Semester III

B.E. 301 - ENGINEERING MATHEMATICS II

Unit I

Fourier Series: Introduction of Fourier series , Fourier series for Discontinuous functions, Fourier series for even and odd function, Half range series Fourier Transform: Definition and properties of Fourier transform, Sine and Cosine transform.

Unit II

Laplace Transform: Introduction of Laplace Transform, Laplace Transform of elementary functions, properties of Laplace Transform, Change of scale property, second shifting property, Laplace transform of the derivative, Inverse Laplace transform & its properties, Convolution theorem, Applications of L.T. to solve the ordinary differential equations

Unit III

Second Order linear differential equation with variable coefficients : Methods one integral is known, removal of first derivative, changing of independent variable and variation of parameter, Solution by Series Method

Unit IV

Linear and Non Linear partial differential equation of first order: Formulation of partial differential equations, solution of equation by direct integration, Lagrange's Linear equation, charpit's method. Linear partial differential equation of second and higher order: Linear homogeneous and Non homogeneous partial diff. equation of nth order with constant coefficients. Separation of variable method
for the solution of wave and heat equations

Unit V

Vector Calculus: Differentiation of vectors, scalar and vector point function, geometrical meaning of Gradient, unit normal vector and directional derivative, physical interpretation of divergence and Curl. Line integral, surface integral and volume integral, Green's, Stoke's and Gauss divergence theorem

References

(i) Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India
(ii) Higher Engineering Mathematics by BS Grewal, Khanna Publication
(iii) Advance Engineering Mathematics by D.G.Guffy
(iv) Mathematics for Engineers by S.Arumungam, SCITECH Publuication
Engineering Mathematics by S S Sastri. P.H.I.

Semester III
Name of Subject: Mechanics of Solids & Fluids (Subject Code: MI302)

UNIT-1 Concept of Stress and Strain

Stress and strain at a point; Axial and shear stresses, Ultimate and 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 compression; Thermal stresses in composite bars.

UNIT-2 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-3 Deflection of beams

Slope and deflection of beams by deflection methods; Area moment and conjugate beam methods, propped cantilever and fixed beams.

UNIT-4 Introduction to Fluid Mechanics

Physical properties of fluids; Compressible and Incompressible fluids; Newtonian and Non-Newtonian fluids.

UNIT-5 (A) Fluid Statics

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.

UNIT-5 (B) Fluid Kinematics

Classification of flow: Uniform and Non-Uniform; Steady and Non- Steady; Laminar and Turbulent; One, Two, Three dimensional flows; Stream lines; Streak lines; Path lines; Stream Tubes; Elementary Explanation of stream function and velocity potential; Basic idea of flow nets.

Text Books:

1. Strength of material by B.S. Punmiya
2. Strength of material by Ramamurtham
3. Fluid Mechanics by Bansal

Reference Books:

1. Fluid Mechanics, F. M. White

Semester III
Name of Subject: Geology-I (Subject Code: MI303)

UNIT 1: 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, their relationship with Plate Tectonics.

UNIT 2: 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 3: 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 4: Sedimentary Petrology

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

UNIT 5: Structural Geology

Concept of Deformation; Primary and Secondary Planer & Linear Structure of Rocks; Topography and

its Representation. 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.

Text Books:

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 Petrolog y : G.W. Tyrell

Reference Books:

1. Structural Geology : M.P. Billings
2. Geological Maps : G.W. Chiplonkar
3. A Text Book of Geology : P.K. Mukherjee
4. Applied Geology : S. Banger
5. Applied Geology : D.V. Reddy
6. Engineering Geology : D.V. Reddy
7. Geology of India (Vol I&II) : R. Vaidyanadhan & M. Ramakrishnan

Semester III
Neme of Subject: Mining Surveying-I (Subject Code: MI304)

UNIT 1: Chain Survey
Linear Measurements; Types of chains; Tapes; Errors in chaining and corrections in linear measurements; Direct and indirect Ranging; Principles of chain surveying. Offsets, Limiting length of offsets; Booking field notes; Obstacles in chaining; Instruments for setting out right angles.

UNIT 2: 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 3: Plane Table Surveying
Principles of Plane Tabling; Working operations; Methods of Plane Table Surveying; Two and Three point problems.

UNIT 4: 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 5: Levelling
Definitions of important terms used in levelling; Development in levelling Instruments; Types and Constructional details of Dumpy Level, Auto Level; Temporary and Permanent Adjustments; Methods
of levelling; Straight edge levelling; Fly levelling; Check levelling; Reciprocal levelling; Longitudinal Sections; Cross- Sectioning; Trigonometric levelling; Methods of booking and reduction of levels; Levelling through drifts and shafts (Including steeply inclined shafts) ; Plumbing measurements of depth of shaft and subsidence.

Text Books:
1. Mine surveying by S. Ghatak
2. Surveying & Levelling by B. C. Punamia

Reference Books:
1. Surveying & Levelling by Kanetkar & Kulkarni

Semester III
Name of Subject: Engineering Materials (Subject Code: MI305)

UNIT 1: General
Introduction, Classification of Engg. Materials, Structure of Metals and Alloys, Iron-carbon phase diagram.

UNIT 2: 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 3: 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 4: Constructional Materials
Cements – Classification & Properties, Quick Setting Cement, Resin Capsule, R.C.C., Shot Encapsulization, Shotcreting, Brick & Stone Masonries, Hollow blocks , Application of Fly Ash in Mining - mine filling.

UNIT 5: 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.

Semester III
Name of Subject: Lab Geology-I (Subject Code: (MI303))

List of Experiments:

1. Megascopic Description of Rock Forming Minerals.
2. Megascopic Description of important Igneous, Sedimentary, Metamorphic Rocks.
3. Basic Concept of Contours, Attitude of Beds, Width of Outcrop, True and Apparent Dips, Rules of V`s.
4. Study of Geological Maps and Preparation of Cross Sections.

Text Books:

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 Petrolog y : G.W. Tyrell

Reference Books:

1. Structural Geology : M.P. Billings
2. Geological Maps : G.W. Chiplonkar

Semester III
Name of Subject: Lab Mining Surveying (Subject Code: MI304)

List of Experiments:

Experiment 1.
Ranging and Chaining of line of 50 Meter.

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

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

Experiment 4.
Study of various types of chained.

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

Experiment 6.
Plotting a closed traverse and elimination of errors.

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

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

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

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

Experiment 11.
Study of Miner's dial.

Experiment 12.
Study of Dumpy level.

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

Experiment 14.
Fly leveling by Tilting level.

Experiment 15.
Longitudinal sectioning by Level.

Text Books:

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

Reference Books:

1. Surveying & Levelling by Kanetkar & Kulkarni

Semester III
Subject : Computer Programming (Code : MI306)

List of programs (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 detail 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 num/ 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.

Text Books:

Let us C – Yashwant Kanetkar BPB Publication
Programming in ANSI C – E. Balaguruswamy Tata Mc-Gcraw Hill

Reference Books:

Programming with C – Ritchie