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

Semester - B. Tech V   Branch : Mining Engineering

Subject: Numerical   Analysis   and   Computer Code: C039511(022)
Programming

Total Theory Periods : 36   Total Tutorial Periods: 12

Total marks in End semester Exam : 100   Total Credits: 4

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:
Approximation s 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. Balag urusaumy , Numerical Method, Tata McGraw -Hill publishing company Limited.
4. Sastry S. S. , Introductory Methods of Numerical Analysis , Prentice Hall of lndia Pvt. Ltd.

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

Semester - B. Tech V
Subject: Mine Survey - II
Total Theory Periods : 36
Total marks in End semester Exam : 100

Branch : Mining Engineering
Code: C039512(039)
Total Tutorial Periods: 12
Total Credits: 4

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 Theodolit es, 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-ordin ates, 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:

I. Mine surveying by S. Ghatak
2. Surveying &Levelling by B. C. Punamia
3. Surveying &Levelling by Kanetkar&Kulkarni
4. Surveying &Levelling by R. Agor

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

Semester - B. Tech V   **Branch : Mining Engineering**
Subject: Mine Legislation – I   **Code: C039513(039)**
Total Theory Periods : 36   **Total Tutorial Periods: 12**
Total marks in End semester Exam : 100 **Total Credits: 4**

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

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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 creche Rules & Pit Head Bath Rule

UNIT V - Mine Vocational- training Rules.

References:

1. Legislation in Indian Mines (A critical Appraisal) Vol.11&1 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 , S. J. Kejeriwal

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

Semester - B. Tech V   **Branch : Mining Engineering**
Subject: Programming with C   **Code: C039513(039)**
Total Theory Periods : 36   **Total Tutorial Periods: 12**
Total marks in End semester Exam : 100   **Total Credits: 3**

UNIT-1

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

UNIT-II

Conditional constructs : 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, readind 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: reading and writing strings, passing a string into a function, using library functions to manipulate strings. 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 though C programs . File manipulating functions : fputc , fgetc, fgets, fputs, fseek, ftell etc. Working with Binary files , fread and fwrite. Command line arguments. Bitwise operators in C.

Text Books:

1.   Let us C - Yashwant Kanetkar BPB Publication

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

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

Semester - B. Tech V　　　　　　　　　　　**Branch : Mining Engineering**
Subject: Programming with C　　　　　　　　**Code: C039523(022)**
Total Theory Periods : 48　　　　　　　　　**Total Credits: 1**

List of programmes to be executed (but should not be less than 10):

1.　　Write a program to take the radius of a sphere as input and print the volume and surface and surface area of that sphere.

2.　　Write a program to take a 5-digit number as input and calculate the sum of its digits.

3.　　Write a program to take three sides of a triangle as input and verify whether the triangle is an isosceles, scalene or an equilateral triangle.

4.　　Write a program that will take 3 positive integers as input and verify whether or not they form a Pythagorean triplet or not.

5.　　Write a program to print all the Prime numbers between a given range.

6.　　 Write a program to define a function that will take an integer as argument and return the sum of digits of that integer

7.　　 Write a program to define a macro that can calculate the greater of two of its arguments. Use this macro to calculate the greatest of 4 integers.

8.　　 Write a program to define a recursive function that will print the reverse of its integer argument.

9.　　 Write a program to print the sum of first N even numbers using recursive function.

10.　　Write a program to sort an array using Bubble sort technique.

11.　　Write a program that will take the elements of two integer arrays of 5 element each, and insert the common elements of both the array into a third array (Set intersection)

12.　　Write a program to take 5 names as input and print the longest name.

13.　　Write a program to define a structure Student that will contain the roll number , name and total marks of a student. The program will ask the user to input the details of 5 students and print the details of all the students whose total marks is greater than a given value.

14.　　Write a program to define a union Contact that will contain the members Mobile no and E- mail id. Now define a structure Employee that will contain name, roll number , mode of contact (mob/e-mail) and a variable of type Contact as members. The program will ask the user to give the details of two Employees including mode of contact and the contact nurn/ E- mail. Print the details of both the Employees.

15.　　Write a program that will ask the user to input a file name and copy the contents of that file into another file.

16.　　Write a program that will take any number of integers from the command line as argument and print the sum of all those integers.

List of Equipments/Machine Required:
PCs, C-Compiler

Recommended Books:
Programming in ANSI C - E. Balaguruswamy　　　Tata Mc-Gcraw Hill

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

Semester - B. Tech V   **Branch : Mining Engineering**
Subject: Numerical Analysis & Computer   Code: C039521(022)
Programming Laboratory
Total Theory Periods : 48   **Total Credits: 1**

Note-: All the 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.

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

Semester - B. Tech V   **Branch : Mining Engineering**
Subject: Mine Survey - II Laboratory   **Code: C039522(039)**
Total Theory Periods : 48   **Total Credits: 1**

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 in accsseible 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.

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

Semester - B. Tech V	**Branch : Mining Engineering**
Subject: Under ground Metal Mining	**Code: C039531(039)**
Total Theory Periods : 36	**Total Tutorial Periods: 12**
Total marks in End semester Exam : 100	**Total Credits: 2**

Course Objective

- To choose proper extraction methods to different mineral deposits depending on their geo- miningconditions.
- 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 ofmetal mine.
- Aooly knowledge of metal mining for designing a metal mines

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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. SM E Handbook

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

Semester - B. Tech V
Subject: Under ground Metal Mining
Total Theory Periods : 36
Total marks in End semester Exam : 100

Branch : Mining Engineering
Code: C039532(039)
Total Tutorial Periods: 12
Total Credits: 2

UNIT 1

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 2

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

UNIT 3

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

UNIT 4

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

UNIT 5

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

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of the Program: **BTech**　　　　　　　　　　　Semester: **V**
Subject: **Environmental Studies**　　　　　　　　　Code: **C000506(020)**
Period per week (L-T-P): **(2-0-0) / Week**　　　　　Non-Credit
Total Contact Hours: **40**　　　　　　No. of assignments to be submitted: **05**

PREREQUISITE: Knowledge of basic Chemistry, Physics and Mathematics.

COURSE OBJECTIVES:
1. Basic knowledge of environment, ecology, ecosystems, biodiversity and conservation.
2. Fundamentals of natural resources, control, uses and its impact on environment.
3. Human population, growth, growing needs and its impact on society and environment.
4. Types of environmental pollution, legislations, enactment and management.

COURSE DETAILS:
UNIT I: Introduction to environmental studies, ecology and ecosystems　　　**(06 hours)**
Introduction to environment; Concept and structure of ecology and ecosystem, energy flow; Community ecology; Food chains and webs; Ecological succession; Characteristic features of forest, grassland, desert and aquatic ecosystem; Multidisciplinary nature of environmental studies, scope and importance; Concept of sustainability and sustainable development.

UNIT II: Biodiversity and conservation　　　　　　　　　　　　　　　**(06 hours)**
Introduction to biological diversity and levels of genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots; Threats to biodiversity, habitat loss, conflicts and biological invasions; In-situ and Ex-situ conservation of biodiversity: Ecosystem and biodiversity services.

UNIT III: Natural resources and environment　　　　　　　　　　　　　**(08 hours)**
Concept of Renewable and non-renewable resources; Land resources, land use change, land degradation, soil erosion; Desertification; Deforestation: causes, consequences and remedial measures; Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state); Energy resources: environmental impacts of energy generation, use of alternative and nonconventional energy sources, growing energy needs.

UNIT IV: Human communities, social issues and environment　　　　　　　**(08 hours)**
Basic concept of human population, growth and communities; Impacts on environment, human health, welfare and human rights; Resettlement and rehabilitation; Environmental natural disaster: floods, earthquake, cyclones, tsunami and landslides; Manmade disaster; Environmental movements; Environmental ethics: role of gender and cultures in environmental conservation; Environmental education and public awareness; Human health risks and preventive measurements.

UNIT V: Environmental pollution, policies, legislations, assessment and practices　　**(12 hours)**
Environmental pollution: Causes, effects and controls of air, water, soil, noise and marine pollution; Concept of hazardous and non-hazardous wastes, biomedical and e-wastes; Solid waste management and control measures; Climate change, global warming, ozone layer depletion, acid rain and their societal impacts; Environment laws: Wildlife Protection Act, Forest Conservation Act, Water (Prevention and control of Pollution) Act, Air (Prevention & Control of Pollution) Act, Environment Protection Act, Biodiversity Act, International agreements negotiations, protocols and practices; EIA, EMP.

On completion of each unit, students have to submit one assignment from each unit.

COURSE OUTCOMES (CO):
On completion of the course, students will able to:
1. Interpret and demonstrate the concept of ecology and ecosystem for environmental sustainability.
2. Define and establish the diversified knowledge of biodiversity and its conservation.

3. Explain the uses of natural resources efficiently and its impact on environment.
4. Illustrate and solve the simple and complex social issues relating to human communities.
5. Exemplify and make useful solution to combat the environmental degradation with the aid of national and international legislations and protocols there under.
6. Demonstrate and elucidate the complicated issues and anthropological problems for societal development.

TEXT BOOKS:

1. De, A.K., (2006).*Environmental Chemistry*, 6th Edition, New Age International, New Delhi.
2. Bharucha, E. (2013). *Textbook of Environmental Studies for Undergraduate Courses*. Universities Press.
3. Asthana, D. K. (2006).*Text Book of Environmental Studies*. S. Chand Publishing.

REFERENCE BOOKS:

1. Odum, E. P., Odum, H. T., & Andrews, J. (1971).*Fundamentals of ecology*. Philadelphia: Saunders.
2. Basu, M., Xavier, S. (2016). Fundamentals of Environmental Studies, Cambridge University Press, India.
3. Sharma, P. D., & Sharma, P. D. (2005).*Ecology and Environment*. Rastogi Publications.

OPEN SOURSE LEARNING:

http://nptel.ac.in/