3rd SEM

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.

CE-203E BUILDING CONSTRUCTION, MATERIALS & DRAWING

L T P/D Total   Max. Marks: 150
4 -   2   6   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, fixures and fastners 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 accoustical 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 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:
Stready & 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, Orficemeter, 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, Buckinghum 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

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

L T P/D Total   Max. Marks: 150
3 1 -   4   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   Max. Marks: 150
3 1 -   4   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

L	T	P
3	1	-

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

UNIT – I

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

<u>Fourier Transforms</u> : Fourier integrals, Fourier transforms, Fourier cosine and sine transforms. Properties of Fourier transforms, Convolution theorem, Perseval's identity, Relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of a function, Application to boundary value problems.

UNIT-II

<u>Functions of a Complex Variables</u> : 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

<u>Probability Distributions</u> : 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

<u>Linear Programming</u> : 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. Churchil; 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		Max. Marks - 75
-	-	2	2		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.
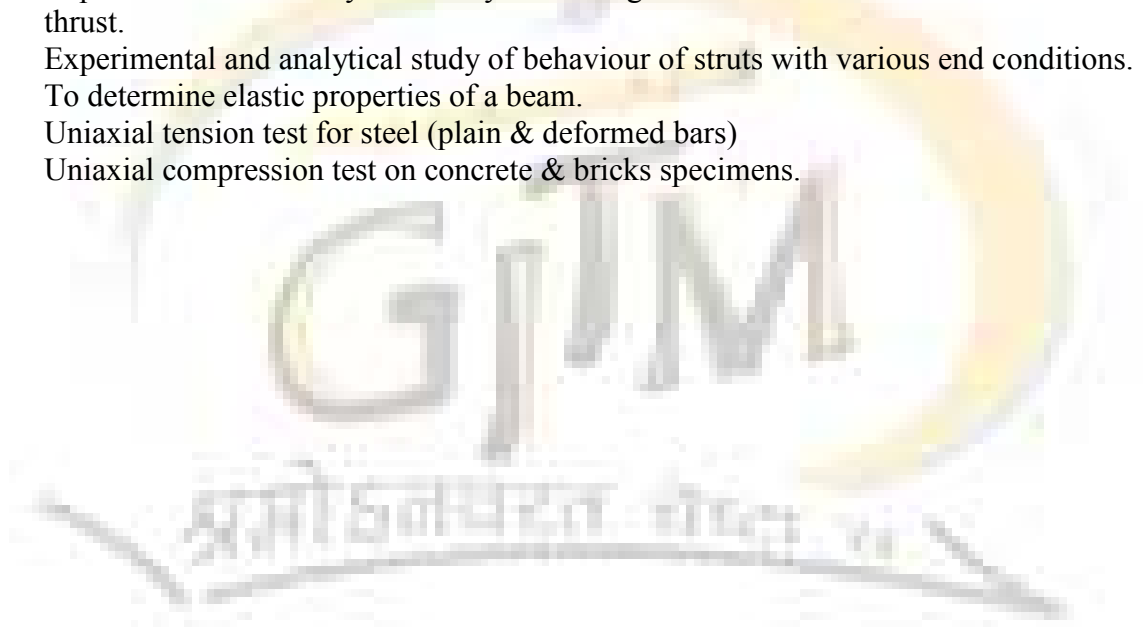
B. Tech. III Semester (Civil)
CE-213E FLUID MECHANICS-I(P)

L T P/D Total   Max.Marks:75
- -   2   2   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, Cc, Cv).
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).
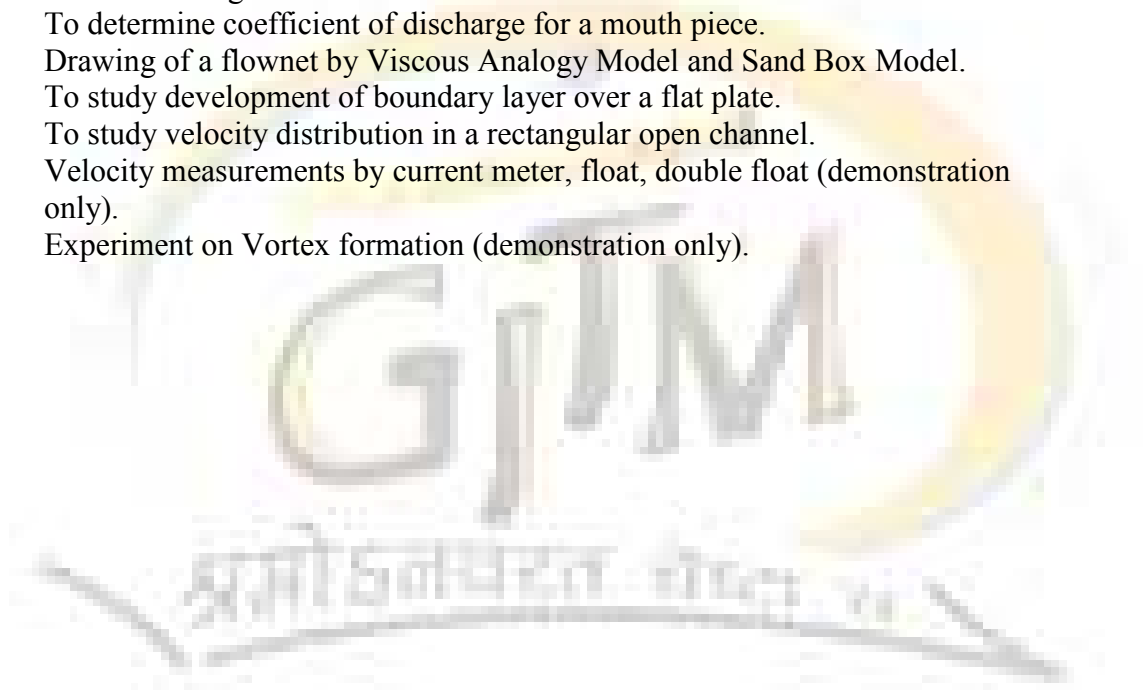
B.Tech.III Semester(Civil)
CE-215E SURVEYING-I(P)

L T P/D Total   Max.Marks:100
- -   3   3   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.
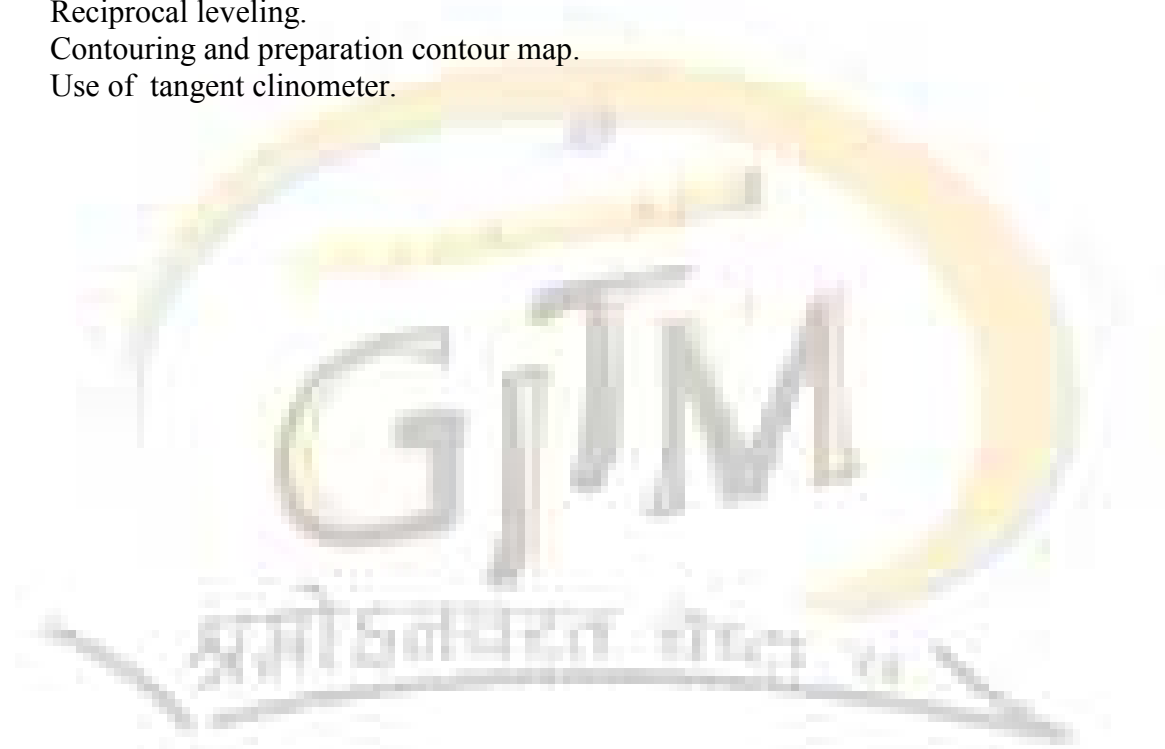
4th SEM

BASICS OF INDUSTRIAL SOCIOLOGY, ECONOMICS AND MANAGEMENT
HUM – 201 E

L   T   P   3   1

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                                            Sessional   : 50 Marks

                                                  Theory   : 100 Marks

                                                Total   : 150 Marks

                                            Duration of Exam.:   3 Hrs.

UNIT-I

Meaning of social change, nature of social change, theories of social change. The direction of social change, the causes of social change, the process of social change. Factors of social change – the technological factors, the cultural factors, effects of technology on major social institutions, social need of status system, social relations in industry.

UNIT-II

Meaning of Industrial Economic, Production Function, its types, Least Cost Combination, Law of Variable Proportion, Laws of Return – Increasing, Constant & Diminishing.

Fixed & variable costs in short run & long run, opportunity costs, relation between AC & MC, U-shaped short run AC Curve.

Price & Output Determination under Monopoly in short run & long run. Price Discrimination, Price Determination under Discriminating Monopoly. Comparison between Monopoly & Perfect Competition.

UNIT – III

Meaning of Management, Characteristics of Management, Management Vs. Administration, Management – Art, Science & Profession, Fayol's Principles of Management.

Personnel Management – Meaning & Functions, Manpower – Process of Manpower Planning, Recruitment & Selection – Selection Procedure.

Training – Objectives & Types of Training, Various Methods of Training. Labour Legislation in India – Main provisions of Industrial disputes Act 1947;

UNIT – IV

Marketing Management – Definition & Meaning, Scope of Marketing Management, Marketing Research – Meaning, Objectives.

Purchasing Management – Meaning & Objectives, Purchase Procedure, Inventory Control Techniques.

Financial Management – Introduction, Objectives of Financial decisions, Sources of Finance.

Note : Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all, taking at least one from each unit.

TEXT BOOKS :
1. "Modern Economic Theory" Dewett, K.K., S. Chand & Co.
2. "Economic Analysis" K.P. Sundharam & E.N. Sundharam (Sultan Chand & Sons).
3. "Micro Economic Theory" M.L. Jhingan (Konark Publishers Pvt. Ltd.).

4. "Principles of Economics" M.L. Seth (Lakshmi Narain Aggarwal Educational Publishers – Agra).
5. "An Introduction to Sociology", D.R. Sachdeva & Vidya Bhusan.
6. "Society – An Introductory Analysis", R.M. MacIver Charles H. Page.
7. "Principles and Practices of Management : R.S. Gupta; B.D. Sharma; N.S. Bhalla; Kalyani.

REFERENCE BOOKS

1. "Organization and Management : R.D. Aggarwal, Tata McGraw Hill.
2. Business Organization and Management : M.C. Shukla

B. Tech. IV Semester (Civil)
CE-202E STRUCTURAL ANALYSIS-II

L T P/D Total   Max. Marks: 150
3 2 -   5   Theory: 100 marks
                                           Sessionals: 50 marks
                                           Duration: 3 hours

UNIT-I
Statically Indeterminate Structures:
Introduction, Static and Kinematic Indeterminacies, Castigliano's theorems, Strain energy method, Analysis of frames with one or two redundant members using Castigliano's 2nd theorem.

UNIT-II
Slope deflection and moment Distribution Methods:
Analysis of continuous beams & portal frames, Portal frames with inclined members.

UNIT-III
Column Analogy Method:
Elastic centre, Properties of analogous column, Applications to beam & frames.
Analysis of Two hinged Arches:
Parabolic and circular Arches, Bending Moment Diagram for various loadings, Temperature effects, Rib shortening, Axial thrust and Radial Shear force diagrams.

UNIT-IV
Unsymmetrical Bending
Introduction Centroidal principal axes of sections, Bending stresses in beam subjected to unsymmetrical bending, shear centre, shear centre for channel, Angles and Z sections.
Cable and suspension Bridges:
Introduction, uniformly loaded cables, Temperature stresses, three hinged stiffening Girder and two hinged stiffening Girder.

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.   Statically Indeterminate Structures, C.K. Wang, McGraw Hill Book Co., New   York.
2.   Advanced Structural Analysis, A.K. Jain, Nem Chand & Bros., Roorkee.
3.   Indeterminate Structures, R.L. Jindal, S. Chand & Co., New Delhi.
4.   Theory of Structures, Vol. I, S.P. Gupta & G.S.Pandit, Tata McGraw Hill, New Delhi.

B Tech IV semester (civil)
CE-204E DESIGN OF STEEL STRUCTURES-I

L T P/D Total   Max. Marks: 150
3 - 2   5   Theory :   100 Marks
                                                              Sessional :   50 Marks
                                                              Duration   3 Hours

UNIT-I

Introduction:
Properties of structural steel. I.S.Rolled sections and I.S. specification.
Connections:
Importance, various types of connections, simple and moment resistant, riveted, bolted and welded connections.
Design of Tension Members:
Introduction, types of tension members, net sectional areas, design of tension members, lug angles and splices.

UNIT-II

Design of Compression Members:
Introduction, effective length and slenderness ratio, various types of sections used for columns, built up columns, necessity, design of built up columns, laced and battened columns including the design of lacing and battens, design of eccentrically loaded compression members.
Column Bases and Footings:
Introduction, types of column bases, design of slab base and gussested base, design of gussested base subjected to eccentrically loading, design of grillage foundations.

UNIT-III

Design of Beams:
Introduction, types of sections, general design criteria for beams, design of laterally supported and unsupported beams, design of built up beams, web buckling, web crippling and diagonal buckling.

UNIT-IV

Gantry Girders:
Introduction, various loads, specifications, design of gantry girder.
Plate Girder:
Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices (brief introduction), Curtailment of flange plates, design beam to column connections: Introduction, design of framed and seat connection.

DRAWINGS:
1.   Structural drawings of various types of welded connections (simple and eccentric)
2.   Beam to column connections (framed & seat connections)
3.   Column bases- slab base, gussested base and grillage foundation.
4.   Plate girder.
5.   Roof truss.

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. Design of steel structures, A.S.Arya & J.L.Ajmani, Nem chand & Bros., Roorkee.
2. Design of steel structures, M.Raghupati, TMH Pub., New Delhi.
3. Design of steel structures, S.M.A.Kazmi & S.K.Jindal, Prentice Hall, New Delhi.
4. Design of steel structures, S.K.Duggal, TMH Pub., New Delhi.

B. Tech. IV Semester (Civil)
CE-206E   FLUID MECHANICS-II

L   T   P/D   Total
3   2   -   5

Max. Marks: 150
Theory: 100 marks
Sessionals: 50 marks
Duration: 3 hours

UNIT-I

Laminar Flow:

Navier Stoke's equation, Laminar flow between parallel plates, Couette flow, laminar flow through pipes-Hagen Poiseuille law, laminar flow around a sphere-Stokes'law.

Flow through pipes:

Types of flows-Reynold's experiment, shear stress on turbulent flow, boundary layer in pipes-Establishment of flow, velocity distribution for turbulent flow in smooth and rough pipes, resistance to flow of fluid in smooth and rough pipes, Stanton and Moody's diagram. Darcy's weisbach equation, other energy losses in pipes, loss due to sudden expansion, hydraulic gradient and total energy lines, pipes in series and in parallel, equivalent pipe, branched pipe, pipe networks, Hardy Cross method, water hammer.

UNIT-II

Drag and Lift:

Types of drag, drag on a sphere, flat plate, cylinder and airfoil, development of lift on immersed bodies like circular cylinder and airfoil.

Open Channel Flow:

Type of flow in open channels, geometric parameters of channel section, uniform flow, most economical section (rectangular and trapezoidal), specific energy and critical depth, momentum in open channel, specific force, critical flow in rectangular channel, applications of specific energy and discharge diagrams to channel transition, metering flumes, hydraulic jump in rectangular channel, surges in open channels, positive and negative surges, gradually varied flow equation and its integration, surface profiles.

UNIT-III

Compressible flow:

Basic relationship of thermodynamics continuity, momentum and energy equations, propagation of elastic waves due to compression of fluid, Mach number and its significance, subsonic and supersonic flows, propagation of elastic wave due to disturbance in fluid mach cone, stagnation pressure.

UNIT-IV

Pumps and Turbines:

Reciprocating pumps, their types, work done by single and double acting pumps. Centrifugal pumps, components and parts and working, types, heads of a pump-statics and manometric heads,. Force executed by fluid jet on stationary and moving flat vanes, Turbines-classifications of turbines based on head and specific speed, component and working of Pelton wheel and Francis turbines, cavitation and setting of turbines.

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   Hydraulics & Fluid Mechanics by P.N.Modi and S.M.Seth
2   Flow in Open Channels by S.Subraminayam
3   Introduction to Fluid Mechanics by Robert N.Fox & Alan T.Macnold

B. Tech. (Civil) IV Semester
CE-208E SOIL MECHANICS

L T P/D Total   Max. Marks: 150
3 2 -   5   Theory: 100 marks
                                                    Sessionals: 50 marks
                                                    Duration: 3 hours

UNIT-I

Soil Formation and Composition

Introduction, soil and rock, Soil Mechanics and Foundation Engineering, origin of soils, weathering, soil formation, major soil deposits of India, particle size, particle shape, interparticle forces, soil structure, principal clay minerals.

Basic Soil Properties

Introduction, three phase system, weight-volume relationships, soil grain properties, soil aggregate properties, grain size analysis, sieve analysis, sedimentation analysis, grain size distribution curves, consistency of soils, consistency limits and their determination, activity of clays, relative density of sands.

Classification of soils

Purpose of classification, classification on the basis of grain size, classification on the basis of plasticity, plasticity chart, Indian Standard Classification System.

Permeability of Soils

Introduction, Darcy's law and its validity, discharge velocity and seepage velocity, factors affecting permeability, laboratory determination of coefficient of permeability, determination of field permeability, permeability of stratified deposits.

UNIT-II

Effective Stress Concept

Principle of effective stress, effective stress under hydrostatic conditions, capillary rise in soils, effective stress in the zone of capillary rise, effective stress under steady state hydro-dynamic conditions, seepage force, quick condition, critical hydraulic gradient, two dimensional flow, Laplace's equation, properties and utilities of flownet, graphical method of construction of flownets, piping, protective filter.

Compaction

Introduction, role of moisture and compactive effect in compaction, laboratory determination of optimum moisture content, moisture density relationship, compaction in field, compaction of cohesionless soils, moderately cohesive soils and clays, field control of compaction.

UNIT-III

Vertical Stress below Applied Loads

Introduction, Boussinesq's equation, vertical stress distribution diagrams, vertical stress beneath loaded areas, Newmark's influence chart, approximate stress distribution methods for loaded areas, Westergaard's analysis, contact pressure.

Compressibility and Consolidation

Introduction, components of total settlement, consolidation process, one-dimensional consolidation test, typical void ratio-pressure relationships for sands and clays, normally consolidated and over consolidated clays, Casagrande's graphical method of estimating pre-consolidation pressure, Terzaghi's theory of one-dimensional primary consolidation, determination of coefficients of consolidation, consolidation settlement, Construction period settlement, secondary consolidation.

UNIT-IV

Shear Strength

Introduction, Mohr stress circle, Mohr-Coulomb failure-criterion, relationship between principal stresses at failure, shear tests, direct shear test, unconfined compression test, triaxial compression tests, drainage conditions and strength parameters, Vane shear test, shear strength characteristics of sands, normally consolidated clays, over-consolidated clays and partially saturated soils, sensitivity and thixotropy.

Earth Pressure

Introduction, earth pressure at rest, Rankine's active & passive states of plastic equilibrium, Rankine's earth pressure theory, Coulomb's earth pressure theory, Culmann's graphical construction, Rebhann's construction.

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 Recommended

1. Basic and Applied Soil Mechanics by Gopal Ranjan, ASR Rao, New Age Intetrnational(P)Ltd.Pub.N.Delhi.
2. Soil Engg. in Theory and Practice, Vol .I, Fundamentals and General Principles by Alam Singh, CBS Pub.,N.Delhi.
3. Engg.Properties of Soils by S.K.Gulati, Tata-Mcgraw Hill,N.Delhi.
4. Geotechnical Engg. by P.Purshotam Raj,Tata Mcgraw Hill.
5. Principles of Geotechnical Engineering by B.M.Das,PWS KENT, Boston.

B. Tech IV Semester (Civil)
CE-210E SURVEYING -II

L T P/D Total   Max.Marks: 150
3 1 -   4   Theory: 100marks
                                                    Sessionals: 50 marks
                                                    Duration: 3 hrs.

UNIT-I
Trigonometrical Levelling:
Introduction, height and distances-base of the object accessible, base of object inaccessible, geodetical observation, refraction and curvature, axis signal correction, difference in elevation between two points.

Triangulation:
Triangulation systems, classification, strength of figure, selection of triangulation stations, grade of triangulation, field work of triangulation, triangulation computations, introduction to E.D.M. instruments.

UNIT-II
Survey Adjustment and Treatment of Observations:
Types of errors, definition of weight pf an observation, most probable values, law of accidental errors, law of weights, determination of probable error (different cases with examples) principle of least squares, adjustment of triangulation figures by method of least squares.

UNIT-III
Astronomy:
Definitions of astronomical terms, star at elongation, star at prime vertical star at horizon, star at culmination, celestial coordinate systems, Napier's rule of circular parts, various time systems: sidereal, apparent, solar and mean solar time, equation of time-its cause.

UNIT-IV
Elements of Photogrammetry:
Introduction: types of photographs, types of aerial photographs, aerial camera and height displacements in vertical photographs, stereoscopic vision and stereoscopies, height determination from parallax measurement, flight planning,

Introduction of remote sensing and its systems:
Concept of G.I.S and G.P.S. -Basic Components, data input, storage & output.

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 Recommended

1   Surveying Vol.2 by B.C.Punmia
2   Surveying Vol.3 by B.C.Punmia
3   Surveying Vol2 by T.P.Kanitkar
4   Higher Surveying by A M Chandra

B. Tech IV Semester (Civil)
CE-212E FLUID MECHANICS-II (P)

L T P/D Total   Max. Marks:75
- - 2   2   Sessionals: 50 mark
                                                          Viva-voce: 25 marks
                                                          Duration: 3 hrs.

1   To determine the coefficient of drag by Stoke's law for spherical bodies.
2   To study the phenomenon of cavitation in pipe flow.
3   To determine the critical Reynold's number for flow through commercial pipes.
4   To determine the coefficient of discharge for flow over a broad crested weir.
5   To study the characteristics of a hydraulic jump on a horizontal floor and sloping glacis
        including friction blocks.
6   To study the scouring phenomenon around a bridge pier model.
7   To study the scouring phenomenon for flow past a spur.
8   To determine the characteristics of a centrifugal pump.
9   To study the momentum characteristics of a given jet.
10   To determine head loss due to various pipe fittings.
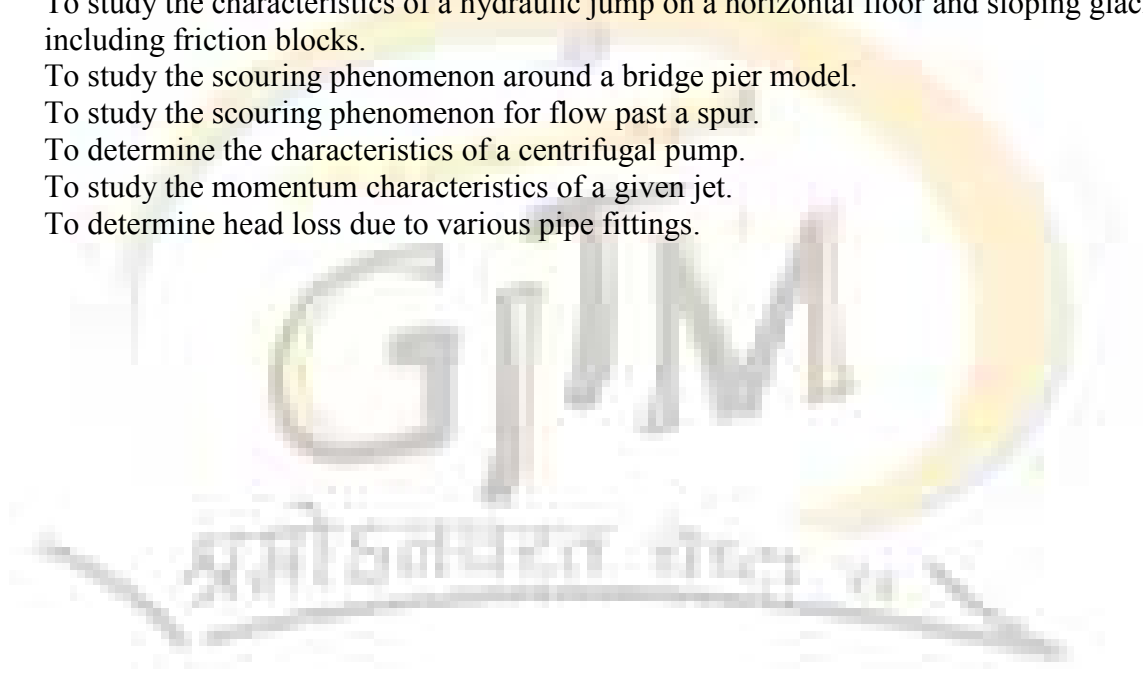
B. Tech. IV Semester (Civil)
CE-214E SOIL MECHANICS (P)

L T P/D Total   Max.Marks:75
                                                            Sessional:50 marks
- -   2   2   Pract./ Viva-Voce:25 marks
                                            Duration:3 hrs.

1.   Visual Soil Classification and water content determination.
2.   Determination of specific gravity of soil solids.
3.   Grain size analysis-sieve analysis.
4.   Liquid limit and plastic limit determination.
5.   Field density by:
        i) Sand replacement method
        ii) Core cutter method
6.   Proctor's compaction test.
7.   Coefficient of permeability of soils.
8.   Unconfined compressive strength test.
9.   Direct shear test on granular soil sample.
10.   Unconsolidated undrained (UU) triaxial shear test of fine grained soil sample.

BOOKS

1   Soil Testing for Engineers by S.Prakash, PK Jain, Nem Chand & Bros.,Roorkee.
2   Engineering Soil Testing by Lambi, Wiley Eastern.
3   Engineering Properties of Soils and their Measurement by J.P.Bowles, McGraw Hill.
4   Soil Engineering in Theory and Practice, Vol.II, Geotechnical Testing and Instrumentation
    by Alam Singh, CBS Pub.

B. Tech. IV Semester(Civil)
CE-216E SURVEYING-II(P)

L T P/D Total   Max. Marks: 75
- -   2   2   Sessionals: 50 marks
                                            Viva-voce: 25 marks
                                            Duration: 3 hrs.

1.   Theodilite:
Study of theodolite, measurement of horizontal angle, measurement of vertical angle,
Permanent adjustment.

2   Tacheometry:
Tacheometric constants, calculating horizontal distance and elevations with the help of
tacheometer.

3   Curves:
Setting of simple circular curves by off set method, off set from chord produced, off set
from long chord and by deflection angleethod.

4   Trirangulation:
An exercise of triangulation including base line measurement.