

B. Tech. III Semester (Civil)
CE-201E STRUCTURAL ANALYSIS-I

L	T	P/D	Total
3	2	-	5

Max. Marks: 150
Theory: 100
Sessional: 50
Duration: 3 hrs.

UNIT-I

Analysis of stresses and strains:

Analysis of simple states of stresses and strains, elastic constraints, bending stresses, theory of simple bending, flexure formula, combined stresses in beams, shear stresses, Mohr's circle, Principle stresses and strains, torsion in shafts and closed thin walled sections, stresses and strains in cylindrical shells and spheres under internal pressure.

Theory of Columns:

Slenderness ratio, end connections, short columns, Euler's critical buckling loads, eccentrically loaded short columns, cylinder columns subjected to axial and eccentric loading.

UNIT-II

Bending moment and shear force in determinate beams and frames:

Definitions and sign conventions, axial force, shear force and bending moment diagrams.

Three hinged arches:

horizontal thrust, shear force and bending moment diagrams.

UNIT-III

Deflections in beams:

Introduction, slope and deflections in beams by differential equations, moment area method and conjugate beam method, unit load method, principle of virtual work, Maxwell's Law of Reciprocal Deflections, Williot's Mohr diagram

UNIT-IV

Analysis of statically determinate trusses:

Introduction, various types, stability, analysis of plane trusses by method of joints and method of sections, analysis of space trusses using tension coefficient method.

Note for Paper-setter: EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

Books:

- 1 Strength of Materials Part-I, S.Timoshenko, Affiliated East-West Press, New Delhi
- 2 Mechanics of Solids, Prasad, V. S. Gakgotia Pub., New Delhi.
- 3 Elementary Structural Analysis, Jain, A. K., Nem Chand & Bros, Roorkee.
- 4 Elementary Structural Analysis, Wibur & Nooris, McGraw Hill Book Co., Newyork.
- 5 Structural Analysis, Bhavikatti S.S.,Vikas Pub.House, N.Delhi.

B. Tech. III Semester (Civil)

CE-203E BUILDING CONSTRUCTION, MATERIALS & DRAWING

L	T	P/D	Total
4	-	2	6

Max. Marks:	150
Theory:	100 marks
Sessional:	50 marks
Duration:	3 hrs.

A. CONSTRUCTION

UNIT-I

Masonry Construction:

Introduction, various terms used, stone masonry-Dressing of stones, Classifications of stone masonry, safe permissible loads, Brick masonry-bonds in brick work, laying brick work, structural brick work-cavity and hollow walls, reinforced brick work, Defects in brick masonry, composite stone and brick masonry, glass block masonry.

Cavity and Partition Walls:

Advantages, position of cavity, types of non-bearing partitions, constructional details and precautions, construction of masonry cavity wall.

Foundation:

Functions, types of shallow foundations, sub-surface investigations, geophysical methods, general feature of shallow foundation, foundations in water logged areas, design of masonry wall foundation, introduction to deep foundations i.e. pile and pier foundations.

UNIT-II

Damp-Proofing and Water-Proofing:

Defects and causes of dampness, prevention of dampness, materials used, damp-proofing treatment in buildings, water proofing treatment of roofs including pitched roofs.

Roofs and Floors:

Types of roofs, various terms used, roof trusses-king post truss, queen post truss etc. Floor structures, ground, basement and upper floors, various types of floorings.

Doors and Windows:

Locations, sizes, types of doors and windows, fixtures and fasteners for doors and windows.

Acoustics, Sound Insulation and Fire Protection:

Classification, measurement and transmission of sound, sound absorber, classification of absorbers, sound insulation of buildings, wall construction and acoustical design of auditorium, fire-resisting properties of materials, fire resistant construction and fire protection requirements for buildings.

B. MATERIALS

UNIT-III

Stones:

Classification, requirements of good structural stone, quarrying, blasting and sorting out of stones, dressing, sawing and polishing, prevention and seasoning of stone.

Brick and Tiles:

Classification of bricks, constituents of good brick earth, harmful ingredients, manufacturing of bricks, testing of bricks.

Tiles: Terra-cotta, manufacturing of tiles and terra-cotta, types of terra-cotta, uses of terra-cotta.

Limes, Cement and Mortars:

Classification of lime, manufacturing, artificial hydraulic lime, pozzolona, testing of lime, storage of lime, cements composition, types of cement, manufacturing of ordinary Portland cement, testing of cement, special types of cement, storage of cement.

Mortars: Definition, proportions of lime and cement mortars, mortars for masonry and plastering.

UNIT-IV

Timber:

Classification of timber, structure of timber, seasoning of timber, defects in timber, fire proofing of timber, plywood, fiberboard, masonite and its manufacturing, important Indian timbers.

Ferrous and Non-Ferrous Metals:

Definitions, manufacturing of cast iron, manufacturing of steel from pig iron, types of steel, marketable form of steel, manufacturing of aluminium and zinc.

Paints and Varnishes:

Basic constituents of paints, types of paints, painting of wood, constituents of varnishes, characteristics and types of varnishes.

Plastic:

Definition, classification of plastics, composition and raw materials, manufacturing, characteristics and uses, polymerization, classification, special varieties.

C. DRAWINGS

1. Typical drawings of:

- a) Cavity Wall
- b) Bonds in brick work
- c) Grillage foundation

2. Preparation of building drawing mentioning its salient features including the following details:

- a) Ground floor plan
- b) Two Sectional Elevations
- c) Front and Side Elevations
- d) Plan and Sectional Elevation of stair case, doors/ windows/ ventilators, floor and roof.

Note for Paper-setter: EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

Books:

- 1 Building Construction, Sushil Kumar, Standard Pub., N. Delhi
- 2 Building Material, Rangawala
- 3 Construction Engineering, Y.S. Sane
- 4 Building Construction, Gurcharan Singh, Standard Pub., N. Delhi.

B. Tech. III Semester (Civil)
CE-205E FLUID MECHANICS-I

L	T	P/D	Total
3	2	-	5

Max. Marks:	150
Theory:	100 marks
Sessional:	50 marks
Duration:	3 hrs.

UNIT-I

Introduction:

Fluid properties, mass density, specific weight, specific volume and specific gravity, surface tension, capillarity, pressure inside a droplet and bubble due to surface tension, compressibility viscosity, Newtonian and Non-newtonian fluids, real and ideal fluids.

Kinematics of Fluid Flow:

Steady & unsteady, uniform and non-uniform, laminar & turbulent flows, one, two & three dimensional. flows, stream lines, streak lines and path lines, continuity equation in differential form, rotation and circulation, elementary explanation of stream function and velocity potential, rotational and irrotational flows, graphical and experimental methods of drawing flownets.

UNIT-II

Fluid Statics:

Pressure-density-height relationship, gauge and absolute pressure, simple differential and sensitive manometers, two liquid manometers, pressure on plane and curved surfaces, center of pressure, Buoyancy, stability of immersed and floating bodies, determination of metacentric height, fluid masses subjected to uniform acceleration, free and forced vortex.

UNIT-III

Dynamic of Fluid Flow:

Euler's equation of motion along a streamline and its integration, limitation of Bernouli's equation, Pitot tubes, venturimeter, Orificemeter, flow through orifices & mouth pieces, sharp crested weirs and notches, aeration of nappe.

UNIT-IV

Boundary layer analysis:

Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, turbulent boundary layer, laminar sub-layer, smooth and rough boundaries, local and average friction coefficient, separation and its control.

Dimensional Analysis and Hydraulic Similude:

Dimensional analysis, Buckingham theorem, important dimensionless numbers and their significance, geometric, kinematic and dynamic similarity, model studies, physical modeling, similar and distorted models.

Note for Paper-setter: EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

Books:

- 1 Hydraulic and Fluid Mechanic by P.N.Modi & S.M.Seth

- 2 Introduction to Fluid Mechanics by Robert W.Fox & Alan T.McDonald
- 3 Fluid Mechanics Through Problems by R.J.Garde
- 4 Engineering Fluid Mechanics by R.J.Garde & A.G.Mirajgaoker

B. Tech. III Semester (Civil)
CE-207E SURVEYING-I

L	T	P/D	Total
3	1	-	4

Max. Marks: 150
Theory: 100 marks
Sessional: 50 marks
Duration: 3 hrs.

UNIT-I

Fundamental Principles of Surveying:

Definition, objects, classification, fundamental principles, methods of fixing stations.

Measurement of distances:

Direct measurement, instruments for measuring distance, instruments for making stations, chaining of line, errors in chaining, tape corrections examples.

Compass and Chain Traversing:

Methods of traversing, instruments for measurement of angles-prismatic and surveyor's compass, bearing of lines, local attraction, examples.

UNIT-II

Leveling:

Definition of terms used in leveling, types of levels and staff, temporary adjustment of levels, principles of leveling, reduction of levels, booking of staff readings, examples, contouring, characteristics of contours lines, locating contours, interpolation of contours.

Plane Table Surveying:

Plane table, methods of plane table surveying, radiation, intersection, traversing and resection, two point and three point problems.

UNIT-III

Theodolite and Theodolite Traversing:

Theodolites, temporary adjustment of theodolite, measurement of angles, repetition and reiteration method, traverse surveying with theodolite, checks in traversing, adjustment of closed traverse, examples.

Tacheometry:

Uses of tacheometry, principle of tacheometric surveying, instruments used in tacheometry, systems of tacheometric surveying-stadia system fixed hair method, determination of tacheometric constants, tangential systems, examples.

UNIT-IV

Curves:

Classification of curves, elements of simple circular curve, location of tangent points-chain and tape methods, instrumental methods, examples of simple curves. Transition Curves-Length and types of transition curves, length of combined curve, examples.

Vertical Curves: Necessity and types of vertical curves.

Note for Paper-setter: EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

Books:

1. Surveying Vol.I & II by B.C.Punmia
2. Surveying Vol.I by T.P.Kanitkar

B. Tech. III Semester (Civil)
CE-209E ENGINEERING GEOLOGY

L	T	P/D	Total
3	1	-	4

Max. Marks:	150
Theory:	100 marks
Sessional:	50 marks
Duration.:	3 hrs.

UNIT-I

Introduction:

Definition, object, scope and sub division of geology, geology around us. The interior of the earth. Importance of geology in Civil Engineering projects.

Physical Geology:

The external and internal geological forces causing changes, weathering and erosion of the surface of the earth. Geological work of ice, water and winds. Soil profile and its importance. Earthquakes and volcanoes.

UNIT-II

Mineralogy and Petrology:

Definition and mineral and rocks. Classification of important rock forming minerals, simple description based on physical properties of minerals. Rocks of earth surface, classification of rocks. Mineral composition, Textures, structure and origin of Igneous, Sedimentary and Metamorphic rocks. Aims and principles of stratigraphy. Standard geological/stratigraphical time scale with its sub division and a short description based on engineering uses of formation of India.

Structural Geology:

Forms and structures of rocks. Bedding plane and outcrops Dip and Strike. Elementary ideas about fold, fault, joint and unconformity and recognition on outcrops. Importance of geological structures in Civil Engineering projects.

UNIT-III

Applied Geology:

Hydrogeology, water table, springs and Artesian well, aquifers, ground water in engineering projects. Artificial recharge of ground water, Elementary ideas of geological investigations. Remote sensing techniques for geological and hydrological survey and investigation. Uses of geological maps and interpretation of data, geological reports.

Suitability and stability of foundation sites and abutments:

Geological condition and their influence on the selection, location, type and design of dams, reservoirs, tunnels, highways, bridges etc. Landslides and Hill-slope stability.

UNIT-IV

Improvement of foundation rocks:

Precaution and treatment against faults, joints and ground water, retaining walls and other precautions.

Geology and environment of earth.

Note: The physical study of rock samples and minerals may be performed in the tutorials.

Note for Paper-setter: EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

Books:

1 A Text Book of Geology by P.K. Mukherjee

- 2 Physical and General Geology by S.K.Garg
- 3 Engineering and General Geology by Prabin Singh
- 4 Introduction of Physical Geology by A.Holmes.

MATHEMATICS – III
MATH-201 E

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Theory : 100
Sessional : 50
Total : 150
Duration of Exam : 3 Hrs.

UNIT – I

Fourier Series : Euler’s Formulae, Conditions for Fourier expansions, Fourier expansion of functions having points of discontinuity, change of interval, Odd & even functions, Half-range series.

Fourier Transforms : Fourier integrals, Fourier transforms, Fourier cosine and sine transforms. Properties of Fourier transforms, Convolution theorem, Parseval’s identity, Relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of a function, Application to boundary value problems.

UNIT-II

Functions of a Complex Variables : Functions of a complex variable, Exponential function, Trigonometric, Hyperbolic and Logarithmic functions, limit and continuity of a function, Differentiability and analyticity.

Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form of the Cauchy-Riemann equations, Harmonic functions, Application to flow problems, Conformal transformation, Standard transformations (Translation, Magnification & rotation, inversion & reflection, Bilinear).

UNIT-III

Probability Distributions : Probability, Baye’s theorem, Discrete & Continuous probability distributions, Moment generating function, Probability generating function, Properties and applications of Binomial, Poisson and normal distributions.

UNIT-IV

Linear Programming : Linear programming problems formulation, Solution of Linear Programming Problem using Graphical method, Simplex Method, Dual-Simplex Method.

Text Book

1. Higher Engg. Mathematics : B.S. Grewal
2. Advanced Engg. Mathematics : E. Kreyzig

Reference Book

1. Complex variables and Applications : R.V. Churchill; Mc. Graw Hill
2. Engg. Mathematics Vol. II: S.S. Sastry; Prentice Hall of India.
3. Operation Research : H.A. Taha
4. Probability and statistics for Engineer : Johnson. PHI.

Note : Examiner will set eight question, taking two from each unit. Students will be required to attempt five questions taking at least one from each unit.

B. Tech III Semester (Civil)
CE-211E STRUCTURAL MECHANICS-I (P)

L	T	P/D	Total
-	-	2	2

Max. Marks - 75
Viva-Voce - 25 marks
Sessional - 50 marks
Duration – 3 Hours

1. Verification of reciprocal theorem of deflection using a simply supported beam.
2. Verification of moment area theorem for slopes and deflections of the beam.
3. Deflections of a truss- horizontal deflection & vertical deflection of various joints of a pin- jointed truss.
4. Elastic displacements (vertical & horizontal) of curved members.
5. Experimental and analytical study of 3 hinged arch and influence line for horizontal thrust.
6. Experimental and analytical study of behaviour of struts with various end conditions.
7. To determine elastic properties of a beam.
8. Uniaxial tension test for steel (plain & deformed bars)
9. Uniaxial compression test on concrete & bricks specimens.

B. Tech. III Semester (Civil)
CE-213E FLUID MECHANICS-I(P)

L	T	P/D	Total
-	-	2	2

Max.Marks:75
Viva-voce:25 marks
Sessionals: 50 marks
Duration: 3 hours

- 1 To determine metacentric height of the ship model.
- 2 To verify the Bernoulli's theorem.
- 3 To determine coefficient of discharge for an Orificemeter.
- 4 To determine coefficient of discharge of a venturimeter.
- 5 To determine the various hydraulic coefficients of an Orifice (C_d , C_c , C_v).
- 6 To determine coefficient of discharge for an Orifice under variable head.
- 7 To calibrate a given notch.
- 8 To determine coefficient of discharge for a mouth piece.
- 9 Drawing of a flownet by Viscous Analogy Model and Sand Box Model.
- 10 To study development of boundary layer over a flat plate.
- 11 To study velocity distribution in a rectangular open channel.
- 12 Velocity measurements by current meter, float, double float (demonstration only).
- 13 Experiment on Vortex formation (demonstration only).

B.Tech.III Semester(Civil)
CE-215E SURVEYING-I(P)

L	T	P/D	Total
-	-	3	3

Max.Marks:100
Sessionals:50 marks
Viva-voce: 50 marks
Duration:3 hours

- 1 Chain surveying: Chaining and chain traversing.
- 2 Compass traversing.
- 3 Plane tabling: methods of plane table surveying, two point & three point problems.
- 4 Leveling: Profile leveling and plotting of longitudinal section and cross sections. y leveling. Permanent adjustment of level.
Reciprocal leveling.
Contouring and preparation contour map.
- 5 Use of tangent clinometer.