| BE III Semester (Common for All Branch) | | | | | | |
|---|---|---|---|---|---|---|
| COURSE CONTENTS | | | | | | |
| MA-3001 | Mathematics – III | L | T | P | C | Max. Marks | Min. Marks |
| Duration | 3 Hours | 3 | 1 | 0 | 4 | 70 | 22 |

**Unit I**

**Functions of Complex Variables:** Analytic functions, Harmonic Conjugate, Cauchy-Riemann Equations, Line integral, Cauchy's theorem, Cauchy's Integral Theorem, Tailors & Laurent's series expansions Singular points, Poles and Residues, Residue theorem, Evaluation of Real Integral, Elementary transformation, Bilinear Transformation.

**Unit II**

**Numerical Analysis:** Difference operators, Errors and Approximations, Interpolation, Inverse interpolation, Numerical differentiation, Numerical Integration Newton-cotes formula, Simpson's and Weddel's rule and Gauss Legendre open quadrature formula.

**Unit III**

**Algebraic and Transcendental Equations:** Solutions of algebraic and transcendental equations( Regula Falsi, Newton-Rephson, Iterative, Graffe's root squaring methods), Solutions of simultaneous algebraic equations, Solutions of ordinary differential equations (Taylor's Series, Picard's Method, Euler's method, Modified Euler's method, Runge-Kutta Method, Predictor-Corrector Method), Solution of Partial differential equation, Difference scheme, Solution of parabolic, hyperbolic and elliptic equations.

**Unit IV**

**Introduction of Optimization:** Introduction of optimization by linear programming (only two variables problem), Solution by graphical and simplex method, Concepts of degeneracy and duality, Simple three variables transport and assignment problems and modeling into LPP.

**Unit V**

**Sampling distributions:** The central limit theorem, Distributions of the sample mean and the sample variance for a normal population, Chi-Square test, t and F distribution, **Estimation:** The method of movements and method of maximum likelihood estimation, Confidence intervals for the mean(s) and variance(s) of normal population

**Suggested Readings:**

1. Adv. Engineering Mathematics by E. Kreyszig.
2. Adv. Engineering Mathematics by R.K. Jain & S.R.K. Iyenger.
3. Higher Engineering Mathematics by B.S. Grewal.
4. Mathematical Statistics by J.N. Kapoor.
5. Probability and Statistics in Engineering by W.W. Hines et al.
6. Numerical Methods of Scientific and Engineering Computation by M.K. Jain et al.
7. Operation Research : An Introduction by H.A. Taha.
8. Introduction to Operation Research by F.S. Hiller and G.J. Liberman.
9. Numerical Solutions of Differential Equations by M.K. Jain.

| COURSE CONTENTS | | | | | | |
|---|---|---|---|---|---|---|
| CE-3001 | Engineering Geology | L | T | P | Max. Marks | Min. Marks |
| Duration | 3 Hours | 3 | 1 | 2 | 70 | 22 |

**UNIT - I**

**Introduction and General Geology  :**  Objects and branches of geology. Origin of earth, age of earth and internal structure of earth, weathering of rocks, soil, soil formation, soil profile and types of Indian soils. Geological work of wind, geological of river, geological work of glaciers and geological work of sea, volcanoes and earthquake, concept of plate tectonics.

**UNIT - II**

**Mineralogy and Crystallography  :**  Fundamentals of mineralogy, physical properties of minerals and study of common rock forming minerals, ores and minerals of economic importance. Elements of crystal, crystal symmetry and introduction to crystal systems.

**UNIT - III**

**Petrology and Geology of India  :**  Study of igneous, sedimentary and metamorphic rocks, their formation, structures, textures and classification. Descriptive study of rocks.  Rocks of civil engineering importance, physical features of India, Brief geological history of India, geological time scale, major geological groups of India and their economic importance.

**UNIT - IV**

**Structural Geology  :**  Structural features of rocks, dip, strike and out croups, classification and detailed studies of geological structures i.e. folds, faults, joints, unconformity and their importance in civil Engineering

**UNIT - V**

**Applied Geology  :**  Introduction to applied geology and its use in Civil Engineering, Engineering properties of rocks. Selection of sites for construction of Dams, reservoirs, roads, bridges and tunnels, water bearing strata, use of remote sensing technique in selection of above sites.

 **Laboratory Work :-**

1      Identification of simple rock forming minerals and important ores, their study and properties.
2      Identification of rock, their physical and chemical properties.
3      Study of geological maps and their interpretation.
4      Folds and their interpretation.
5      Faults and their interpretation.
6      Unconformities and their interpretation.
7      Field visit geological excursion.
8      Study of various folds and types of folds.
9      Study of various faults and types of faults.

**Reference Books :**

1      Parbin – "Engineering & General Geology".
2      P.K. Mukerjee – "A Text Book of Geology".
3      S.K. Garg – "A Text Book of Physical and Engineering Geology".
4      D. Venkat Reddy – "Engineering Geology".

| | **COURSE CONTENTS** | | | | | |
|---|---|---|---|---|---|---|
| **CE-3002** | **Strength of Materials** | **L** | **T** | **P** | **Max. Marks** | **Min. Marks** |
| Duration | 3 Hours | 3 | 1 | 0 | 70 | 22 |

**UNIT - I**
**Simple Stress and Strains :** Concept of elastic body, stress and strain. Hooke's law, various types of stress and strains. Elastic constants. Stresses in compound bars, composite and tapering bars, Temperature stresses.
**Complex Stress and Strains :** Two dimensional and three dimensional stress system. Normal and tangential stresses, Principal planes, Principal Stresses and strains, Mohr's circle of stresses, Combined Bending and Torsion, Theories of failure.

**UNIT - II**
**Shear Force & Bending Moment :** For different types of beams for different loading.
**Theory of Simple Bending:** Concept of pure bending and bending stress, Equation of bending. Neutral axis, Section-Modulus, Determination of bending stresses in simply supported, cantilever and overhanging beams subjected to point load and uniformly distributed loading. Bending & shear stress distribution across a section in beams.

**UNIT - III**
**Deflection of beams:** Double Integration method, Macaulay method, Area Moment method, Conjugate Beam method and Strain Energy method.

**UNIT - IV**
**Columns and Struts:** Euler's buckling load for uniform section, various end conditions. Slenderness ratio. Stress in columns. Rankine formulae, Eccentric loading on columns.
**Combined Direct & Bending Stress**: Introduction and middle third rule.

**UNIT - V**
**Torsion of Shafts :** Concept of pure torsion, Torsion equation, Determination of shear stress and angle of twist of shafts of circular section, Hollow shafts, Open and closed coil springs, Leaf spring. Spiral spring.
**Pressure Vessels :** Thin and Thick walled cylinders and spheres, Stress due to internal pressure, Change in diameter and volume. Compound cylinders and shrink fittings.

**Reference Books :**

(i)      Strength of Materials (Schaum Outlines Series), Nash, Tata McGraw-Hill Pub. Co. Ltd.
(ii)     Strength of Materials, Timoshenko, Vol  I & II.
(iii)    Strength of Materials, B.C. Punmia.
(iv)    Strength of Materials, Ramamrutham.
(v)     Strength of Materials, by R.K. Bansal.
(vi)    Strength of Materials by Bhavikatti,
(vii)   Strength of Materials by Ryder.

| | COURSE CONTENTS | | | | | |
|---|---|---|---|---|---|---|
| **CE 3003** | **Building Design & Drawing** | **L** | **T** | **P** | **Max. Marks** | **Min. Marks** |
| Duration | 3 Hours | 3 | 1 | 2 | 70 | 22 |

**UNIT - I**

Principles of planning of building, building bye-laws, Orientation of building, Principle of architectural composition (Mass, Unity, Proportioning, Scale etc.), Energy efficient buildings.

**UNIT – II & III**

Planning, designing & preparing drawings of residential & public buildings like primary school, office building, primary health center etc**.**

**UNIT - IV**

Introduction of foundations, shallow and deep foundation, brick masonry, load bearing cavity and partition wall.  Floor, damp proofing, water proofing, of Doors, Windows, Ventilators, Lintels, Staircases, & Roofs etc**.**

**UNIT - V**

Provisions of National Building Codes (Lighting, Ventilation, Acoustics, Water Supply etc.), Elements of Perspective drawing involving simple problems.

**Sessional Work: -**

1. Preparation of important signs & symbols sheets.
2. Drawing of doors, windows, and ventilators.
3. Drawing of lintels, stairs, and roofs etc.
4. Planning of Residential Building for medium class family.
5. Planning of Residential Building for high class family
6. Planning of Primary School.
7. Planning of Primary Health Centre.
8. Perspective drawing of simple problems.

**Reference Books: -**

1. Meo & Malik – Elements of Planning of Building Design
2. Y.S. Sane – Planning of Building
3. Gurucharan Singh – Elements of Building Design & Drawing
4. Sushil Kumar – Building Construction, Standard Book House
5. B.C. Punmia - Building Construction, Laxmi Publications
6. Bindra  &  Arora - Building Construction

## COURSE CONTENTS

| CE-3004 | Fluid Mechanics – I | L | T | P | Max. Marks | Min. Marks |
|---------|---------------------|---|---|---|------------|------------|
| Duration | 3 Hours | 3 | 1 | 2 | 70 | 22 |

### UNIT - I

**Fluid Properties:** Engineering units of measurement, mass, density, specific weight, specific volume, specific gravity, surface tension, capillarity, viscosity, Newtonian, Non Newtonian, Ideal fluid.

**Pressure & Its Measurement :** Pressure & pressure head, Fluid pressure at a point, Pascal's law, Absolute and gauge pressure, pressure variation in static fluid, Measurement of pressure: manometers, Hydrostatic forces on surfaces: Total pressure & centre of pressure on horizontal, vertical, inclined & curved immersed surfaces and gates.

**Buoyancy & Flotation:** Buoyant force and its centre, metacentre and its height, stability of submerged bodies.

### UNIT - II

**Fluid Kinematics:** Description of fluid motions: Langrangian and Eulerian method, Types of fluid flow, types of flow lines, principles of fluid flow, continuity equation, velocity & acceleration, circulation and vorticity, velocity potential and stream function, flow net, potential flow and its cases**.**

### UNIT - III

**Fluid Dynamics :** Euler's equation of motion & Bernoulli's equation of motion along a stream line, their derivation and practical application, Pitot and Prandtl tube, Venturimeter, Orifice meter.

Linear momentum equation for steady flow, energy correction factor and momentum correction factor, moment of momentum equation,forces on fixed and moving vanes.

**Flow measurement**: Orifice, Nozzles, Mouth pieces, Weirs & Notches.

### Unit - IV

**Dimensional & Model Analysis :** Dimensional homogeneity, methods of dimensional analysis – Reyleigh's method, Buckingham's $\pi$ method, model analysis, simulated, types of similarities, types of forces in moving fluid, dimension less numbers, model laws, model testing, classification of models, scale ratio.

### Unit-V

**Laminar or Viscous Flow:** Introduction of Laminar & Turbulent flow with examples & characteristics, Reynolds experiment, Navier-Stoke equation of motion, relation between shear stress & pressure gradient, laminar flow through circular pipes, laminar flow between parallel plates, laminar flow through porous media, Loss of head due to friction in viscous flow, measurement of viscosity by rotating circular method, falling sphere method, capillary tube method and efflux viscometer.

### List of Experiment:

01      Pressure measurement by Differential Manometer.
02      Velocity measurement by Pitot / PrandtlTube.
03      Verification of Bernoulli's equation.
04      Calibration of Venturimeter.
05      Determination of $C_c$, $C_v$, $C_d$ of Orifices.
06      Calibration of Mouth Piece.
07      Calibration of Orifice Meter.
08      Reynolds experiment for demonstration of stream lines & turbulent flow.
09      Determination of metacentric height.
10      Determination of Friction Factor / Coefficient of friction of a pipe.

### Suggested Books and Study Materials :

(i)      Fluid Mechanics by Modi & Seth - Standard Book House, Delhi.
(ii)      Fluid Mechanics by A.K. Jain - Khanna Publishers, Delhi.
(iii)      Fluid Mechanics by Streeter - Mc Graw Hill.
(iv)      Essential of Engineering Hyd. By JNIK DAKE.
(v)      (Published by Africon Network & Scientific & Technical Instt. (ANSTI).
(vi)      A Text Book of fluid Mech. for Engg. Student by Franiss JRD

| COURSE CONTENTS | | | | | | |
|---|---|---|---|---|---|---|
| **CE-3005** | **Computer-I** | L | T | P | **Max. Marks** | **Min. Marks** |
| Duration | 6 Hours | 0 | 0 | 6 | 60 | 20 |

**2D : Lines**- Line, Polyline, Multiline, Construction Line.

**Modifiers** – Erase, Trim, Extend, Fillet, Chamfer,
               Offset, Copy, Move, Array, Circles, Polygon.
               Dimension, Hatch, Blocks, Layers.