey- II Lab	-	-	4	40	-	20	60	2
11	Humanities etc.	300525 (46)	Personality Development	-	-	2	-	-	20	20	1
12	Mining Engg.	339526 (39)	*Practical Training	-	-	-	-	-	20	20	-
13			Library	-	-	1	-	-	-	-	-
Total				20	5	15	640	120	240	1000	32

**L – Lecture, T – Tutorial,
P – Practical, ESE- End Semester Exam, CT- Class Test,
TA – Teacher’s Assessment**

*To be completed after IV Sem. and before the commencement of V Sem.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.E. V Sem.
Subject: Numerical Analysis & Computer Programming
Total Theory Periods: 40
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 2

Branch: Mining Engg.
Code: 339511 (22)
Total Tutorial Periods: 12

- 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 question's pertaining to the above units should be programmed though C or C++ Languages.

Text Book:-

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. Balagurusamy, Numerical Method, Tata Mc Graw –Hill publishing company Limited.
4. Sastry S. S. , Introductory Methods of Numerical Analysis, Prentice Hall of India Pvt. Ltd.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.E. V Sem.

Subject: Mine Survey -II

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mining Engg.

Code: 339512 (39)

Total Tutorial Periods: 12

UNIT 1: Theodolite Surveying

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

UNIT 2: Tacheometry

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

UNIT 3: Setting Out

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

UNIT 4: Errors & Problems

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

UNIT 5: Plans & Sections

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

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.E. V Sem.

Subject: Mine Legislation - I

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 02

Branch: Mining Engg.

Code: 339513 (39)

Total Tutorial Periods: 12

- 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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Semester: B.E. V Sem.

Subject: Underground Metal Mining

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 02

Branch: Mining Engg.

Code: 339514 (39)

Total Tutorial Periods: nil

UNIT 1: General

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

UNIT 2: 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 3: 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 4: Stoping Methods-II

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

UNIT 5: Support Systems

Pillars; Back fill, Cable bolting, Steel Rock 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

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.E. V Sem.

Subject: Surface Mining - I

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 02

Branch: Mining Engg.

Code: 339515 (39)

Total Tutorial Periods: 12

UNIT 1: 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 2: 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 3: Site preparation

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

UNIT 4: 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 5: 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 |

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.E. V Sem.

Subject: Mine Machinery -I

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 02

Branch: Mining Engg.

Code: 339516 (39)

Total Tutorial Periods: 12

UNIT 1: 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 cattles and changing the ropes.

UNIT 2: HAULAGE

Different systems of rope haulage, rope haulage calculations, safety devices, tubs, haulage road and manholes, locomotive haulage and calculations based on it, track laying, mine cars.

UNIT 3: WINDING

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

UNIT 4:

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

UNIT 5: PUMPING

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

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 Statham

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester – V.

Sub :- Numerical Analysis & Computer Programming Lab

Total Practical Periods – 50

Total marks in end semester exam – 40.

Branch - Mining Engineering.

Practical Code –339522 (22).

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) Euler'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. Balagurusamy, Numerical Method, Tata Mc Graw –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.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester : B.E. V

Subject : Personality Development

No. of Periods : 2 pds/week

Total Marks in End Semester Exam. : NIL

Minimum number of class tests to be conducted : Two

Branch : Common to All Branches

Code : 300525 (46)

Tutorial Periods : NIL

Teacher's Assessment : 20 Mks

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.

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. How to overcome CRITICISM. What is stress and how to cope up with it? What is crisis and how to manage it.
- How to apply the **character MOTIVATORS** that elevate you and your personality to the top, the art of self motivation.
- How to acquire **mental well-being.**
- How to acquire **physical well-being.**
- How to formulate effective **success philosophy.**

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. More tips for decisions of importance.

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.

Reference Books:

1. How to develop a pleasing personality by Atul John Rego, Better yourself books, Mumbai, 2000.
2. How to Succeed by Brian Adams, Better Yourself books, Mumbai, 1969.
3. Basic Managerial skills for all by E. H McGrawth, Prentice Hall India Pvt Ltd, 2006.
4. The powerful Personality by Dr Ujjwal Patni & Dr Pratap Deshmukh, Medident Publisher, 2006.
5. Great Words win Hearts by Dr Ujjwal Patni, Fusion Books, 2006.
6. Personality : Classic Theories & Modern Research; Friedman ; Pearson Education 2006.
7. How to win friends and influence people by Dale Carnegie, A.H. Wheeler 2006.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: Vth
Subject: Mine Machinery –I Lab
Total Practical Periods: 28
Total Marks in end Semester Exam: 40

Branch: Mining Engg.
Code: 339521 (39)

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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Semester: Vth
Subject: Surface Mining –I Lab
Total Practical Periods: 28
Total Marks in end Semester Exam: 40

Branch: Mining Engg.
Code: 339523 (39)

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 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

Chhattisgarh Swami Vivekanand Technical University, Bilai

Semester: Vth
Subject: Mine Survey –II Lab
Total Practical Periods: 50
Total Marks in end Semester Exam: 40

Branch: Mining Engg.
Code: 339524 (39)

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 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.