

S Y L L A B U S

BACHELOR OF TECHNOLOGY

CIVIL ENGINEERING

(Semester Scheme)

Four Year Degree Course

B.Tech., Second Year Examination, 2010 / 2011

B.Tech., Third Year Examination, 2011 / 2012

B.Tech., Fourth Year Examination, 2012 / 2013



JODHPUR NATIONAL UNIVERSITY
JODHPUR

Jodhpur National University, Jodhpur

Teaching & Examination Scheme

B.Tech II Year (Civil Engineering)

III Semester

A: THEORY PAPERS						
S. No.	Code No.	Subject	L	T	MM	Ex. Hrs.
1.	3CE1	Strength of Materials and Mechanics of Structures – I	3	1	100	03
2.	3CE2	Building Material & Construction	3	1	100	03
3.	3CE3	Engineering Geology	3	0	100	03
4.	3CE4	Computer Applications in Civil Engineering	3	0	100	03
5.	3CE5	Fluid Mechanics-I	3	1	100	03
6.	3CE6	Engineering Mathematics	3	1	100	03
7.	GE307 A*	Special Mathematics- I*	3	1	100	3
TOTAL			21	05	700	

B: PRACTICAL AND SESSIONALS				
S. No.	Code No.	Subject	P	MM
1.	3CE7	Engineering Mechanics & Experimental Techniques Lab.	3	100
2.	3CE8	Computer Programming Lab.	3	100
3.	3CE9	Building Planning & Design – I	3	100
4.	3CE10	Fluid Mechanics Lab.-I	3	100
TOTAL			12	400
GRAND TOTAL				1000

**** It will be sessional paper: marks shall not be counted for awarding division.**

3CE 1 STRENGTH OF MATERIALS AND MECHANICS OF STRUCTURES – I

L-3, T-1

Exam. Hrs.:- 3

M.M. :- 100

UNIT 1

Simple Stresses and Strains : Concept of stress and strain in three dimensions and generalized Hooke's law; Direct stress and strain: free body diagrams, Hooke's law, Young's modulus; Tension test of mild steel and other materials: true and apparent stress, ultimate strength, yield stress and permissible stress; Stresses in prismatic & non prismatic members and in composite members; Thermal stresses; Shear stress, Shear strain, Modulus of rigidity, Complementary shear stress; Poisson's ratio, Volumetric strain, Bulk modulus, relation between elastic constants; Strain energy for gradually applied, suddenly applied and impact loads.

UNIT 2

Compound Stress : Two dimensional stress system: stress resultant, principal planes and principal stresses, state of pure shear maximum shear stress, Mohr's circle & its application.

Columns : Short and long columns, slenderness ratio, crushing and buckling of column, short column subjected to axial and eccentric loads; Euler's theory and its limitation, concept of effective length of columns; Rankine & Secant formulae.

UNIT 3

Centroid and Moment of Inertia : First moment of area, Centroid and moment of inertia of symmetrical & unsymmetrical sections, radius of gyration, polar moment of inertia, product moment of inertia, parallel axis theorem, principal axes and principal moment of inertia.

Plane trusses : Simple pin jointed trusses and their analysis: method of joints, method of section and introduction to computer methods.

UNIT 4

Bending of Beams : Types of supports, support reactions, determinate and indeterminate structures, static stability of plane structures; Bending moment, Shear force and Axial thrust diagrams for statically determinate beams subjected to various types of loads and moments.

UNIT 5

Theory of simple bending: Distribution of bending and shear stresses for simple and composite sections; Shear center and its location in flanged sections. Introduction to unsymmetrical bending.

References Books:-

1. "Mechanics of Materials," by B.C. Punmia, Ashok Kumar Jain & Arun Kumar Jain.
2. "Elements of Strength of Materials," by S.P. Timoshenko & D.H. Young.
3. "Strength of Materials," by R.S. Khurmi.
4. "Structural Analysis," by G.S.Pandit & S.P. Gupta.
5. "Strength of Materials and Structural Analysis," by Ashok Kumar Jain.
6. "Strength of Materials," by G.H. Ryder.
7. "Mechanics of Materials," by Ferdinand Beer & E. Russell, Johnston & John T De Wolf.
8. Strength of Materials," by Nash W.A.
9. Advanced Strength and Applied Stress Analysis," by Richard Budynas.

3CE 2 BUILDING MATERIAL AND CONSTRUCTION

L-3,T-1

Exam. Hrs.:- 3

M.M. :- 100

UNIT 1

Stones : Classification, quarrying of stones, Dressing of stones, various standard test on building stones including compressive strength, water absorption, durability, impact value, tensile strength, identification, selection criteria and uses of common building stones.

Clay Products : Bricks such as water absorption, compressive strength, effloresces, dimension and tolerance test– Manufacture process, properties, Classification, standard tests as per IS code, Types of Tiles, standard tests for tiles as per IS code such as water absorption, tolerance, impact value, glazing.

UNIT 2

Cement and Lime : Raw materials, constituents of cement and their role, type of cement, manufacture of OPC, Chemistry of setting and hardening, Various standard tests on Portland cements, as per IS code including consistency, setting time, fineness, soundness and strength. Lime: Classification, Manufacture, properties, tests for lime.

Mortar and Plaster: Functions and types of sand, bulking of sand, tests for sand, classification, preparation method, tests, uses and properties of mortar and plaster.

UNIT 3

Timber : Definitions of related terms, classifications and properties, conversion of wood, seasoning, preservation, fire proofing, Ply woods, fiber boards, defects in wood.

Plastics : Introduction, properties, classification, uses.

Miscellaneous: Properties and uses of glass, steel, aluminum, Asbestos, G.I., various types of paints and Varnishes, Prestressed and precast concrete.

UNIT 4

Building Requirements : Building components, their functions and requirements, classification, of building by occupancy and by types of construction, load bearing construction and framed structure construction.

Foundation : Purpose, types of foundation, bearing capacity of soil, depth of footing, foundation for black cotton soil, causes of failure of foundation and remedial measure.

UNIT 5

Brick and Stone Masonary : Basic principle of sound masonry work, different types of bonds, relative merits merit and demerits of English, single flemish and double flemish bond. Comparison between stone and brick masonry. General principles, classification of stone masonry.

Pointing & Plastering : Definition uses and Relative merits, types of panting, types of plastering.

Partition Wall : Types, purpose and use of partition wall

References Books:-

1. "Building Constriction," by Dr. BC.Punmia, Ashok Kumar Jain & Arun Kumar Jain
2. "A Text Book of Building Construction," by S.K.Sharma & B.K.Kaul.
3. "Building Construction," by S.C.Rangwala, K.S.Rangwala & P.S.Rangwala.
4. "Building Construction," by Sushil Kumar.
5. "Building Construction," by Janardan Jha & S.K.Sinha.
6. "The Text Book of Building Construction," by S.P. Bindra & S.P.Arora.
7. "Manual of Tropical Housing and Building," by O.H.Koenisberger.

8. "Building Construction Hand book," by Roy Chudley & Roger Greeno.
9. "Building Construction," by P.C. Varghese.
10. "Building Materials ," by Gurcharan Singh.
11. "Building Construction, by Francis D.K. Ching & Cassandra Adams.
12. "Civil Engineering Materials and construction Practice," by R.K. Gupta.

3CE 3 ENGINEERING GEOLOGY

L-3

Exam. Hrs.:- 3
M.M. :- 100

UNIT 1

General Geology : Subdivision of Geology; Importance of Geology in Civil Engg.; Internal Structure of the Earth; Physical properties of Minerals; Weathering and Work of Wind & River ; Geological Time Scale.

UNIT 2

Petrology : Origin, Classification, Texture & Structures of Igneous, Sedimentary and Metamorphic Rocks; Engineering Properties of Rocks.

UNIT 3

Structural Geology: Causes & Classification of Fold, Fault, Joints & Unconformities.

Geophysical Methods: Electrical resistivity & Seismic refraction method for civil engineering importance.

UNIT 4

Engineering Geology: Geological investigation for site selection of site for Dams, Tunnels, Reservoirs and Bridges. Site improvement for different engineering projects.

UNIT 5

Remote Sensing: Introduction and applications in Civil Engineering.

References Books:-

1. "Structural Geology," by Marland P. Billings
2. "Engineering and General Geology," by Prof. Prabin Singh
3. "Geology of Engineering," by J.M.Treteth.
4. "Principle Engineering Geology and Geotechnics," by Krynine and Judd
5. "Geology and Engineering," by Leggot, R.F.
6. "A Text book of Geology," P.K. Mukerjee

3CE 4 COMPUTER APPLICATIONS IN CIVIL ENGINEERING

L-3

Exam. Hrs.:- 3

M.M. :- 100

UNIT 1

Approximation & Error analysis: Approximations and round of errors, Truncation errors and Taylor Series.

Roots of Non-linear Equations: Determination of roots of polynomials and transcendental equations by Bisection, Secant and Bairstow's method, Newton-Raphson method, Successive substitution method etc.

UNIT 2

Linear Algebraic Equation: Solutions of linear simultaneous linear algebraic equations by Gauss Elimination and Gauss-Siedel iteration methods Successive substitution method and Decomposition methods.

UNIT 3

Curve fitting & Numerical Differentiation: Curve fitting – linear and nonlinear regression analysis; Backward, Forward and Central difference relations and their uses in numerical differentiation and integration, Application of difference relations in the solution of differential equations.

UNIT 4

Numerical Integration and Area under a Curve: Introduction to numerical integration and Area under a Curve; Trapezoidal method, Simpson's 1/3 method, Simpson's 3/8 method and Newton's method for integration.

UNIT 5

Ordinary Differential Equation: Numerical solution of ordinary differential equations by Euler, Modified Euler, Runga-Kutta and Predictor-Corrector method.

Partial Differential Equation: Elliptic equation & parabolic equation & their solution techniques. Finite Element Method: – General approach, application in one dimension. Computer programming using C/ C++ on these topics.

Reference Books:-

1. "Computer Oriented Numerical Methods," by R.S.Salaria.

3CE 5 FLUID MECHANICS-I

L-3 T-1

Exam. Hrs.:- 3
M.M. :- 100

UNIT 1

Fluids: Definition, Ideal fluids, real fluids, Newtonian and non-Newtonian fluids.

Properties of Fluids: Units of measurement, Mass density, Specific weight, Specific volume, Specific Gravity, Viscosity, Surface tension and Capillarity, Compressibility and Elasticity.

UNIT 2

Hydrostatics : Pressure at a point in a static fluid; pressure variation in an incompressible static fluid; atmospheric pressure, Gauge pressure, vacuum pressure, absolute pressure, Manometers Bourdon pressure gauge.

Buoyancy: Forces acting on immersed plane surface. Centre of pressure, forces on curved surfaces. Conditions of equilibrium for floating bodies, meta-centre and metacentric height experimental and analytical determination of metacentric height.

UNIT 3

Equilibrium of Fluid particles and flow: Fluid mass subjected to horizontal and vertical acceleration and uniform rotation.

Hydro-kinematics : Types of Flows : Steady and unsteady, uniform and non-uniform, stream lines, path lines, stream tubes, principles of conservation of mass, equation of continuity, acceleration of fluid particles local and connective, Rotational and irrotational motions, free and forced vortex, circulation and vorticity velocity potential and stream function, elementary treatment of flow net. Euler's equations of motion and integration of Euler's equations, Bernoulli's equation for incompressible Fluids, assumptions in Bernoulli's equation, Energy correction factor.

UNIT 4

Applications of Bernoulli's equation : Pitot tube, Venturimeter, orifice meter, orifices & mouth pieces, time of emptying of tanks by orifices, sharp edged rectangular, triangular and trapezoidal notches, Francis formula. Velocity of approach. End contractions Cippoletti Weir, time of emptying reservoirs by weirs.

Momentum Equation and its Application : Development of momentum equation by control volume concept, Momentum correction factor, applications – Boarda's mouth pieces, sudden enlargement of flow, pressure on flat plates, Nozzles.

UNIT 5

Flow through Pipes : Laminar flow, Reynolds experiment, transition from laminar to turbulent flow. Turbulent Flow : Laws of fluid friction, friction factor Moody's diagram, loss of head due to friction and other causes. Hydraulic gradient, total energy line Chezy's, Darcy's and Manning's formula, flow through parallel pipes and pipes in series, flow through branched pipes. Flow along a by pass. Power transmission through pipe, condition for maximum power. Elementary water hammer concept.

Reference Books:-

1. "Fluid Mechanics and Machines," by V.P. Gupta & Alam Singh.
2. "Fluid Mechanics and Fluid Power Engineering," by D.S. Kumar.
3. "Engineering Fluid Mechanics (Including Hydraulic Machines) by Prof. R.J.Garde & A.G. Miragaoker.
4. "Fluid Mechanics," by Dr. S. Subrahmiyam.
5. "Fluid Mechanics and Its Applications," by Vijay Gupta & Santosh K. Gupta.
6. "Fluid Mechanics," by White, Frank M.

3CE 6 ENGINEERING MATHEMATICS

L-3,T-1

Exam. Hrs.:- 3
M.M. :- 100

UNIT 1

Fourier Series & Z Transform – Expansion of simple functions in fourier series. Half range series, Changeof intervals, Harmonic analysis. Introduction, Properties, Inverse Z Transform .

UNIT 2

Laplace Transform - Laplace transform with its simple properties. Unit step function, Dirac delta functiontheir Laplace transforms, Inverse Laplace, transform – convolution theorem, applications to the solution of ordinary and partial differential equations having constant coefficients with special reference to wave and diffusion equations.

UNIT 3

Fourier Transform - Complex form of Fourier Transform and its inverse, Fourier sine and cosine transform and their inversion. Applications of Fourier Transform to solution of partial differential equations having constant co-efficient with special reference to heat equation and wave equation.

UNIT 4

Numerical Analysis: Difference operation Forward backward and central, shift and average operators and relation between them. Newton’s forward and backward differences interpolation formulae. Sterling’s formulae, Lagrange’s interpolation formula. Numerical differentiation and integration. Trapezoidal rule, Simpson's one third and one eighth rule.

UNIT 5

Numerical integration: Numerical integration of ordinary differential equations of first order, Picards method, Euler's method & Modified Euler's Method, Mille's method and Ranga Kutta fourth order method.

Reference Books:-

1. "Advanced Engineering Mathematics III," by Mehta D.M.& Sharma.
2. "Higher Engineering Mathematics III," by Gokhroo, Mehta.
3. "Engineering Mathematics, by Dr. Hari Arora.

GE 307* Special Mathematics I**

(Common for all branches CSE/ECE/IT/ME/CSE/CIVIL for Diploma Holders)

Teaching Hrs.
3L + 1T

Exam Hrs. 3 Hrs.
Total-100

Unit	Topics	
I	Trigonometry	Trigonometric functions, simple identities, range and values of trigonometric functions, inverse functions, De Moivre's theorem, Euler's theorem. Lectures Req : 6
II	Basic Algebra	Binomial theorem for positive and negative index, logarithmic and simple properties, exponential, Logarithmic and trigonometric series. Lectures Req : 6
III	Differential Calculus:	Function, single variable and multivariable function, polynomial, trigonometric, logarithmic and exponential fun's, derivative of a function, elementary formulae. Lectures Req : 6
IV	Differential Calculus:	Derivative of sum and difference of two functions, derivative of product and quotient of two functions, logarithmic differentiation, partial differentiation. Lectures Req : 6
V	Integral Calculus:	Integration of a function standard integrals and properties, integration by substitution, Integration by parts, definite integral and properties. Lectures Req : 6

Total Lectures Req : 30

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Jodhpur National University, Jodhpur
Teaching & Examination Scheme
B.Tech II Year (Civil Engineering)
IV Semester

A: THEORY PAPERS						
S. No.	Code No.	Subject	L	T	MM	Ex. Hrs.
1.	4CE1	Strength of Materials and Mechanics of Structures – II	3	1	100	03
2.	4CE2	Concrete & Construction Technology	3	1	100	03
3.	4CE3	Fluid Mechanics-II	3	0	100	03
4.	4CE4	Surveying – I	3	1	100	03
5.	4CE5	Building Technology	3	0	100	03
6.		Elective – I	3	1	100	03
	4CE6.1	Rock Mechanics				
	4CE6.2	Optimization Techniques				
	4CE6.3	Advanced Mathematics				
7	GE407 A*	Special Mathematics II**	3	1	100	3
TOTAL			21	05	700	

B: PRACTICAL AND SESSIONALS				
S. No.	Code No.	Subject	P	MM
1.	4CE7	Material Testing and Concrete Lab.	3	100
2.	4CE8	Fluid Mechanics Lab.-II	3	100
3.	4CE9	Surveying Lab. – I	3	100
4.	4CE10	Building Planning & Design – II	3	100
TOTAL			12	400
GRAND TOTAL				1000

**** It will be sessional paper: marks shall not be counted for awarding division.**

B. TECH. SECOND YEAR (4TH SEMESTER)

4CE 1 STRENGTH OF MATERIALS AND MECHANICS OF STRUCTURES–II

L-3, T-1

Exam. Hrs.:- 3
M.M. :- 100

UNIT 1

Deflection of Beams : Differential relation between load, shear force, bending moment, slope deflection. Slope & deflection in determinate beams using double integration method, Macaulay's method, area moment method and conjugate beam method.

UNIT 2

Fixed Beams & Continuous Beams : Analysis of fixed beams & continuous beams by three moment theorem and area moment method.

UNIT 3

Torsion : Elementary concepts of torsion, shear stress in solid and hollow circular shafts, angle of twist, power transmitted by a shaft, combined bending and torsion; Springs: stiffness of springs, close coiled helical springs, springs in series and parallel, laminated plate springs.

Membrane Analysis : Stress and strain in thin cylindrical & spherical shells under internal pressures.

UNIT 4

Introduction to Energy Methods : Strain energy due to bending, shear and torsion; Castiglino's theorems, unit load method & their applications in analysis of redundant frames upto two degree of redundancy and deflection of determinate beams, frames and trussed beams; Stresses due to temperature & lack of fit in redundant frames. Theories of Failures

UNIT 5

Vibrations : Stress tensor and failure criterion. Elementary concepts of structural vibration, degree of freedom, free vibration of undamped single degree of freedom systems. Newton's law of motion, D'Alembert's principle, solution of differential equation of motion, frequency & period of vibration, amplitude of motion; Damped single degree of freedom system: types of damping, analysis of viscously damped, under-damped, over-damped & critically-damped systems, logarithmic decrement

Reference Books:-

1. "Structural Analysis," by Negi and Jangid.
2. "Basic Structural Analysis," by C.S. Reddy.
3. "Advanced Theory of Structures and Matrix Method," by M.M. Ratwani & V.N. Vazirani.
4. "Analytical Methods in Structural Analysis," by Prof. Sarwar A. Raz.
5. "Analysis of Structures Vol I & II," V.N. Vazirani.
6. "Analysis and Design of Structures," by R.S. Vaishwanor. & M.M. Malhotra.
7. "Strength of Materials," by Surendra Singh.
8. "Strength of Materials," by S.S. Rattan.
9. "Structure and Properties of Engineering Materials," by V.S.R. Murthy.

4CE 2 CONCRETE & CONSTRUCTION TECHNOLOGY

L-3

Exam. Hrs.:- 3
M.M. :- 100

UNIT 1

Concrete : Grade of concrete, proportioning of ingredients, water content and its quality for concrete, water/cement ratio and its role, gel/pore ratio, concrete mix design (ACI, IS method), quality control for concrete. Properties of fresh concrete including workability, air content, flow ability, methods to determine and factors affecting. Properties of hardened concrete such as strengths, permeability, creep, shrinkage, factors influencing, standard tests on fresh and hardened concrete as per IS code. Aggregate, cement interface, maturity concept.

UNIT 2

Concrete Handling in Field : Interaction to mixing & batching methods, placing, transportation and Compaction methods, curing methods and compounds.

Admixture in concrete : Chemical and mineral admixtures, their types, use of water reducers, accelerator, retarders, water-proofing plasticizers and super plasticizers, use of fly ash and silica fume in concrete, their properties, effect and production of high strength concrete, properties of high strength concrete & application.

UNIT 3

Form work: Requirements, Indian standard on form work, loads on form work, type & method to provide centering and shuttering for Columns, beams, slabs, walls and staircase, slip and moving formwork.

Site Preparation and temporary Structures: Sequence of construction activity and co-ordination, site clearance, marking, foundation plan, earthwork in dry and loose soil, different methods and their suitability, dewatering, construction of temporary shed, types of shoring, methods of underpinning and types of scaffolding.

Damp Proofing: Causes of dampness, effects of dampness methods and material for damp proofing DPC treatment in buildings, methods and materials for anti termite treatment.

UNIT 4

Joints : Requirements, types and material used, construction details.

Arches and Lintels : Terms used, types of arches and their construction detail, types of lintels and constructions.

Stairs : Terms used, requirements of good staircase, classification, construction details and suitability of different types of stairs, lifts and ramps.

Construction System : Prefabricated/precast construction; advantages & disadvantage of prefabrication. Precast R.C. plank flooring/roofing, Thin R.C. ribbed slab for floors & roofs, thin precast RCC lintels in brickwalls, Modular co-ordination. Multi storied building frames, Concrete skeleton system, lift slab system, cast one house system, L-shaped panel system.

UNIT 5

Ground & Upper floors : Floor components and their junctions, selection of flooring and floor types, construction details of ground and upper floors, merits and demerits.

Roof and Roof Covering : Purposes, classification of roofs, terms used, types of pitched roofs, trussed roofs specially king port, queen port, steel roof trusses, details of steel roof trusses, method of construction, roof covering materials for pitched roofs.

Reference Books:-

1. "R.C.C. Design," by Dr. B.C.Punmia, Ashok Kumar Jain & Arun Kumar Jain.
2. "Fundamentals of Reinforced Concrete Design," by M.L.Gambhir.
3. "Concrete for Construction," by V.K.Raina.
4. "Concrete Technology," by M.S.Shetty.
5. "R.C.C. Theory and Design," by M.G.Shah & C.M.Kale.
6. "Plain and Reinforced Concrete Structures," by Krishna & Jain.
7. "Reinforced Concrete Structures," by S.K.Solomen.
8. "Treasure of R.C.C. Design," by Sushil Kumar.

4CE 3 FLUID MECHANICH-II

L3, T-1

Exam. Hrs.:- 3

M.M. :- 100

UNIT 1

Dimensional Analysis & Models : Dynamical Similarity and Dimensional Homogeneity Model experiment, geometric, Kinematic and Dynamic similarity. Reynold's, froudes, Weber's, Euler and Mach numbers. Distorted river models and undistorted models, proper choice of scale ratios. Scale effect. Principle of dimensional analysis Rayleigh method, Buckingham theorem, applications of dimensional analysis to pipe Friction problems, resistance to motion of partially and fully submerged bodies and other simple problems. Ship model experiments.

UNIT 2

Turbulent Flow: Turbulence in pipe flow. The Prandtl Mixing length hypothesis applied to pipe flow, Variation of friction factor with Reynolds number, velocity distribution in smooth and rough pipes. The Universal pipe friction laws, Colebrook-White formula.

Dimensional Analysis: Units and dimensions. Dimensional analysis using Buckingham's theorem, Similitude and Model testing.

Force ratios: Reynolds number, Froude number, Mach number, Weber number and Euler number, and their applications. Undistorted model, Distorted model and scale ratio for distorted model. Scale effect.

UNIT 3

The Boundary Layer: Description of the boundary layer. Boundary layer thickness, boundary layer separation and control. The Prandtl boundary layer equation. Solution for laminar boundary layer. The momentum equation for the boundary layer. The flat plate in uniform free stream with zero pressure gradients. Flow Round A Body: Drag, friction drag, pressure drag, combined skin friction and pressure drag. Flow past-sphere and cylinder. Magnus effect, Airfoil theory. Induced drag.

UNIT 4

Flow through channels : Uniform, Non-Uniform and variable flow. Resistance equations of Chezy, Mannring and Bazin. Section factor for uniform flow. Most Efficient rectangular, triangular and trapezoidal sections. Equations of gradually varied flow in Prismatic channels. Limitation of its applicability and assumption made in its derivation. Specific energy of flow. Critical depth in prismatic channels. Alternate depths. Rapid, critical and sub critical Flow Mild, steep and Critical Slopes. Classification of surface curves in prismatic channels and elementary computation

UNIT 5

Rapidly varied flow: Hydraulic jump or standing wave in rectangular channels. Conjugate or sequent depths Losses in jump, location of jump. Broad crested weirs for channel flow: Measurement, velocity distribution in open channels, parshall flume.

Impact of free Jets : Impact of a jet on a flat or a curved vane, moving and stationary vane, flow over radial vanes.

Reference Books:-

1. "Fluid Mechanics and Machines," by V.P. Gupta & Alam Singh.
2. "Experimental Fluid Mechanics Vol I," by Asawa G.L.
3. "Flow through Open Channels," by Ranga Raju, K.G.
4. "Basic Fluid Mechanics," by C.P.Kothandarama & R. Rudramoorthy.
5. "Flow Through Open Channels," by Prof. Rajesh Srivastava.
6. "Fluid Mechanics (Including Hydraulic Machines)," by Dr. A.K.Jain.
7. "Hydraulics and Fluid Mechanics," by Modi P.N. & Seth S.H.
8. "Fluid Mechanics," by Jagdish Lal.
9. "Flow in Open channels," by K.Subramanya.

4CE 4 SURVEYING – I

L-3, T-1

Exam. Hrs.:- 3
M.M. :- 100

UNIT 1

Introduction :Importance of surveying to engineers, Plane and geodetic surveying, methods of location of points, principle of surveying from whole to part, conventional signs.

Measurement of Distances : Different types of chains, tapes and their uses. Sources of error and precautions, corrections to tape measurements. Field problems in distance measurement.

UNIT 2

Measurement of Angles & Direction : Different types of direction measuring instruments and their uses. Reference meridians, Bearing and azimuths, magnetic declination and its variation. Use and adjustment of surveyors and prismatic compass. Vernier and micro-optic theodolite, temporary and permanent adjustment of vernier theodolite. Measurement of horizontal and vertical angle by different methods. Application of theodolite in field problems.

UNIT 3

Traversing : Different methods of traversing; chain traverse, chain & compass traverse, transit-tape traverse. Methods of computations and adjustment of traverse; transit rule, Bowditch rule, graphical method, axis method. Gales traverse table.

UNIT 4

Leveling : Definitions of various terms in leveling. Different types of leveling, sources of errors in leveling curvature and refraction corrections. Temporary and permanent adjustment of dumpy and tilting levels. Computation and adjustment of levels. Profile leveling; L-Section and cross-sections.

UNIT 5

Plane Table Surveying : Elements of plane table survey working operations, methods of plane table survey; intersection, traversing and resection, two point and three point problems.

Contouring : Characteristics of contours, contour interval, contour gradient, Methods of locating contours, uses of contour maps.

Reference Books:-

1. "Surveying Vol I," by Dr. B.C.Punmia, Ashok Kumar Jain & Arun Kumar Jain.
2. "Surveying Vol II," by Dr. B.C.Punmia, Ashok Kumar Jain & Arun Kumar Jain.
3. "Surveying Vol I," by Dr. K.R.Arora.
4. "Surveying and Levelling Part I," by T.P.Kanet Kar & S.V. Kulkarni.
5. "A Text Book of Surveying and Levelling," by R. Agor.
6. "Surveying and Levelling," by N.N.Basak.
7. "Fundamental of Surveying," by S.K. Roy.

4CE 5 BUILDING TECHNOLOGY

L-3

Exam. Hrs.:- 3
M.M. :- 100

UNIT 1

Introduction: Types of buildings, criteria for location and site selection, site plan and its detail.

Sun Consideration : Different methods of drawing sun chart, sun shading devices, design of louvers, energy conservation in buildings, passive solar cooling and heating of buildings

UNIT 2

Climatic and comfort Consideration : Elements of climate, global climate, climatic zones of India, comfort conditions, bi climatic chart, climate modulating devices.

Orientation: Meaning, factors affecting orientation, orientation criteria for tropical climate.

Building Bye Laws and NBC Regulations : Objective of by-laws, Regulation regarding; means of access, lines of building frontages, covered area, floor area ratio, open spaces around buildings, height & sizes of rooms, plinth regulation and sanitation provisions.

UNIT 3

Principles of Planning : Different factors affecting planning viz-aspect, prospect, furniture requirement, roominess, grouping, circulation, elegance, privacy etc.

Vastu Shastra In Modern Building planning : Factors considered in Vastu, site selection, orientation, planning and design of residential buildings.

UNIT 4

Functional design and Accommodation requirements

(A) **Residential Buildings** : Anthrometry, activities and their spatial requirements; Area planning, living area, sleeping area, service area; Bubble diagram showing sequence of arrangement of area, plan, elevation, sectional elevation.

(B) **Non Residential Buildings** : viz-school buildings, rest house, primary health centres, post office, bank, college library, cinema theatres etc.

UNIT 5

Services in Buildings

(A) Lighting and ventilation, doors and windows.

(B) Acoustics, sound insulation and noise control.

Reference Books:-

1. "Manual of Tropical Housing and Building (Part I) :- Climatic Design," by Koenigs Berger Ingersoll & Szokolay.
2. "Man, Climate and Architecture," by Givony.
3. "Time Saver Standards," by E & OE.
4. "Refrigeration, Air Conditioning and Ventilation," by Croome & Roberts.
5. "I S I Spl. Publication No. 26 on Ventilation,"
6. "Climate Responsive Architecture," by Arvind Krishans, Nick Baker, Simos Yannas & S.V. Szokolay.
7. "Defect free Buildings," by Robert S Mann.

4CE 6.1 ROCK MECHANICS

L 3, T-1

Exam. Hrs.:- 3

M.M. :- 100

UNIT: 1

ENGINEERING CLASSIFICATION OF ROCKS: Objectives, Intact rock classification, Rock mass Classification. Terzaghi's, Rock load classification, Austrian classification, Deere's rock quality classification, rock structure rating concept, RMR classification, Q classification. Inter relation between Q and RMR, prediction of ground condition and support pressure. Effect of Tunnel size on support pressure.

UNIT: 2

ENGINEERING PROPERTIES AND LABORATORY TESTS ON ROCKS: Porosity, Density, Moisture content, Degree of saturation, Co-efficient of permeability, Durability, Compressive strength, Tensile strength, Shear strength, elasticity, Plasticity Deformability. Sampling and Samples Preparations, Uniaxial Compressive strength, Tensile Strength – Brazilian test, Shear strength test – Direct Shear test and Punch shear test, Triaxial Test, Flexural strength.

UNIT: 3

INSITU TESTS ON ROCKS: Necessity of Insitu test, Plate load test for deformability, Shear test, Test for internal stresses – flat Jack, pressure meter test.

JOINTED ROCKS: Rocks Joint properties, Joint properties, Joint Roughness Co-efficient, Scale effects, Dilation, Orientation of Joints, Gouge, Joint Intensity, Uniaxial Compressive strength of Jointed Rocks

UNIT: 4

STRENGTH OF ROCKS IN UNCONFINED CONDITION: Ramamurthy Strength Criteria, Singh and Rao Strength Criteria, Kulatilake Methodology, Hoek Criteria, Barton Methodology.

STRENGTH OF ROCKS IN CONFINED CONDITION: History of Hoek and Brown Failure Criteria and latest methodology, Parabolic Strength Criteria.

UNIT: 5

GROUTING AND ROCK BOLTING: Grouting materials, Grouting operations, methods of Grouting, Mechanism of Rock Bolting, Principal of design.

BEARING CAPACITY OF ROCKS: Bearing capacity of intact rocks, jointed rocks, IS Code methodology, Singh and Rao Method and latest methodologies.

Reference Books:-

1. "Rock Mechanics for Engineers" by Dr. B.P.Verma.
2. "Rock Mechanics with Emphasis on Stress," by Fritz Rummel
3. "Rock Mass Classification System- A Practical Engg. Approach," by Singh B. & Goel R.K.
4. "Underground Excavations," by Hoek E & Brown E.T.
5. "Rock Slope Engineering," Hock E. & Bray J.W.

4CE 6.2 OPTIMIZATION TECHNIQUES

L-3, T-1

**Exam. Hrs.:- 3
M.M. :- 100**

UNIT 1

Introduction: Historical development, Engineering application of optimization, Formulation of design problems as a mathematical programming problems, Classification of optimization problems.

UNIT 2

Linear Programming : Simplex methods, Revised simplex method, Duality in linear programming, post optimality analysis.

UNIT 3

Applications of Linear programming : Transportation and assignment problems.

UNIT 4

Non Linear Programming : Unconstrained optimization techniques, Direct search methods, Descent methods, Constrained optimization, Direct and Indirect methods.

UNIT 5

Dynamic Programming: Introduction, multi-decision processes, computational procedure.

Reference Books:-

1. "Engineering Optimization Theory and Practice," by Singiresu S. Rao.
2. "Experiments Planning Analysis and Parameter Design Optimization," by Wu.
3. "Optimization for Engineering Design," by Deb Kalyanmay.

4CE 6.3 ADVANCED MATHEMATICS

L-3, T-1

Exam. Hrs.:- 3

M.M. :- 100

UNIT 1

Elementary Statistics & Probability: Elementary theory of probability, Baye's Theorem with its simple applications, Theoretical probability distributions – Binomial, Poisson, Normal distribution.

UNIT 2

Advance Statistics: Chisquare test as test of goodness of fit. Line of regression, Coefficient of correlation and rank correlation

UNIT 3

Tensor Analysis: Definition of a tensor, Transformation of co-ordinates, contra variant and co-variant vectors, addition and multiplication of tensors, contraction of tensors, inner product, fundamental tensors, Christoffel symbols, covariant differentiation.

UNIT 4

Bessel's Functions: Bessel functions of first and second kind, simple recurrence relations, orthogonal, property of Bessel's function.

UNIT 5

Legendre's function: Legendre's function, simple recurrence relations, Rodrigues formula, orthogonal property of Legendre's function, generating function.

Reference Books:-

1. "Advanced Engineering Mathematics," by H.S.Govinda Rao.
2. "Advanced Engineering Mathematics," by Dennis G. Zill & Michael R. Cullen.
3. "Fourier Series and B.V.P.," by James Brawn & Churchill.
4. "Mathematics IV," by Mehta D.M., Sharma.
5. "Engineering Mathematics," by Gokhroo, Mehta.

GE 407* Special Mathematics** II

(Common for all branches CSE/ECE/IT/ME/CSE/CIVIL for Diploma Holders)

Teaching Hrs.
3L + 1T

Exam Hrs. 3 Hrs.
Total-100

Unit	Topics	
I	Differential equation of first Order	Definition, order and degree of differential equation, Method of separation of variable, Homogeneous differential equation. Lectures Req : 6
II	Differential equation of first Order	Exact differential equation of first order, Reducible to exact form, Linear form, Reducible to linear form. Lectures Req : 6
III	Differential equation of second Order	Linear differential equation with constant coefficients, complementary function, particular integral Lectures Req : 6
IV	Elementary Complex variable	Complex Numbers, Real and imaginary parts of complex, complex conjugate, modulus and argument of complex number. Euler's theorem and De' moivre's theorem (only statement) polar form of complex number. Lectures Req : 6
V	Matrices and Determinants	Determinants and Matrices of order two and three properties of determinants, Evaluation of Determinants, Addition, Subtraction, Multiplication, Transpose, Adjoint and inverse of Matrix. Lectures Req : 6

Total
Lectures Req : 30

**** It will be sessional paper: marks shall not be counted for awarding division.**