

DCE 301 STRENGTH OF MATERIALS

3L+1T+0P+3.5C

MM: 100

Module 1

Simple Stress and Strain: Various mechanical properties-Elasticity, Plasticity, Ductility, Brittleness, Toughness, And Hardness. Concept of stress and strain. **Type of force** - Direct, shear. **Stress** - Tensile, compressive, shear. Hook's law. Tensile test diagram for mild steel with define the following properties- Gauge length, Limit of proportionality, Elastic limit, Yield point, Yield strength, Ultimate stress, Rupture strength, Nominal stress, Proof stress. Working stress and factor of safety. Principle of superposition. Stress and strain calculations. Temperature stresses. Modulus of rigidity. Complementary shear stress. Poisson's ratio and volumetric strain- Lateral strain, longitudinal strain, volumetric strain, Bulk modulus. Relationship between elastic constants (No Derivation) & their numerical.

Module 2

Compound Stresses & Strain Energy: Compound Stresses- Introduction, Stress components on an inclined plane induced by- Induced by direct stresses, Induced by simple shear, Induced by direct and simple shear stresses. **Mohr's circle-** For like direct stresses, for unlike direct stresses. **Principal stresses and planes-** Major Principal Stress, Minor principal stress. **Strain Energy-**Introduction, Strain energy from stress - strain diagram, Proof resilience, Types of loading - gradual, sudden, impact. Derivation of formula for resilience of a uniform bar in tension.

Module 3

Moment of Inertia& Column: Moment of Inertia- Concept of Centroid & Centre of gravity. Concept of moment of Inertia & Radius of gyration. Parallel axis and Perpendicular axis theorem. Moment of Inertia of various sections such as rectangular, triangular and circular etc. Moment of inertia of unsymmetrical section like: T-section, channel section, L-section etc. **Columns and Struts-**Definition of long column, short column and strut, slenderness ratio, equivalent length, critical load, collapse Load. End conditions of column. Application of Euler's and Rankine's formula (no derivation).Simple numerical problems based on Euler's and Rankine's formulae.

Module 4

Bending Moments and Shear Force, Torsion: Bending Moments and Shear Force- Basic concept, Types of support, Types of beam, and Types of load. Point of contra-flexure. Concept of shear force and bending moment. Sign convention for shear force and bending moment. Bending moment and shear force diagrams (for point loads, U.D.L. and their combinations) for Cantilever beam, simply supported beam, simply supported beam with overhang. **Torsion-**Definition of torque and angle of twist. Derivation of torsion equation. Polar moment of inertia. Strength of hollow and solid shaft, advantage of a hollow shaft over a solid shaft.

Module 5

Bending& Shear Stresses in Beams: Bending stresses in beams- Concept of bending stress. Assumptions of theory of simple bending. Derivation of the equation $M/I = F/y = E/R$. Section modulus. Calculation of max bending stress in beams of rectangular, circular, I and T section. **Shear Stress in Beams-**Concept of shear stress. Derivation of the equation for shear stress. Shear stress distribution diagram of various sections like rectangular, circular, triangular, I, T. Channel sections etc. Calculation of max & min shear stress in beams of rectangular, circular section.

Text/Reference Books:

1. Strength of Materials, Rajput R. K., S.Chand & Co. Ltd., Delhi.
2. Strength of Materials, Kapoor J.K., Asian Publication, Muzaffarnagar.
3. Strength of Materials, Punmia B.C., Laxmi Publication, Delhi.
4. Strength of Materials, Ramamarutham S., Dhanpat Rai & Sons, Delhi.

Module 1

Surveying: Definition, Types of surveying with their brief description, difference between plane surveying and geodetic surveying, Uses of surveying in engineering, Principles of surveying.

Module 2

Chain Surveying: Introduction, Different type of chains, Type of taps, Brief descriptions on Ranging rods, Offset rods, Line ranger, Cross staff, Optical square, Arrows. Folding, unfolding, of chains. Ranging – direct ranging and indirect ranging, Chaining on plane ground, Conventional signs in surveying. Chaining on sloping ground by direct method & indirect method. Common errors and precautions. Traversing, Fixing and marking stations, Base line, Check lines and Tie lines, Common obstacles in chaining, Plotting of traverse.

Module 3

Compass Surveying: Prismatic compass and Surveyor's compass, Difference between them, Meridian-(magnetic, true and arbitrary), magnetic dip (Definitions only), Whole circle and Quadrilateral bearing systems. Conversion from whole circle bearing to quadrilateral bearing and vice versa. Local attraction, Correction of bearings due to local attractions. Traversing with chain and compass. Adjustment of error in a closed traverse

Module 4

Levelling: Definitions of –Levelling, level surface, level line, Horizontal line, vertical line, mean sea level and reduced level, Brief description on types of levelling. Difference in dumpy and tilting level, Temporary adjustment of dumpy and tilting. Levelling staff (Self reading, Telescope & Target staff). Calculation of R.L. by Height of instrument method & Rise and fall method. Effect of curvature and refraction in levelling and their corrections.

Module 5

Plane Table Surveying: Purpose of plane table surveying, equipment used in plane table survey: Plane table Alidade (Plain and Telescopic) Accessories, Setting of a Plane Table: Centring, Levelling, Orientation Methods of plane table surveying Radiation, Intersection, Traversing, Resection. Two Point Problem, Three Point Problem Errors in plane table survey and precautions to control them. Testing and adjustment of plane table and alidade.

Text/Reference Books:

1. Plane Surveying by Dr. A.M. Chandra, New Age International.
2. Surveying Volume I by Dr. B.C. Punmia Laxmi Publications (P) Ltd.
3. Surveying Volume –I & II by Dr. K.R. Arora Standard Book House Delhi
4. Surveying & Levelling by Subramanian Oxford University Press.
5. Surveying Vol.1 by S.K. Duggal Tata McGraw Hill, Delhi

Module 1

Building Stones, Bricks: Classification of Rocks Geological classification and Chemical classification of rocks (Brief review only). General characteristics of stones, Requirements of good building stones and their testing. Identifications of common building stones. Various uses of stones in construction.

Introduction to bricks- Raw materials for manufacturing and properties of good brick making earth. Manufacturing of bricks testing of common building bricks as per BIS: 3495 Compressive strength, water absorption, efflorescence.

Module 2

Tiles and Cement: Tiles-Use of tiles, Classification of tiles according to use & shape. Special tiles - Allahabad tiles, Mangalore tiles. Moulding, shaping, drying and burning process of tiles. Properties and uses of fire clay tiles.

Cement and Cement Mortar-Introduction, Raw material, Manufacturing process of ordinary Portland cement, Flow diagram for wet and dry process, Properties and use of ordinary Portland cement, Constituents, function and use of cement mortar.

Module 3

Lime, Timber and Wood Based Products: Lime- Natural sources for the manufacture of lime. Lime mortar Definition of terms: quick lime, fat lime, hydraulic lime, hydrated lime, lump lime. Calcinations and slaking of lime. IS classification of lime, testing of lime. **Timber**-Classification of trees: Exogenous and Endogenous trees. Preservation of timber and methods of treatment as per BIS.

Wood Based Products- Plywood, Veneers and veneering, uses of plywood, Laminated board, block board, fiber board, hard board and gypsum board.

Module 4

Paints and Varnishes: Paints- purpose and uses of paints, Different types of paints: oil paints, water paints, cement paints and plastic paints. Application of cement paint, Water paint, Plastic paints and their uses. **Varnishes**-Varnishes and polish types, properties and their uses.

Module 5

Metals and Miscellaneous Materials: Metals- Ferrous Metals, their Composition, properties and uses of cast iron, steel (mild and high tension steel), requirements of mild steel as per BIS. **Non Ferrous Metals**- properties and uses of the nonferrous metals in Civil engineering works. **Miscellaneous Materials**- Plastics, Polymers, and Glass: Asbestos based products, Construction chemicals like: water proofing compound, epoxies, sulphides.

Note: - A field visit may be planned to explain and show the relevant things

Text/Reference Books:

1. Construction Materials: Their nature & Behaviour by J.M. Illston; E& FN Spon
2. Building Materials: Products, Properties and Systems by Ghambir, Tata McGraw Hill, and Delhi.
3. Building Materials by S. Duggal; New Age International Publishers.

ENG 108 TECHNICAL COMMUNICATION

2L+0T+0P+2C

MM100

Module 1

Functional Grammar: Active, Passive voice, Conditional Sentences, Syntax, Concord, and Common Errors.

Practical (Oral): To make students practice the above mentioned grammatical rules in the practical classes.

Module 2

Communication: Meaning & Importance of communication, Process of communication, Language as a tool of communication.

Practical (Oral): To make students speak on their understanding of communication

Module 3

Writing Skills: Reporting events, writing newspaper reports, Bio-data making, writing of Resumes, and writing job application.

Practical (Oral): To make students practice writing on the above mentioned processes.

Module 4

Listening Skills: The listening process, hearing & listening, types of listening, Barriers to listening.

Practical (Oral): To make student develop the skills of listening & thus improve their speaking skills.

Module 5

Project Writing: Project writing for sponsoring agencies. Research paper and data sheet preparation and communication for publication. Preparing analysis report

Text/Reference Books:

1. Technical Communication Principles & Practices, Raman Meenakshi & Sharma Sangeeta, ONP, N. Delhi
2. Wren & Martin: High School English Grammar & Composition- S. Chand& Co. N. Delhi

DCE 305 BUILDING CONSTRUCTIONS

3L+0T+0P+3C

MM: 100

Module 1

Introduction and foundation: Introduction- Definition of a building, classification of buildings based on occupancy, requirements of a good residential building. Different parts of a building.

Excavation in ordinary and hard soils, excavation in soft and hard rock, excavation in weak soils.

Foundation- Concept of foundation and its purpose (i) Types of foundations shallow and deep (ii) Shallow foundation - constructional details of : Spread foundations for walls, thumb rules for depth and width of foundation and thickness of concrete block.

Module 2

Brick & Stone Masonry in Walls; Scaffolding, Shoring and Underpinning : Brick Masonry-Definition of terms: mortar, bond, facing, backing, hearting, column, pillar, plinth, plinth masonry, header, stretcher, bed of brick, bat, queen closer, king closer, frog, queen closer, types of Bond & their brief descriptions. **Stone Masonry-** Types of Stone Masonry: Rubble Masonry: random and coursed. **Scaffolding, Shoring and Underpinning-** Brief description and application of different types of scaffolding and shores & underpinning. Brief description of Form work for columns, walls, beams and slabs.

Module 3

Mortars and Concretes, Dampness and its Prevention: Mortar-Preparation, use, average strength and suitability of cement, lime, lime cement, lime surkhi, mud mortar, **Concretes-** Ingredient of concrete, advantages of concrete, types and uses of concrete Constructional details and suitability of mason's brick layers. **Dampness and its Prevention-** Causes of dampness in buildings and principles of its prevention, Materials commonly used for damp proofing, damp proof course, Anti termite treatment of buildings before and after construction

Module 4

Doors, Windows, Walls, Floor and Roofs: Doors -Types of door frames (stone, timber, steel, concrete), Description and sketches of different types of doors Use of collapsible door, rolling steel doors, side sliding doors, wire mesh doors.

Windows- Names, uses and sketches of different types of windows. Window frames of different materials- wood, steel, aluminium.

Roofs- Functions of roofs and ceilings. Brief description, constructional details and suitability of common types of roofs. Definition of related terms.

Floors- Brief description, uses and construction of ground floors - Brick on edge; tiles, stone slab, marble and glazed tiles, lime concrete, cement concrete, terrazzo and mosaic.

Module 5

Stairs and Building planning: Stairs- Definition of Stair case, winders, landing, stringer, newel baluster, riser, tread, width of staircase, hand rail, nosing Planning and layout of staircase. Relations between rise and going, determination of width of stair, landing etc.

Building planning - Basic principles of building planning, arrangement of doors, windows, cupboards for residential building.

Text/Reference Books:

1. Construction Technology by Subir K. Sarkar & Subhajt Saraswati, Oxford University Press
2. Building Construction by Bindra & Arora; Dhanpat Rai & Sons.
3. Construction Equipments & Management by R.L. Purifoy, Tata McGraw Hill.

Module 1

Properties of Fluids: Real fluid, ideal fluid., Fluid Mechanics, Hydraulics, Hydrostatics, Hydro kinematics., Mass density, specific weight, specific gravity, cohesion, adhesion, viscosity, surface tension, capillarity, vapour pressure and compressibility.

Hydrostatic Pressure: Pressure, intensity of pressure, pressure head, Pascal's law and its applications. Total pressure, resultant pressure, and centre of pressure. Total pressure and centre of pressure on vertical plane surfaces.

Module 2

Measurement of Pressure: Atmospheric pressure, gauge pressure, vacuum pressure and absolute pressure. Use of simple manometer, differential manometer and mechanical gauges. Measurement of pressure by manometers and pressure gauges. Fundamental of Fluid Flow, Types of Flow, Steady and unsteady flow, Laminar and turbulent flow Uniform and non-uniform flow. Discharge and continuity equation (flow equation), Bernoulli's theorem; statement and description (without proof of theorems). Venturimeter (horizontal)

Module 3

Orifice & Flow through pipes: Orifice: Definition of Orifice, and types of Orifices, Hydraulic Coefficients. Large vertical orifices. Free, drowned and partially drowned orifice. Time of emptying rectangular/circular tanks with flat bottom.

Flow through Pipes: Definition, laminar and turbulent flow, Reynolds's Experiment. Head Losses in pipe lines due to friction, sudden expansion and sudden contraction entrance, exit, obstruction and change of direction (No derivation of formula).

Module 4

Flow through open channels: Definition of a channel, uniform flow and open channel flow. Discharge through channels using. (i) Chezy's formula (no derivation) (ii) Manning's formula most economical sections: (i) Rectangular (ii) Trapezoidal

Flow Measurements: Measurement of velocity by Pitot tube, Measurement of Discharge by a Notch. Discharge formulae for rectangular notch, triangular Notch, trapezoidal notch, and conditions for their use. (No derivation). Difference between notch, weir and barrage.

Module 5

Hydraulic Machine: Reciprocating pumps, Centrifugal pumps, Impulse Turbines, Reaction Turbines, Sketching and description of principles of working of above mentioned machines.

Text/Reference Books:

1. Fluid Mechanics & Hydraulic Machines, Laxmi Publication (P) Ltd., New Delhi.
2. Vijay Gupta Gupta S.K., Fluid Mechanics, New Age International Publishers, New Delhi.
3. Kapoor J.K., Hydraulics, Bharat Bharti Prakashan, Merrut.
4. Likhi S.K., Hydraulics Laboratory Manual, New Age International Publishersz NewDelhi.
5. Garde R.J., Fluid Mechanics, New Age International Publishers, New Delhi.

List of Experiments

1. Determination of shear force at different sections on a simply supported beam under points loads.
2. Determination of bending moment at different sections on a simply supported beam under different types of loading.
3. Determination of yield stress, ultimate stress, percentage elongation, plots the stress strain diagram and compute. The value of Young's Modulus of mild steel.
4. Determination of the maximum deflection and Young's Modulus. Of elasticity by deflection apparatus.
5. Determination of modulus of rigidity of material by Torsion apparatus.
6. Determination of hardness of a metal plate by Rockwell's & Brinell's hardness testing machine.
7. To perform impact test on Izod Impact testing machine.

DCE 308 SURVEYING LAB-I

0L+0T+3P+1.5C

MM: 100

List of Experiments:

1. Ranging and Fixing of Survey Station.
2. Plotting Building Block by offset with the help of cross staff.
3. To determine the magnetic bearing of a line Using surveyor's compass and prismatic compass.
4. Measurement and adjustment of included angles of traverse using prismatic compass.
5. To determine the reduced levels using Tilting Level/Automatic Level.
6. To determine the reduce levels in closed circuit using Dumpy Level.
7. Plane Table Surveying.
8. To carryout temporary adjustment of Theodolite & Measurement of horizontal angle.
 - a. By method of repetition.
 - b. By method of Reiteration.
9. To determine the tachometric constant.
10. To determine the horizontal and vertical distance by tachometric survey.
11. To study the various minor instruments.

List of Experiments:

1. To physically identify different types of stones.
2. To determine the crushing strength of stones.
3. To determine the water absorption of bricks.
4. To conduct dimensional tolerance test on bricks.
5. To conduct field tests on cement.
6. To determine fineness (by sieve method) of cement.
7. To determine normal consistency of cement.
8. To determine initial and final setting times of cement.
9. To determine soundness of cement.
10. To determine compressive strength of cement.
11. To identify various types of timbers such as: Teak, Sal, Chirr, Sissy, Deodar, Kail, Mango etc.

DCE 310 BUILDING CONSTRUCTION LAB

0L+0T+2P+1C

MM: 100

List of Experiments:

1. Brick and Stone masonry.
2. Doors and Windows.
3. Stairs, Cross section of Dog legged stairs.
4. Roofs: Flat and Inclined (Steel).
5. Foundations for Masonry Structures.

List of Experiments:

1. To verify Bernoulli's Theorem.
2. To find out venturimeter coefficient.
3. To determine coefficient of velocity (C_v), coefficient Of discharge (C_d) coefficient of contraction (C_c) and verify the relation between them.
4. To perform Reynold's Experiment.
5. To determine Darcy's coefficient of friction for flow through pipes.
6. To verify loss of head due to:
 - a) Sudden enlargement
 - b) Sudden Contraction.
7. Study of the following
 - a) Reciprocating Pumps or Centrifugal Pumps.
 - b) Impulse turbine or Reaction turbine
 - c) Pressure Gauge /Pitot tube.

1	Introduction to Engineering Drawings, Projections (First &Third angle), Views (Orthographic, Isometric & Perspective), Introduction to AutoCAD, History, Exploring GUI, Workspaces, Co-ordinate systems
2	Drawing settings - Units, Limits, Drawing Tools: Line, Circle, Arc, Ellipse, Donut, Polygon, Rectangle,
3	Modify Tools: Erase, Oops, Undo, Redo, Explode, Move, Copy, Rotate, Mirror, Trim, Extend, Offset. File Management - New, Qnew, Open, Save, Save as, Close, Exit, Quit
4	Array- Rectangular, Polar, Path. Array , edit, Drafting Setting.
5	Editing Commands- Fillet, Chamfer, Scale, Stretch, Break, Join.
6	Display Control: Zoom, Pan, Regen, Drawing Tools: Multiline, P-line, Sp-line, X-line, Ray, Modify Tools: Mlstyle, Mledit, Pedit, Spline edit, Grip Editing, Blend Curve.
7	Object Properties: Color,Linetype, Ltscaler, Line weight, Properties, Match prop,
8	Layer Management, Adding / Removing Layers, Layer Status, New Property Filter, New Group Filter, Layer Status Manager
9	Annotation Tools: Text Style, Mtext, Scaletext, Spell, Table, Tablestyle, Tabledit
10	Isometric View Drawings, Perspective View Drawings, One Point & Two Point
11	Object Selection Methods, Select, Qselect, Filter, Symbol & BOM Creation Block, Base, Wblock, Insert) , Attribute (Attdef, Attedit) , Design Centre, Tool Palette

DCE 401 CONCRETE TECHNOLOGY

3L+0T+0P+3C

MM: 100

Module 1

Introduction, Ingredients of Concrete: Definition of concrete. Cement: Manufacture of Portland cement, Chemical composition, Hydration of cement, Types of cement, Tests on cement- fineness, consistency, initial & final setting time, specific gravity test. **Aggregates**-Classification of aggregates (according to sources, Shape, size and texture), Sieve analysis, Grading of aggregates, standard grading curve, bulking of aggregate, Various test on aggregates as per IS code. **Water**-Indian Standards for quality of water for use in cement concrete, Effect of impurities in water on concrete.

Admixture-Definition, types of admixture with their brief description

Module 2

Properties of Concrete: Properties in plastic stage, workability, segregation, bleeding Properties of hardened concrete: strength, durability, permeability, dimensional changes; Water Cement Ratio: Hydration of Cement, effect of water cement ratios on the physical structure of hydrated cement, water cement ratio law and the conditions under which the law is valid; Internal moisture, temperature, age and size of specimen. Definition of cube strength of concrete, relations between water cement ratio and strength of concrete. Use of CRRI charts and BIS codes.

Module 3

Workability, Mix design for concrete: Workability-Definition, phenomenon of workability, concept of internal friction, segregation and bleeding; Factors affecting workability; Water content; Shape, size and percentage of fineness passing 300 micron. Measurement of workability; Slump test and compaction factor test; Recommended slumps for placement in various conditions of placement. **Design mix for concrete**-Concept, Variables in proportioning, Indian Standard recommended method for concrete mix design IS10262-1982

Module 4

Concrete Operations: Batching (Volume & weight batching), Mixing (Hand & Machine mixing), Transporting of concrete (Mortar pan, Wheel barrow, Bucket and rope way, Truck mixer and dumpers, Belt conveyors, Chute, Skip and hoist, Pumps and pipeline), Placing concrete, Compaction of concrete (Hand compaction, Compaction by vibrators), Curing of concrete (Water curing, Membrane curing & Steam curing), Finishing. Joints in concrete viz, Construction joints, Expansion joints, Contraction joints, Isolation joints

Module 5

Special concrete, Form work: Special concrete-Light-weight concrete, No fines concrete, Aerated concrete, High density concrete, Fiber reinforced concrete, Polymer concrete, RMC (ready mixed concrete), Ferro cement, Guniting or shot concrete, High Performance concrete.

Formwork-Requirements of formwork, Types of formwork, Time for stripping formwork

Note: - A field visit may be planned to explain and show the relevant things

Text/Reference Books:

1. Concrete Technology by Neville & Brooks, Pearson Education.
2. Concrete: Microstructure, Properties & Materials by Mehta P.K, Tata McGraw Hill.
3. Concrete Technology by M.S.Shetty, S.Chand & Co.
4. Concrete materials by Popovics, Standard Publishers.
5. Chemistry of Cement and Concrete by Peter C.Hewlett, Elsevier Butterworth Heinemann.

Module 1

Theodolite Surveying: Definition and their types, different parts of a Vernier Transit theodolite, fundamental, axes of a theodolite, Temporary & permanent adjustments of a theodolite, prolonging a line (forward and backward), measurement of horizontal angles by repetition & reiteration method, measurement of vertical angles.

Module 2

Contouring: Concept of contours, purpose of contouring, interval and horizontal equivalent, factors affecting contour interval, characteristics of contours, methods of contouring: Direct and indirect, use of stadia measurements in contour survey, interpolation of contours, use of contour map. Drawing cross section from contour map; marking alignment of a road, railway and a canal on a contour map, composition of earth work and reservoir capacity from a contour map

Module 3

Traversing and Tacheometric surveying: Traversing- Definition, types- open & closed traverse, Method of traversing by included angles and by deflection angles. Brief description on Latitude & Departure. Balancing of a traverse by Bowditch's rule & Transit rule. **Tacheometric surveying-** Brief descriptions on concept & the methods of Tacheometric surveying.

Module 4

Curves, Trigonometrical Levelling: Types of curve, Elements of simple circular curve, Radius & degree of curve and their relations. Setting out of simple circular curve by Linear and Tangential method, Types of Transition curve, Ideal Transition curve. Trigonometrical Levelling- Introduction, Determination of height and distance of a point if (i) Base accessible (ii) Base inaccessible

Module 5**Minor and Modern Instruments**

Minor instruments- Study and use of the instruments given below to be explained in addition to providing practice: Abney level, Tangent clinometers, Sextant, Ceylon Ghat Tracer, Pantograph, Planimeter.

Modern instruments- Brief description on Electronic distance measuring (EDM) instrument, T-2 Theodolite, Total Station (TS), Global Positioning system (GPS).

Note: - A) For various surveying equipment relevant Indian standards should be followed.
B) No sketch of the instruments may be asked in the examination.

Text/Reference Books:

1. Plane Surveying by Dr. A.M. Chandra, New Age International.
2. Surveying Volume II by Dr. B.C. Punamia Laxmi Publications (P) Ltd.
3. Surveying Volume –I & II by Dr. K.R. Arora Standard Book House Delhi

Module I:

Elements of C: character set, key words, Data types, Constants and Variables, Operators: unary, binary, ternary, Operator precedence, flowcharts. Control statement- if statement, if-else statement, conditional operator, switch control statement, for loop, while loop, do-while loop, the break and continue keyword.

Module II:

Array Introduction: Basic concepts, Memory representation, one dimensional array, Two dimensional array, Three dimensional array.

Module III:

Functions- Basic Concepts, Declaration and prototypes, Calling, Arguments, and Scope rules, recursion, Storage classes types, Library of functions: math, string, system.

Module IV:

Pointers- Basic concepts, operators, Pointer expression: assignment, arithmetic, comparison, Dynamic memory allocation, Pointer v/s Arrays, Array of pointers, Pointer v/s Functions.

Module V:

Structure- Basic concepts, Declaration and memory map, Elements of structures, Structure v/s array, Structure v/s function, Union, Enumerated data types: typedef, enum, Self –referential structures, Low level Bitwise Operators.

Text/Reference Books:

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|----------------------|-----------------------|
| 1.Let us C | Yashwant Kanetkar,BPB |
| 2.Programming with C | Schaum's Series, TMH |
| 3.C Programming | E.Balaguru Swami,TMH |

DCE 403 FLUID MECHANICS

3L+1T+0P+3.5C

MM: 100

Module 1

Basic Concepts and properties of ideal fluid: Dimensions and Units, Specific Gravity, Viscosity, Bulk Modulus, Vapour Pressure, Surface Tension, Pressure Variation with Depth of Liquid, Absolute, Gauge and Vacuum Pressure, Basic Definitions of Mechanics, Coplanar Concurrent Forces, Coplanar Non-concurrent Forces, Laws of Motion, Impulse-momentum Equation, Principle of Conservation of Energy

Module 2

Flow of Fluids: Visualisation of the Flow Patterns, Types of Flow, Continuity Equation, Mean Velocity, General Energy Equation, Euler's Equation, Derivation of Bernoulli's Equation from Euler's Equation, Bernoulli's Equation as an Energy Equation, Bernoulli's Equation for Real Fluids, Application of the Bernoulli's Equation to Simple Problems, Horizontal Venturimeter, Inclined Venturimeter, Use of Differential Manometers in Venturimeter, Orifice Meter

Module 3

Flow through Orifices: Discharge through a Sharp-edged Circular Orifice, Experimental Determination of the Coefficients of Contraction, Velocity and Discharge, Coefficient of Resistance, Submerged Orifice, Velocity of Approach, Large Vertical Rectangular Orifice, Bell-mouthed Orifice, Time of Emptying a Tank through an Orifice, Time of Emptying a Circular, Cylindrical, Horizontal Tank through an Orifice, Time of Emptying a Hemispherical Tank through an Orifice, Time of Flow from One Tank to Another Tank,

Module 4

Flow through Mouthpieces and Minor Losses: External Mouthpiece, Internal Mouthpiece, Internal Mouthpiece Running Free, Internal Mouthpiece Running Full, Convergent Mouthpiece, Minor Losses, Loss of Head due to Sudden Enlargement in a Pipe, Loss of Head due to Sudden Contraction, Loss of Head at Entrance to Pipe, Loss of Head at Exit, Loss of Head due to Obstruction, Loss of Head at Bends, Loss of Head in Pipe Fittings

Module 5

Flow through Simple Pipes: Darcy-Weisbach Equation, Definitions, Empirical Formulae, Transmission of Power, Pipe Discharging from a Reservoir, Pipe Connecting Two Reservoirs, Time of Emptying a Tank Through a Long Pipe, Time of Emptying a Tank to Another Tank Through a Pipe, Flow through Open Channel - Types of Open Channels, Types of Flow, Definitions, Chezy's Formula, Determination of Chezy's C by Ganguillet Kutter Formula, Manning's Formula, Circular Formula, Conditions for Maximum Discharge and Maximum Velocity in a Circular Channel.

Text/Reference Books:

1. Fluid Mechanics – A.K. Jain – Khanna Pub., Delhi
2. Fluid Mechanics – Hydraulic & Hydraulic Mechanics -Modi / Seth – Standard Book House, Delhi
3. Fluid Mechanics & Hydraulics by Dr. R.K. Bansal, Laxmi Publications (P) Ltd.

DCE 405 IRRIGATION ENGINEERING

3L+0T+0P+3C

MM: 100

Module 1

Introduction, Rain fall and Run-Off: Definition of irrigation ,Necessity of irrigation, History of development of irrigation in India, Types of irrigation, Sources of irrigation water, Hydrological cycle, Definition of rainfall and run-off, Factors affecting run-off, Catchment area, Dicken's and Ryve's formulae Types of rain gauges Automatic and non- automatic Stream gauging

Module 2

Water Requirement of Crops: Lift Irrigation, Definition of crop season, Duty, Delta and Base Period, their relationship Gross command area, Intensity of irrigation, Irrigable area, water requirement of different crops - Kharif and Rabi, Types of wells- shallow and deep well, aquifer types, ground water flow, construction of open wells and tube wells, Yield of an open/ tube well and problems Methods of lifting water- Manual and mechanical devices, use of wind mills.

Module 3

Canal Head works, Flow Irrigation: Definition, object, general layout, functions of different parts of head works Difference between weir and barrage, Irrigation canals ,Perennial irrigation, Different parts of irrigation canals and their functions Sketches of different canal cross-section Classification of canals according to their alignment, Design of irrigation canals - Chezy's formulae, Meanings formulae, Kennedy's and Lacey's silt theories and equations, comparison of above two silt theories, critical velocity ratio, Various types of canal lining- Advantages and disadvantages.

Module 4

Regulatory Works, Cross Drainage Works: Functions and explanation of terms used Cross and head regulators ,Falls Energy dissipaters ,Outlets different types Escapes Functions and necessity of the following types: aqueduct, siphon, super passage, level crossing, inlet and outlet, Constructional detail of the above.

Module 5

Dams, Spilling, Water Logging and Drainage, Tube-well Irrigation: Earthen dams types, causes of failure, Classification into masonry and concrete dams Labeled cross section of gravity dam, Spillways types and uses. **Tube-well Irrigation** - Introduction, occurrence of ground water, location and command, advantages of tube wells, explanation of terms water table, radius of influence, depression head, cone of depression, confined and unconfined aquifers

Text/Reference Books:

1. Irrigation Water Power and Water Resource Engineering By KR Arora, Standard Publishers and Distributers, Delhi.
2. Water Resource Engineering by Modi, Standard Publishers.
3. Irrigation and Water Power Engineering by BC Punmia & B B Lal, Laxmi Publication (PLtd).

DCE 406 CIVIL ENGINEERING DRAWING - I

0L+0T+2P+1C

MM: 100

NOTE: 50% work should be done manually and 50% should be with Auto CAD.

Drawing No.1

Details of spread footing foundations for load bearing and non-load bearing wall for given thickness of walls with the help of given data or rule of the thumb, showing offsets, position of DPC; Details of basement showing necessary damp proofing.

Detail of cavity wall.

Drawing No.2

Plans of T and Corner junction of walls 1 Brick, 1-1/2 Brick and 2 brick thick in English and Flemish bonds brick pillars.

Drawing No.3

Elevation, sectional plan and sectional side elevation of paneled and glazed door flush door, steel windows and aluminium windows.

Drawing No.4

Drawing plan, elevation of a small building by measurement.

Drawing No.5

Detailed plan, elevation and section of a two bedroom residential building from a given line plan, showing details of foundations, roof and parapet.

Drawing No.6

Detailed working drawing of a small double stories building on a given plot, keeping in view building eye laws, showing sloping roof or surface drainage plan and flooring details.

Drawing No.7

Each student should be guided to trace any one of the drawings of sheet no 4,5 and 6 with waterproof ink.

Drawing No.8

Each student should be required to take out ammonia print of the tracing made by him.

Note :- A) All drawings should be as per BIS code and specifications in SI units.

B) Intensive practice of reading and interpreting building drawings should be given.

List of Experiments:

1. To determine the compressive strength of Portland cement (IS-269)
2. To determine flakiness index and elongation index of coarse aggregate (IS 2386-Part I)
3. Field method to determine fine silt in aggregate.
4. Determination of specific gravity and water absorption of aggregate (IS-2386-part III for aggregates of size 40 mm to 10 mm)
5. Determination of bulk density and voids of aggregates ((IS-2386-part III)
6. Determination of surface moisture in fine aggregate by displacement method (IS 2383 - Part III)
7. Determination of particle size distribution of fine, coarse and all in aggregate by sieves analysis (grading of aggregate)
8. To determine necessary adjustment for bulking of fine aggregate by field method (IS-2383-Part III)
9. Test for workability (slump test):
 - (a) To verify the effect of water, fine aggregate/coarse aggregate ratio and aggregate/Cement ratio on slump
 - (b) To test cube strength of concrete with varying water cement ratio
10. Compaction factor test for workability (IS: 1199)
11. Non-destructive test on concrete
 - (a) Rebound hammer test
 - (b) Ultrasound test
12. Tests for compressive strength of concrete cubes for M-15 or M-20 grade

List of Experiments:

1. To measure the horizontal and vertical angles by Theodolite.
2. To determine the Height of an object by trigonometrical leveling (single plane method).
3. To determine the Height of an object by trigonometrical leveling (two plane method).
4. To shift the R.L. of known point by double leveling.
5. To measure and adjust the angles of a braced quadrilateral.
6. To prepare a contour map by indirect contouring.
7. To prepare the map of given area by plane tabling.
8. To determine the Azimuth of a given line by ex-meridian observations of Sun.

DCS 406 : COMPUTER PROGRAMMING Using C LAB

0L+0T+4P+2C

MM : 100

1. WAP in C to calculate factorial of a number by using function.
2. WAP in C to swap two numbers by using function.
3. WAP in C to read and display array elements.
4. WAP in C to read an array and display the sum of its element.
5. WAP in C to add two 3x3 matrixes.
6. WAP in C to multiply 3x3 matrixes.
7. WAP in C to calculate the length of a given string.
8. WAP in C to read information about 10 books and display them.
9. WAP in C to read a file and display its contents.

DCE 501 ELEMENTS OF RCC DESIGN

3L+1T+0P+3.5C

MM: 100

Module 1

Introduction, Reinforcement Materials: Reinforced cement concrete- its meaning, constituents, functions & specifications as per IS 456:2000. Brief description for working state method, ultimate state method & limit state method for design. Past practice and present practice for the design of the structure. Load factors, partial safety factor, stress strain curve for concrete. Grades of concrete and steel.

Module 2

RCC Beams: Position of Neutral axis, critical neutral axis, concept of balanced, under reinforced, over reinforced sections. Shear strength of singly reinforced RCC beam. Design of singly & doubly reinforced beams & their design numerical. IS recommendations for shear reinforcement in beams as per IS 456:2000.

Module 3

Design of slabs: Definition, types of slabs, difference between one way & two way slab. Design recommendation as per IS code for design of slabs. Design of one way slabs and two way slabs.

Module 4

Design of axially loaded column: Definition, types of column as per slenderness ratio, IS recommendation for compression member, load carrying capacity, Design of short columns (rectangular, square and circular cross section).

Design of footing: Definition, types, critical section for shear and bending moment, Design of an isolated footing of uniform depth for square column.

Module 5

Retaining wall: Definition, types of retaining walls, Design of cantilever type retaining walls, reinforcement details.

Prestressed concrete: Definition, methods of prestressing, difference between RCC and prestressed concrete. Losses in prestressing, stress calculations for different point loads & UDL different tendon positions.

Text/Reference book:

1. Illustrated Reinforced Concrete Design by Karve & Shah; Standard Publishers, Delhi.
2. Limit State Design of Reinforced Concrete by Verghese P.C.; PHI Delhi.
3. Limit State Design by Dayaratnam; Oxford and IBH Publishing House.
4. Reinforced Concrete : Limit State Design by A.K.Jain; Nem Cahnd and Brothers, Roorkee.
5. Reinforced Concrete Structural Elements by P Purushothaman; Mc Graw Hill
6. Reinforced Concrete Fundamentals by Phil M. Ferguson; Prentice Hall
7. Design of reinforced Concrete by Jack C. Cormac & James K. Nelson; C.H.I.P.S.
8. Reinforced Concrete Design by Wang & Salmon; Harper & Row.

Module 1

Introduction: Importance of highway transportation, Different modes of transportation, Scope of highway engineering.

Highway Development and Planning: Historical development of road construction, Necessity of highway planning, Classification of roads, Road pattern, Highway planning in India.

Module 2

Road Materials, Road Pavements: Subgrade soil- Desirable properties, Highway research board classification of soils, CBR test. Stone aggregates- Desirable properties, Attrition and abrasion tests, Crushing test, Impact test, Shape test. Bituminous materials- Penetration test, Softening point test, Ductility, flash and fire point, Specific gravity test. Water Bound Macadam roads, bituminous roads, Cement concrete road.

Module 3

Hill Roads, Road Drainage, Road Maintenance : Typical cross-sections showing all details of a typical hill road in cutting, partly in cutting and partly in filling.

Landslides: Causes, preventions and control measures Necessity of road drainage work, cross drainage works Surface and subsurface drains and storm water drains. Location, spacing and typical details of side drains, side ditches for surface drainage.

Module 4

Construction Equipment, Railways: Output and use of the following plant and equipments Hot mix plant and mix all battery Tipper, factors (wheel and crawler) scraper, bull-dozer, dumpers, shovels, grader, roller, dragline. Asphalt mixer and tar boilers Road pavers Different types of gauges and sections, Characteristics of Railway embankments Concept of creep.

Module 5

Highway Geometric Design -Highway alignment and basic consideration governing alignment for a road, Glossaries of terms used in road geometric and their importance, Highway cross section elements, Sight distances, Design of horizontal alignments.

Text/Reference book:

1. Highway Engineering by Khanna SK & CG Justo, Nem Chand and Brothers, Roorkee.
2. Highway Engg. by L.R. Kadiyali, Khanna Tech Publications, Delhi.
3. Specification for Roads & Bridges by Ministry of Road Transports & Highways and Indian Road Congress.
4. Transportation Engineering and Planning, 3rd ed., Papacostas & Prevedouros, PHI Publishers.
5. Highway Engineering by Rangawala, Charotar Publishing House.

DCE 503 SOIL AND FOUNDATION ENGINEERING

3L+1T+0P+3.5C

MM: 100

Module 1

Introduction, Physical properties of Soils: Importance of soil studies in Civil Engineering, Residual and transported soil. Engineering classification of soils, comparison between sand and clay.

Phase diagram for soil: Definitions and meaning of void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weight, dry unit weight Simple numerical problems with the help of phase diagrams.

Module 2

Soils Classification: Classification of soils as per particle size and plasticity chart according to IS specifications, Consistency of soils – Liquid limit, Plastic limit and Shrinkage limit, Field identification of soil. **Permeability of Soils-**Definition of permeability and related terms, Darcy's law of flow through soils, Factors affecting permeability, Measurement of permeability in laboratory.

Module 3

Effective Stress: Definition and meaning of total stress, effective stress and neutral stress Principle of effective stress, Importance of effective stress in engineering problems.

Shear strength: Concept of shear strength, Factors contributing to shear strength of soils. Drainage conditions of testing. Determination of shearing strength by direct shear test, unconfined compression test.

Module 4

Compaction & consolidation of soils: Definition of compaction and its necessity Laboratory compaction test (light and heavy as per BIS), Factors affecting compaction, Different methods of compaction.

Consolidation: Meaning and explanation of phenomena, Measurement of compressibility characteristics, Consolidation test, normally consolidated and over consolidated soil.

Earth Pressures: Active and passive earth pressure, Earth pressure at rest, Determination of earth pressure by Rankine's theory for cohesion less soil (No derivation).

Module 5

Bearing Capacity: Concept of bearing capacity, Terzaghi's bearing capacity factors and bearing capacity as per IS code, Factors affecting bearing capacity, plate load test and Standard Penetration Test. **Foundation-**Introduction to different types of foundation. Static formula, Dynamic engineering news formula, Hiley's formula

Text/Reference book:

1. Basic and applied Civil Mechanics by Rajan & Rao, New Age International Publishers.
2. Soil Mechanics & Foundation Engineering by B.C.Punmia, Laxmi Publication.
3. Soil Mechanics & Foundation Engineering by Arora K.R, Standard Publishers and Distributers, Delhi.
4. Soil Engineering in Theory & Practice by Alam Singh, CBS Publishers and Distributers, Delhi.

Module 1

Indeterminate & determinate structure, Analysis of truss: Introduction of Indeterminate & determinate structure. Definition & types of Indeterminacy, Static indeterminacy for beams & pin jointed & rigid jointed frames. **Analysis of truss using-** Method of joints, Method of sections.

Module 2

Slope and Deflections: Slope and Deflections-Calculation of slope & deflection in simply supported & cantilever beams loaded with point loads and UDL using- Double integration method, Macaulay's method & Area moment method.

Module 3

Fixed beams: Definition, Drawing SFD and BMD for fixed beams loaded with point loads & UD using Mohr's Theorem. **Continuous beams-** Definition, Drawing SFD and BMD for continuous beams loaded with point loads & UD using Three Moment Theorem.

Module 4

Rolling loads: Drawing of Max SFD & BMD for simply supported beams for rolling loads of-single concentrated load, two point loads, series of point loads, UDL longer than span, UDL shorter than span. **Influence line diagram-** Definition, ILD for the following in simply supported beams- Reaction at any supports, SF & BM at a given section

Module 5

Three Hinged Arch: Introduction & types of arch, Reactions of symmetrical 3-hinged parabolic arch and their SFD & BMD. **Retaining wall-**Definition, Types of retaining walls, stability of retaining walls.

Text/Reference book:

1. Strength of Materials-II, Rajput R. K., S. Chand & Co. Ltd., Delhi.
2. Strength of Materials, Kapoor J.K., Asian Publication, Muzaffarnagar.
3. Punmia B.C., SMTS-II, Laxmi Publication, Delhi.
4. Ramamarutham S., Theory of structure, Dhanpat Rai & Sons, Delhi.

DCE 505 ENVIRONMENTAL ENGINEERING

3L+0T+0P+3C

MM: 100

Module 1

General: Environment and its components, Importance of water, Role of an Environmental Engineer, Historical overview.

Water Demand: Design flow, design periods, design population, factors affecting water consumption, variation in water demand, design capacities for various water supply components.

Module 2

Source of water and collection works: Alternative sources i.e. rain, surface and ground water, Assessment of yield and development of the source.

Quality of water: The hydrological cycle and water quality, physical, chemical and biological water quality parameters, water quality requirements, Indian Standards.

Module 3

Transmission of water: Hydraulics of conduits, selection of pipe materials, pipe joints, pumps, pumps station.

Preliminary Treatment of Water: Historical overview of water treatment, water treatment processes (theory and application): aeration, solids separation, settling operations, coagulation, softening.

Module 4

Advanced Treatment of Water: filtration, disinfection, other treatment processes, dissolved solids removal, treatment plant design, preparation of hydraulic profiles.

Module 5

Distribution of water: Method of distributing water, distribution reservoirs, distribution system, distribution system components, capacity and pressure requirements, design of distribution systems, hydraulic analysis of distribution systems, pumping required for water supply system.

Plumbing of Building for water supply: Service connections, fixture units, simultaneous flow, design of plumbing system.

Text/Reference Books:

1. Water Supply by S.K. Garg, Khanna Publishing Co.
2. Environmental Engineering by Peavy, H.S., Rowe D.R. and Techobanoglous, McGraw Hill, Book Company.
3. Manual of Water Supply and Water Treatment, Ministry of Urban Development, Govt. of India
4. Water Supply by B.C. Punmia, Laxmi Publication.

PUBLIC HEALTH ENGINEERING DRAWING

1. Drains and Sewers Cross section of standard types of open drains (circular, V shaped and U shaped) with their foundations Cross section of earthen weir and RCC sewer pipes Cross sections of masonry sewers (circular and egg shaped)
2. Traps. Manholes and Inspection chambers, Detailed section of floor trap and gully trap. Detailed plan and section of an inspection chamber Detailed plan and section of a manhole for the given data
3. Septic Tank and Soak Pit Detailed plan and cross-sections of a domestic septic tank and soak pit for 10 users with details of open jointed pipes as per IS 2470 Part I
4. Bath Room and W.C. Connections Cross section through the external wall of lavatories at ground and first floor showing the single and double pipe system and the connections of lavatory, bath, basin tapes, shower and towel rail
5. Draw the plan and section of a two bed roomed double strayed residential buildings showing details of water supply and sanitary installation and drainage systems. Show the drainage and water supply up to the municipal systems on the site plan also.
6. Practice of reading water supply and sanitary engineering drawings.

IRRIGATION ENGINEERING DRAWING

7. Typical Cross -Section of a channel, Typical cross section of an unlined channel in cutting, partly cutting and partly filling and fully in filling
8. Well and Tube Well Plan and cross-section of tube well with pump house
9. A.P.M. Outlet Working plan and L section through an A.P.M outlet
10. Distributor Falls Plan, cross section and L section of Central Design Office (CD)) type fall with details of wing wall, pitching. Flooring and toe wall
11. Siphon Aqueduct Detailed cross-section and L section of a siphon aqueduct from a given data
12. Culvert Plan and cross section of a simple culvert.

1. To determine the water content by Oven Drying Method
2. To determine the Water Content of soil by pycnometer.
3. To determine the specific gravity of soil by pycnometer.
4. Field Density Measurement by Core Cutter Method.
5. Liquid Limit and Plastic Limit Determination.
6. Grain size distribution Curve by sieve Analysis.
7. Determination of optimum moisture and maximum dry density by Standard Proctor test.
8. Unconfined Compression Test Specimen Preparation Conducting the test Plotting the graph Interpretation of results and finding/bearing capacity.
9. Direct shear test on sandy soil samples.

DCE 508 STRUCTURAL MECHANICS LAB

0L+0T+2P+1C

MM: 100

1. Determination of yield stress, ultimate stress, percentage elongation and plot the stress strain diagram and compute the value of Young's modulus on mild steel.
2. Determination of Young's modulus of elasticity for steel wire with Searl's apparatus
3. Determination of modulus of rupture of a timber beam
4. Determination of maximum deflection and Young's modulus of elasticity in simple supported beam with load at middle third
5. Verification of forces in a framed structure.

Some of the suggested project activities are given below

1. Causes Prevention and Repair of Cracks In Building
2. Rehabilitation techniques.
3. Stability of high rise buildings.
4. Corrosion Mechanism, Prevention & Repair Measures of RCC Structure
5. Analysis for seismic retrofitting of buildings
6. Collapse of World Trade Centre.
7. Advanced Pavement Design
8. Intelligent transport system
9. Flexible pavement
10. Rural road development
11. Highway safety
12. Soil Liquefaction
13. Ready mix concrete plants
14. Pile foundation
15. Improvement of bearing capacity of sandy soil by grouting
16. Ground improvement technique

DCE 511 PRESTRESSED CONCRETE

3L+0T+0P+3C

MM: 100

Module 1

Introduction: Systems of pre-stressing in detail, pre-stressing techniques, transfer of pre-stress, types of commercially available jacks, computation of losses of pre-stress. Anchorage Zone: end block stresses, design.

Module 2

Cable profiles: Concordant and non-concordant cable profile and associated factors in continuous members. Modern cable laying: materials & practices, precautions etc. Computation of deflection in pre-stressed concrete members. B. Tech Civil Engineering Syllabus Page 44

Module 3

Design of Pre-stressed Concrete Sections: Flexural, shear and torsion resistance of members, preliminary and final design of sections, design of pre and post tensioned flexural members; simply supported and continuous members.

Module 4

Pre-stressed Slab: Design of slabs, tendon layout, precast slab, production and their applications. Partial Prestressing: Principles and advantages, methods, practices and design.

Module 5

Design of circular pipes and circular water retaining structures etc. Case study of one bridge girder with design and constructional features.

Text/Reference Books:

1. Design of Pre stressed Concrete by T.Y. Lin, Wiley Eastern International.
2. Design of Pre stressed Concrete by N. Krishnan Raju, Tata McGraw Hills.
3. Design of Pre stressed Concrete Structures by N. Sinha Ray, S. Chand Co.
4. Prestressed concrete structures by Praveen Nagrajan, Pearsons

DCE 512 QUANTITY SURVEYING & VALUATION

3L+0T+0P+3C

MM: 100

Module 1

Introduction: Purpose and importance of estimates, principles of estimating. Methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet; bill of quantities. Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.

Module 2

Rate Analysis: Task for average artisan, various factors involved in the rate of an item, material and labour requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.)

Module 3

Estimates: Preparing detailed estimates of various types of buildings, R.C.C. works, and earth work calculations for roads and estimating of culverts, Services for building such as water supply, drainage and electrification.

Module 4

Cost of Works: Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building.

Module 5

Valuation: Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.

Text/Reference Books:

1. Estimating & costing by B.N. Dutta, UBS Publishers & Distributers
2. Estimating Costing Specification & Valuation in Civil Engg. By M .Chakroborty, Bhakti Vedanta, Book Trust, Delhi.
3. Quantity Surveying and Valuation by S.C. Rangawala, Charotar Publishing House.

Module 1

Elements Of Engineering Seismology

Introduction, cause of earthquake, seismic wave, seismograph, seismogram, earthquake size (magnitude, intensity), classification of earthquake, Tectonic features of India, Seismic zones of India, Use of seismic zones

Module 2

Behaviour of building during earthquake: Failure mechanism of a masonry building (Out of plan failure, in plan failure, connection failure, diaphragm failure, failure due to opening in wall, non-structural components failure). Types of damages observed in traditionally built constructions during past earthquake. Common causes of damage.

Module 3

Seismic provision of strengthening for masonry constructions: Introduction, Earthquake resisting construction, traditionally built masonry constructions. Seismic strengthening arrangements as per IS 4326: 1993. Earthquake resisting features of stone masonry as per 13828:1993. General recommendation for improving earthquake resistance of earthen constructions as per 13827:1993

Module 4

Seismic performance of reinforced Concrete buildings& their ductile detailing: Introduction, Definitions of irregular buildings, Effects of irregularities on performance of RC building. Identification of seismic damages in RC buildings.

Module 5

Disaster management: Introduction, Disaster rescue, Psychology of rescue, Rescue workers & their qualities, Rescue equipments, Safety in rescue operations.

Text/Reference book:

1. Manual of Tropical Housing and Buildings by Koenigs Berger Orient and Longman.
2. Building Drawing by M.G. Shah, C.M. Kala, S.Y. Patki , Tata McGraw Hills.
3. SP.41 (S&T)- Handbook on functional Requirements of Buildings Part-I
4. National Building Code, BIS.
5. Architecture Drafting and Design by Donald E. Helper, & Paul I Wallach.
6. Time Saver Standards for Housing and Residential Development by DE Chiara, Tata McGraw Hill, Delhi.

DCE 602 ELEMENTS OF STEEL STRUCTURAL DESIGN**Module 1**

Structural Steel and Sections: Definitions of structural steel, Properties of structural steel as per IS: 226 and IS:197, Advantages & disadvantages of structural steel, Structural steel sections as per IS 800-2007, Limit state method (LSM)- Introduction, IS recommendation. Partial safety factor for materials & loads.

Module 2

Riveted connections: Types of rivets, permissible stresses in rivets as per IS:800, types of riveted joints, specifications as per IS 800 for riveted joints, design of riveted joints for axially loaded members, **Welded connections:** Types of welds, permissible stresses in welds, types of welded connections, design of butt and fillet welded connections subjected to axial loads.

Bolted connections: Types of bolts, Types of bolted joints & their failure, Design of bolted connection subjected to axial loads, Efficiency of bolted connection.

Module 3

Tension Members: Permissible stresses in tension for steel, design of tension members as per IS:800 (flats, angles and Tee sections only).

Compression Members: Concept of buckling of columns, effective length and slenderness ratio, permissible Stresses in comparison as per IS:800, IS specifications for design of compression members. Design of angle, struts and axially loaded columns (no built up columns).

Module 4

Roof truss: Basic components of roof truss, types of loads on roof truss;

Column base- Introduction& their types, sketch of slab base and gusseted base, beam and column connections (no design); Introduction, Plastic hinge, Plastic section modulus (for rectangular, circle, triangular & Diamond section only), Shape factor. Calculate the collapse load for Determinate & Indeterminate beams only.

Module 5

Plate girder: Introduction, Components of plate girder, loads on plate girder, Sketch of bolted & welded plate girder with various types of stiffeners. **Design of Beams-** Introduction, difference between laterally supported & laterally unsupported beam, IS recommendations for design of beams, Design of laterally supported beams. Calculation of Design moment capacity of laterally unsupported beam (No design)

Text/Reference book:

1. Design of Steel Structures by N. Subramanian, Oxford University Press.
2. Limit state Design of Steel Structures: S K Duggal, TMH publication
3. Design of Steel Structures by S. Bhavi katti, I.K. International Pvt. Ltd.
4. Design of Steel Structures by V.L. Shah, Structures Publications.

Module 1

Introduction: Basics of ecology, Ecosystem, Biodiversity Human activities and its effect on ecology and eco system, different development i.e. irrigation, urbanization, road development and other engineering activities and their effects on ecology and eco system, Mining and deforestation and their effects. - Lowering of water level, Urbanization. -Biodegradation and Biodegradability, composting, bio remediation, Microbes' of bio pesticides and bio fungicides - Global warning concerns, Ozone layer depletion, Greenhouse effect, Acid rain, etc.

Module 2

Pollution: Sources of pollution, natural and manmade, their effects on living environments and related legislation.

Module 3

Water Pollution: Factors contributing water pollution and their effect - Domestic waste water and industrial waste water. Heavy metals, microbes and leaching metal-Physical, Chemical and Biological Characteristics of waste water - Indian Standards for quality of drinking water - Indian Standards for quality of treated waste water. - Treatment methods of effluent (domestic waste water and industrial/mining waste water), its reuse/safe disposal.

Module 4

Air Pollution: Definition of Air pollution, types of air pollutants i.e. SPM, NOX, SOX, CO, CO₂, NH₃, F, CL, causes and its effects on the environment - Monitoring and control of air pollutants, Control measures techniques.

Noise Pollution: Sources of noise pollution, its effect and control. Radioactive Pollution: Sources and its effect on human, animal, plant and material, means to control and preventive measures.

Module 5

Solid Waste Management: Municipal solid waste, biomedical waste, Industrial and Hazardous waste, Plastic waste and its management.

Text/Reference book:

1. Manoj Tiwari, Kapil Khulbe, Environmental Studies, I.K. International Publishing Pvt. Ltd.
2. Environmental Engineering, By S K Garg, Khanna publications
3. Solid Waste Engineering Principles and Management Issues by G. Technobanogios H. Theisen & R. Blssen, Mc Graw Hill Book Co.

DCE 604 REPAIR AND REHABILITATION OF BUILDINGS

3L+0T+0P+3C

MM: 100

Module 1

Deterioration of concrete in structures: physical processes of deterioration like F & T abrasion, erosion, pitting, chemical processes like carbonation, chloride ingress, corrosion, alkali aggregate reaction, sulphate attack; their causes, mechanism, effect, preventive measures.

Cracks- Cracks in concrete, type, pattern, quantification, measurement & preventive measures etc.

Module 2

N.D.T.: Non-destructive test methods for concrete including rebound hammer, ultrasonic pulse velocity, rebar locator, corrosion meter, penetration resistance and pull out test, core cutting etc.

Corrosion: Methods for corrosion measurement and assessment including half-cell potential and resistivity, Mapping of data.

Module 3

Materials for repair: polymers and resins, self-curing compound, FRP, Ferro-cement etc; properties, selection criterion, bonding aspect.

Module 4

Repair Techniques: grouting, jacketing, shotcrete, externally bonded plate-sand under water repair; materials, equipments, precautions process etc.

Module 5

Investigation for structures: Distress, observation and preliminary test methods.

Case studies: related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion damaged structures.

Text/Reference book:

1. Properties of Concrete by A.M. Neville, Pearson.
2. Concrete Technology by M.S. Shetty, S. Chand & Comp.
3. Hand book of Analytical Techniques in Concrete Tech by V.S. Ram Chandran, Standard Publishers.

DCE 605 INDUSTRIAL MANAGEMENT

3L+0T+0P+3C

MM: 100

Module 1

Principles of Management: Definition of management, Administration organization, Functions of management. Leadership- Need for eldership, Factors to be considered for accomplishing effective leadership, Communication - formal and informal communication, Motivation - Factors determining motivation, Positive and negative motivation, Methods for improving motivation, quality management, Quality circle, Zero defect concept, Stress Management.

Module 2

Human Resource Development: Introduction, Staff development and career development, Training strategies and methods.

Human and Industrial Relations- Human relations and performance in organization, Understand self and others for effective behaviour, Industrial relations and disputes, Characteristics of group behaviour and Trade unionism, Mob psychology, Lab our welfare, Workers participation in management.

Module 3

Financial Management: Fixed and working capital - resource of capital, Shares, types preference and equity shares, Debenture types, Public deposits, Factory costing, Direct cost, Indirect cost, Factory overhead, Fixation of selling price of product, Depreciation Causes, Methods.

Module 4

Labour, Industrial and Tax Laws: Importance and necessity of industrial legislation, Types of lab our laws and dispute, Factory Act 1948, Payment of Wages Act 1947, Employee State Insurance Act 1948, various types of taxes - Production Tax, Local Tax, Trade tax, Excise duty, Income Tax.

Module 5

Entrepreneurship Development: Concept of entrepreneurship, need of entrepreneurship in context of prevailing employment conditions of the country. Successful entrepreneurship and training for entrepreneurship development. Idea of project report preparation.

Intellectual Property Rights: Introduction to IPR (Patents, Copy Right, Trade Mark), Protection of undisclosed information, Concept and history of patents, Indian and International Patents Acts and Rules.

Text/Reference book:

1. Bhatnagar & Jain, Industrial Management and Entrepreneurship Development, Asian Publication, Muzaffar Naagar.
2. Mittal D.C., Industrial Management and Entrepreneurship Development, Dhanpat Rai & Sons.

DCE 606 EARTHQUAKE RESISTANT BUILDING CONSTRUCTION LAB

0L+0T+2P+1C

MM: 100

List of Experiments:

1. Elements Of Engineering Seismology
2. Seismic Map Of India
3. Seismic behaviour of traditionally built construction of India
4. Seismic provision of strengthening and retrofitting measure for traditionally built constructions.
5. Common modes of Failure of Reinforced Concrete buildings
6. Building construction under earthquake zone.
7. Indian standard under code provision(IS 13920)

List of Experiments:

1. Preparation of a working drawing (elevation, plan, details of joints as ridge, eaves and Other connections) for a riveted steel roof truss resting on a masonry wall with the given Span, shape of the truss and the design data regarding the size of the members and the Connections. Also calculate the quantity of steel for the truss.
2. Steel connections (a, b, c, d) riveted and (e) welded all unstiffened Beam to beam connections (Seated and framed) Beam to column (Seated and framed) Column base connections (Slab base and gusseted base) Details of column splices Connections of a steel bracket with flange of a column
3. Detailed drawing showing plan and elevation for a riveted plate girder with the given design data regarding the sizes of its parts, with details at the supports and connections of stiffeners, flange angles and cover plates with the web.

Some of the suggested project activities are given below

1. Setting up of an enterprise
2. Projects connected with repair and maintenance of civil works
3. Estimating and costing projects
4. Design of residential buildings including design of structural members
5. Project work related to quality control of materials, concrete and construction activities
6. Project work related to waste minimization and waste utilisation
7. Preparation of bar bending schedules and estimation of steel requirement
8. Survey Work
9. Valuation of buildings
10. Alignment of roads
11. Design of septic tanks
12. Design of water supply scheme for a locality
13. Design of flood water disposal system
14. Pollution prevention and control studies etc.

DCE 610 DISASTER MANAGEMENT

3L+0T+0P+3C

MM: 100

Module 1

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Module 2

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards - Planetary Hazards / Disasters - Extra Planetary Hazards / disasters - Planetary Hazards - Endogenous Hazards - Exogenous Hazards.

Module 3

Endogenous Hazards - Volcanic eruption - Earthquakes - landslides - Volcanic Hazards / Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards / disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - Human adjustment, perception & mitigation of earthquake.

Module 4

Exogenous hazards / disasters - Infrequent events - Cumulative atmospheric hazards / disasters
Infrequent events: Cyclones - Lightning - Hailstorms Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters :- Floods - Droughts - Cold waves - Heat waves
 Floods :- Causes of floods - Flood hazards India - Flood control measures Droughts :- Impacts of droughts - Drought hazards in India - Drought control measures - Extra Planetary Hazards / Disasters - man induced Hazards / Disasters - Physical hazards / Disasters - Soil erosion Soil Erosion: Mechanics & forms of Soil Erosion - Factors 7 causes of Soil Erosion - Conservation measures of Soil Erosion. Chemical hazards / disasters: Release of toxic chemicals, nuclear explosion - Sedimentation processes Sedimentation processes.

Module 5

Emerging approaches in Disaster Management - Three stages 1. Pre-disaster Stage (preparedness) 2. Emergency Stage. 3. Post Disaster stage - Rehabilitation

Text/Reference Books:

1. Disaster Mitigation: Experiences And Reflections by Pradeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman - Cengage Learning R. B. Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990
3. Savinder Singh Environmental Geography, Prayag Pustak Bhawann 1997
4. Kates, B. I & White, G. F The Environment as Hazards, oxford, New York, 1978

DCE 611 SOLID WASTE MANAGEMENT

3L+0T+0P+3C

MM: 100

Module 1

General: Problems associated with Solid Waste Disposal.

Generation of Solid Waste: Goals and objectives of solid waste management, Classification of Solid Waste. Solid Waste Generation, Factors Influencing Generation of Solid Waste, Characteristics of Solid Waste, Analysis of Solid Waste.

Module 2

Onsite Handling, Storage and Processing: Public Health and Aesthetics, Onsite Handling, Onsite, Storage, Dust bins, Community Containers, Container Locations, On-site Processing Methods.

Module 3

Solid Waste Collections, Transfer and Transport: Collection Systems, Equipment and labour requirement, Collection Routes, Options for Transfer and Transport Systems.

Module 4

Processing and Disposal Methods: Processing Techniques and Methods of Disposal, Sanitary land filling, Composting and Incineration, Bioremediation.

Module 5

Recovery of Resources, Conversion, Products and Energy: Material Recovery, Energy Generation and Recovery Operation, Reuse in other industry.

Industrial Solid Waste: Nature, Treatment and Disposal Methods.

Text/Reference Books:

1. Solid Waste Engineering Principles and Management Issues by G. Technobanogious H. Theisen & R. Blssen, McGraw Hill Book Co.
2. Solid Waste Management by C.L. Mantell, Mc Graw Hill Book Co.
3. Solid Waste Management in Developing Countries by Bhide & Sunrashen PHI.