

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

Sree Sainath Nagar, A.Rangampet - 517 102.

COURSE STRUCTURE : II B.Tech., I Semester

Code	SUBJECT	Periods/Week				Scheme of Examination Max. Marks		
		L	T	P	C	Internal Marks	External Marks	Total
10BT3BS04	Matrices and Numerical Methods	4	1	-	4	30	70	100
10BT30101	Mechanics of Solids	4	1	-	4	30	70	100
10BT30102	Building Materials and Concrete Technology	4	-	-	4	30	70	100
10BT30103	Basics of Electrical and Mechanical Technology	4	-	-	4	30	70	100
10BT30104	Surveying	4	1	-	4	30	70	100
10BT30105	Fluid Mechanics - I	4	1	-	4	30	70	100
10BT30111	Surveying Lab – I	-	-	3	2	25	50	75
10BT30112	Strength of Materials Lab	-	-	3	2	25	50	75
	TOTAL	24	4	6	28	230	520	750
		34						

COURSE STRUCTURE : II B.Tech., II Semester

Code	SUBJECT	Periods/Week				Scheme of Examination Max. Marks		
		L	T	P	C	Internal Marks	External Marks	Total
10BT3BS01	Probability and Statistics	4	1	-	4	30	70	100
10BT40101	Structural Analysis - I	4	1	-	4	30	70	100
10BT40102	Fluid Mechanics - II	4	1	-	4	30	70	100
10BT40103	Reinforced Cement Concrete Structures - I	4	1	-	4	30	70	100
10BT40104	Construction, Planning and Project Management	4	-	-	4	30	70	100
10BT3BS02	Environmental Sciences	4	-	-	4	30	70	100
10BT40111	Surveying Lab - II	-	-	3	2	25	50	75
10BT40112	Fluid Mechanics and Hydraulic Machinery Lab	-	-	3	2	25	50	75
	TOTAL	24	4	6	28	230	520	750
		34						

II B.Tech. I Semester

10BT3BS04 : MATRICES AND NUMERICAL METHODS

(Common to Biotechnology and Civil Engineering)

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UNIT – I

MATRICES AND LINEAR SYSTEM OF EQUATIONS: Matrices - Algebra of matrices – Inverse of a square matrix - Rank of a matrix – Echelon form – Normal form - Inverse of a matrix by normal form - Symmetric matrix – Skew-symmetric matrix – Hermitian matrix – Skew Hermitian matrix – Unitary matrix – Orthogonal matrix. Homogenous and Non Homogenous Linear systems – Consistency and solutions of linear system of equations - Direct methods – Gauss elimination method – Gauss-Jordan method.

UNIT - II

EIGEN VALUES AND EIGEN VECTORS: Evaluation of eigen values – Eigen vectors – Properties - Cayley Hamilton theorem (without proof) – Inverse and powers of a matrix using Cayley Hamilton theorem – Diagonalization.

UNIT - III

SOLUTIONS OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS AND CURVE FITTING: Solutions of algebraic and transcendental equations by bisection method – False position method – Newton Raphson's Method – Iterative method - Curve fitting by the principle of least squares – fitting of a straight line, parabola, exponential and power curves.

UNIT - IV

INTERPOLATION: Interpolation – Forward difference operator – Backward difference operator – Central difference operator – Relationship between the operators – Newton's forward formula – Newton's backward formula – Interpolation with unequal intervals – Lagrange's interpolation formula.

UNIT - V

NUMERICAL DIFFERENTIATION AND INTEGRATION: Numerical values of derivatives using Newton's forward formula – Newton's backward formula – Numerical integration - Trapezoidal rule - Simpsons 1/3 rule – Simpsons 3/8 rule.

UNIT - VI

NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS: Numerical Solutions of ordinary differential equations using Taylor's method – Euler's modified method – Picard's method – Runge-Kutta method – Milne's predictor corrector method.

UNIT - VII

PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equations - Solutions of first order partial differential equation using Lagrange's method - Method of separation of variables – Solutions of one dimensional wave equation - Heat equations.

UNIT - VIII

FOURIER SERIES: Fourier series of functions in $(0, 2\pi)$, $(-\pi, \pi)$, $(0, 2l)$, $(-l, l)$ - Determination of Fourier coefficients – Euler's formulae – Even and odd functions – Periodic continuation – Half-range Fourier sine and cosine expansions.

TEXT BOOKS

1. T.K.V. Iyenger, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, *Mathematical Methods*, 5th Revised Edition, S. Chand Group, New Delhi, 2010.

REFERENCES

1. B.S. Grewal, *Higher Engineering Mathematics*, 40th Edition, Khanna Publishers, New Delhi, 2010.
2. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John-Wiley & Sons, New Delhi, 2006.
3. S.S. Sastry, *Introductory Methods of Numerical Analysis*, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2009 .
4. B.V. Ramana, *Mathematical Methods*, 2nd Edition, Tata McGraw Hill, 2010.

II B.Tech. I Semester

10BT30101: MECHANICS OF SOLIDS

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UNIT - I

SIMPLE STRESSES AND STRAINS: Elasticity and plasticity – Types of stresses and strains – Hooke's law – Stress-strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – Composite bars – Temperature stresses - Strain energy – Resilience – Gradual, sudden and impact loadings – Simple applications.

UNIT-II

SHEAR FORCE AND BENDING MOMENT: Types of beams, supports and loads – Concept of shear force and bending moment – SF and BM diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying load and combination of these loads – Point of contra flexure – Relation between SF, BM and rate of loading at a section of beam.

UNIT-III

STRESSES IN BEAMS: Flexural Stresses: Theory of simple bending – Basic bending equation– Neutral axis – Bending stresses – Section modulus of rectangular and circular sections, I, T, Angle and Channel sections – Design of simple beam sections – Strain energy due to bending.

Shear Stresses: Basic shear stress equation – Shear stress distribution: Rectangular, circular, triangular, I, T, Angle sections – Strain energy due to shear.

UNIT-IV

COMBINED DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and bending moment – Core of a section – Stresses in chimneys, retaining walls and dams – Conditions for stability – Stresses due to direct loading and bending moment about both axes.

UNIT-V

TORSION: Theory of pure torsion – Torsional equation – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending, torsion and end thrust – Design of shafts.

UNIT-VI

SPRINGS: Deflection of close and open coiled helical springs under axial load and axial twist – Springs in series and springs in parallel – Carriage springs.

UNIT-VII

THIN CYLINDERS: Thin cylindrical shells – Longitudinal and circumferential stresses – Hoop, longitudinal and volumetric strains – Changes in diameter and volume of thin cylinders.

UNIT-VIII

THICK CYLINDERS: Lamé's theory – Distribution of hoop and radial stresses across thickness – Design of thick cylinders – Compound cylinders – Difference of radii for shrinkage.

TEXT BOOKS

1. Punmia, B. C., Ashok Kumar Jain and Arun Kumar Jain, *Mechanics of Materials*, 1st Edition, Laxmi Publications (P) Ltd, New Delhi, 2001.
2. Basavarajaiah, B.S. and Mahadevappa.P, *Strength of Materials*, 3rd Edition, Universities Press (India) Pvt. Ltd., Hyderabad, 2010.

REFERENCES

1. Rajput, R.K., *Strength of Materials (Mechanics of Solids)*, 5th Edition, S. Chand Group, New Delhi, 2006.
2. Junnarkar, S. B. and Shah, H. J., *Mechanics of Structures vol. I (Strength of Materials)*, 27th Revised and Enlarged Edition, Charotar Publishing House Pvt. Ltd., Anand, 2008.
3. Bhavikatti, S. S., *Strength of Materials*, 3rd Edition, Vikas Publishing House, New Delhi,
4. Khurmi, R. S., *Strength of Materials*, 23rd Edition, S. Chand Group, New Delhi, 1968.

II B.Tech. I Semester

10BT30102: BUILDING MATERIALS AND CONCRETE TECHNOLOGY

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UNIT – I

STONES, BRICKS AND TILES: Properties of building stones – Relation to their structural requirements – Classification of stones – Stone quarrying – Precautions in blasting – Dressing of stone – Composition of good brick earth – Various methods of manufacture of bricks – Qualities of a good brick – Efflorescence in Bricks – Classification of bricks – Characteristics of good tile – Manufacturing methods - Types of tiles.

UNIT – II

LIME AND CEMENT: Various ingredients of lime – Constituents of lime stone – Classification of lime – Various methods of manufacture of lime – Ingredients of cement – Manufacture of OPC –Types of cement and their properties – Various field and laboratory tests on cement.

UNIT-III

TIMBER: Structure – Properties – Seasoning of timber – Classification of various types of woods used in buildings – Defects in timber - Decay of timber – Mechanical treatment – Paints – Varnishes – Distempers - Bituminous wooden products in construction.

UNIT-IV

OTHER MATERIALS IN CONSTRUCTION: Use of Materials like galvanized iron, steel, aluminium, gypsum, copper, glass, bituminous materials, rubber, fiber-reinforced plastics, ceramic products, asbestos and their quality.

UNIT – V

CEMENT CONCRETE: Various ingredients of cement concrete and their importance – Proportioning of concrete - Water-cement ratio – Workability of concrete - Factors influencing workability – Measurement of workability - Effect of time and temperature on workability – Segregation and bleeding – Mixing and vibration of concrete – Quality of mixing water.

UNIT – VI

HARDENED CONCRETE : Nature of strength of concrete – Maturity concept – Strength in tension and compression – Factors affecting strength – Relation between compression and tensile strength - Curing.

TESTS ON HARDENED CONCRETE: Compression test – Tension test – Factors affecting strength – Flexure test – Non-destructive testing methods

UNIT – VII

ELASTICITY, CREEP AND SHRINKAGE: Modulus of elasticity – Dynamic modulus of elasticity – Poisson’s ratio – Creep of concrete – Factors influencing creep – Relation between creep and time – Effects of creep – Shrinkage – Types of shrinkage.

MIX DESIGN: Factors in the choice of mix proportions - BIS and ACI methods of mix design.

UNIT – VIII

SPECIAL CONCRETES : Light weight aggregates - Cellular concrete – No-fines concrete – High density concrete – Fiber reinforced concrete – Different types of fibers – Factors affecting properties of FRC – Applications – Polymer concrete – Types of polymer concrete – Properties of polymer concrete – Applications – High performance concrete – Self consolidating concrete .

TEXT BOOKS

1. S. K. Duggal, *Building material*, 3rd Edition, New Age International Publishers, 2010.
2. M.S. Shetty, *Concrete Technology*, 6th Edition, S. Chand and Company Ltd., New Delhi, 2011.

REFERENCES

1. Rajput R.K., *Engineering Materials*, 1st Edition, S. Chand and Company Ltd., New Delhi, 2000.
2. P.C. Varghese, *Building Materials*, Prentice-Hall of India Private Ltd., New Delhi, 2011.
3. A.M. Neville, *Properties of Concrete*, 4th Edition, John Wiley and Sons, New Delhi, 1996.
4. M.L. Gambhir, *Concrete Technology*, 3rd Edition, Tata McGraw-Hill Publishers, New Delhi, 2008.
5. A.R. Santha Kumar, *Concrete Technology*, 7th Edition, Oxford University Press, New Delhi, 2011.

II B.Tech. I Semester

10BT30103: BASICS OF ELECTRICAL AND MECHANICAL TECHNOLOGY

PART –A ELECTRICAL TECHNOLOGY

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UNIT - I

ELECTRICAL CIRCUITS AND CABLES : Basic definitions - Types of elements - Ohm's law - Resistive networks - Kirchhoff's laws - Inductive networks - Capacitive networks - Series and parallel circuits - Star-delta and delta-star transformations - Types of cables.

UNIT - II

DC MACHINES : Principle of operation of DC Generator – EMF equation - Types – DC motor types – Torque equation – Applications – Three point starter.

UNIT - III

TRANSFORMERS: Principle of operation of single phase transformers – EMF equation – Losses – Efficiency and regulation.

UNIT - IV

AC MACHINES: Principle of operation of alternators – Regulation by synchronous impedance method – Principle of operation of induction motor – Slip – Torque characteristics – Applications.

TEXT BOOKS

1. M.S Naidu and S. Kamakshaiah, *Introduction to Electrical Engineering*, Tata McGraw-Hill Publications Ltd., New Delhi, 2009.
2. V.K. Mehta and Rohit Mehta, *Principles of Electrical Engineering*, S. Chand and Company Ltd., New Delhi, 2006.
3. T.K. Nagasarkar and M.S. Sukhija, *Basic Electrical Engineering*, Oxford University Press, New Delhi, 2009.

REFERENCES

1. D.P. Kothari and I. J. Nagrath, *Theory and Problems of Basic Electrical Engineering*, Prentice Hall of India, New Delhi, 2009.
2. P.S. Bimbhra, *Electrical Machinery*, 7th Edition, Khanna Publishers, New Delhi, 2005.

MECHANICAL TECHNOLOGY

UNIT - V

WELDING PROCESSES: Introduction, classification of welding processes - Arc welding and gas welding – Equipment, welding fluxes and filler rods – Submerged arc welding, TIG and MIG processes - Soldering and brazing importance – Applications.

UNIT - VI

INTERNAL COMBUSTION ENGINES : Introduction, Classification and Main components of IC Engines – Working principle of petrol and diesel engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Lubrication and fuel systems of petrol and diesel engines.

UNIT - VII

REFRIGERATION AND AIR CONDITIONING : Terminology of refrigeration and air conditioning – Refrigerants and their desirable properties – Methods of refrigeration: Vapour compression and vapour absorption systems - Basic principles of air conditioning – Room air conditioning systems - Comfort air conditioning systems.

UNIT - VIII

AIR COMPRESSORS AND EARTH MOVING MACHINERY : Working principles of air compressors – Reciprocating air compressor: single and multi stage compression – Earth moving machines and mechanical handling equipment – Bull dozers – Power shovels – Excavators – Concrete mixer – Belt and bucket conveyors.

TEXT BOOKS

1. R.S. Khurmi, *A Text Book of Thermal Engineering: Mechanical Technology*, S. Chand Group, Delhi, 2008.
2. R. K. Rajput, *Thermal Engineering*, 8th Edition, Laxmi Publishers, New Delhi, 2010.

REFERENCES

1. Khurmi, R. S and Gupta, J.K., *Refrigeration and Air Conditioning*, 5th Edition, S. Chand Group, Delhi, 2011.
2. S.K. Hajra Choudhary and S.K. Bose, *Elements of Workshop Technology – Vol. I and II*, 2nd Edition, Asia Publishing House, Bombay, 2008.
3. Kripal Singh, *Automobile Engineering - Vol. II: Engine and Electrical Equipment*, 12th Edition, Standard Publishers Distributors, New Delhi, 2011.

II B.Tech. I Semester
10BT30104: SURVEYING

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UNIT – I

LINEAR MEASUREMENTS AND CHAIN SURVEYING : Principle – Classification - Accuracy and errors - Linear measurements - Direct measurements - Instruments for chaining – Ranging out survey lines – Errors in chaining – Tape corrections - Chain triangulation - Field book - Instruments for setting right angles - Basic problems in chaining - Obstacles for chaining.

UNIT – II

COMPASS AND PLANE TABLE SURVEYING :

Compass Survey: Types of compass – Bearings - Included angles– Declination - Dip and local attraction.

Plane Table Survey: Components – Setting – Methods – Radiation– Traversing - Intersection and Resection.

UNIT – III

LEVELING AND CONTOURING : Types of levels - Dumpy level and tilting level - Temporary and permanent adjustments - Height of instrument and rise and fall methods - Effect of curvature and refraction - Characteristics of contours - Direct and indirect methods of contouring and plotting of contours - Uses of contour maps.

UNIT – IV

COMPUTATION OF AREAS AND VOLUMES :

Areas: Areas dividing into number of triangles - By offsets to a base line - By latitudes and departures (D.M.D. and D.P.D) - By coordinates - Areas from maps.

Volumes : Volume from cross-section - Embankments and cutting for a level section and two level sections with and without transverse slopes - Determination of the capacity of reservoir - Volume of barrow pits - Spot levels from contours.

UNIT – V

THEODOLITE : Description and uses of vernier micrometer – Micro-optic theodolites – Temporary and permanent adjustments of vernier transit – Measurement of horizontal and vertical angles – Heights and distances – Traversing – Closing error and distribution – Gale’s traverse table – Omitted measurements.

UNIT – VI

TACHEOMETRIC SURVEYING : Principle of stadia method – Distance and elevation formulae for staff held vertical – Instrumental constants – Anallactic lens – Tangential method – Use of subtense bar –Tacheometric contouring.

UNIT – VII

CURVES: Types of curves - Linear and angular methods of setting out of simple curves – By offsets from long chord – By offsets from tangents - By successive bisection of arcs of chords – By offsets from chords produced – Two theodolite method.

UNIT – VIII

ELECTRONIC DISTANCE MEASUREMENT AND GIS :

Electronic Distance Measurement: Basic concepts - Classification of electronic radiation - Basic principle of electronic distance measurement - Computing the distance from the phase differences - Total station- Instrumental errors in EDM.

Geographical Information System : Introduction to geodetic surveying - Global positioning system (GPS) - Introduction to geographic information system (GIS).

TEXT BOOKS

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Surveying - Vol. I, II and III*, 15th Edition, Laxmi Publications (P) Ltd., New Delhi, 2010.
2. S. K. Duggal, *Surveying - Vol. I and II*, 3rd Edition, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 2010.

REFERENCES

1. R. Subramanian, *Surveying and Leveling*, 1st Edition, Oxford University Press, New Delhi, 2010.
2. Arthur R. Benton and Philip J. Taety, *Elements of Plane Surveying*, 3rd Edition, McGraw Hill, 2010.
3. Arora, K. R., *Surveying - Vol. I, II and III*, 10th Edition, Standard Book House, Delhi, 2011.
4. Chandra, A.M, *Plane Surveying*, 2nd Edition, New Age International Publishers, New Delhi, 2010.
5. Chandra, A M, *Higher Surveying*, 2nd Edition, New age International Publishers, New Delhi, 2010.

II B.Tech. I Semester

10BT30105: FLUID MECHANICS - I

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UNIT – I

PROPERTIES OF FLUIDS AND PRESSURE MEASUREMENTS : Dimensions and units – Physical properties of fluids – Mass density- specific weight- specific volume-specific gravity - ideal and real fluids- Newtonian and non-Newtonian fluids – Viscosity - Surface tension - Vapour pressure and their influences on fluid motion - Pressure at a point - Pascal's law - Hydrostatic law - Atmospheric, gauge and absolute pressures - Measurement of pressure - Pressure gauges – Manometers - Differential and micro manometers.

UNIT – II

HYDROSTATIC FORCES : Hydrostatic forces on submerged plane surfaces – Total pressure and centre of pressure on plane and curved surfaces – Calculation of total pressure from pressure diagrams.

UNIT – III

FLUID KINEMATICS : Description of fluid flow - Stream line - Path line and streak lines - Stream tube - Classification of flows - Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one dimensional flows – stream and velocity potential functions - Flownet and its uses.

UNIT – IV

FLUID DYNAMICS : Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line – Momentum equation and its application – Momentum and kinetic Energy correction factors – Forces on pipe bend.

UNIT – V

CLOSED CONDUIT FLOW : Laws of fluid friction – Darcy-Weisbach equation - Minor losses – Pipes in series – Pipes in parallel – Total energy line and hydraulic gradient line - Pipe network problems - Variation of friction factor with Reynold's number – Moody's chart.

UNIT – VI

MEASUREMENT OF FLOW : Pitot tube - Venturimeter and orifice meter – Orifices and mouthpieces - Rectangular, triangular and trapezoidal notches – Broad crested weirs.

UNIT – VII

LAMINAR AND TURBULENT FLOW : Reynold's experiment - Characteristics of laminar and turbulent flows – Laminar flow through circular pipes - Flow between parallel plates - Hydrodynamically smooth and rough boundaries.

UNIT – VIII

HYDRAULIC SIMILITUDE : Dimensional analysis - Rayleigh's method and Buckingham's pi theorem - Model studies – Geometric, kinematic and dynamic similarities - Dimensionless numbers – Model laws – Scale effects.

TEXT BOOKS

1. P.N. Modi and S.M. Seth, *Hydraulics and Fluid Mechanics*, 18th Edition, Standard Book House, Delhi, 2011.
2. R.K. Bansal, *Fluid Mechanics and Hydraulic Machines*, 9th Edition, Laxmi Publishers, New Delhi, 2011.

REFERENCES

1. R.K. Rajput, *Fluid Mechanics and Hydraulic Machinery*, 4th Edition, S. Chand Publishers, New Delhi, 2010.
2. J.F. Douglas, J.M. Gaserek and J.A. Swaffird, *Fluid Mechanics*, 5th Edition, Longman, 2010.
3. A.K. Mohanty, *Fluid Mechanics*, 2nd Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2010.
4. S.K. Som and G. Biswas, *Introduction to Fluid Machines*, 2nd Edition, Tata McGraw-Hill Publishers Pvt. Ltd, 2010.

II B.Tech. I Semester
10BT30111: SURVEYING LAB – I

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LIST OF EXERCISES

A) CHAIN SURVEY

1. Study of chains and its accessories - Aligning, Ranging and Chaining
2. Cross staff survey and plotting
3. Chaining across obstacles and plotting
4. Chain traversing and plotting

B) COMPASS SURVEY

5. Study of prismatic compass – Measurement of bearings of lines
6. Determination of area by radiation method and plotting
7. Determination of distance between two inaccessible points with compass
8. Compass traversing and plotting

C) PLANE TABLE SURVEY

9. Study of plane table and its accessories
10. Radiation and Intersection methods by plane table survey
11. Plane table traversing
12. Resection - Two point and three point problems

D) LEVELLING

13. Study of Dumpy level/Auto level and levelling staff
14. Fly levelling (differential levelling)
15. Longitudinal and cross-sectioning of a road profile and plotting.
16. Contouring exercise

II B.Tech. I Semester
10BT30112: STRENGTH OF MATERIALS LAB

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LIST OF EXPERIMENTS

1. Tension test on mild steel / HYSD bar
2. Compression test on wood
3. Compression test on coiled spring
4. Tension test on coiled spring
5. Bending test on carriage spring
6. Brinell and Rockwell hardness tests
7. Charpy and Izod impact tests
8. Shear test on mild steel
9. Bending test on simply supported beam
10. Bending test on cantilever beam
11. Bending test on fixed beam
12. Bending test on continuous beam
13. Verification of Maxwell's reciprocal theorem
14. Torsion test on mild steel

II B.Tech. II Semester
10BT3BS01: PROBABILITY AND STATISTICS

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UNIT - I

PROBABILITY MATHEMATICAL EXPECTATIONS :

Introduction to Probability : Definition of random experiment, events and sample space – Definition of probability – Addition and multiplication theorems - Conditional probability – Baye’s theorem – Simple problems on Baye’s theorem.

Random Variable : Discrete and continuous random variables - Distribution function of random variable – Properties – Probability mass function - Probability density function – Mathematical expectation – Properties of mathematical expectations – Mean and variance.

UNIT - II

PROBABILITY DISTRIBUTIONS:

Discrete Distributions : Binomial distribution – Mean and standard deviations of Binomial distribution – Poisson distribution – Mean and standard deviations of Poisson distribution – Applications.

Continuous Probability Distributions : Uniform distribution – Exponential distribution – Normal distribution – Properties of normal distribution – Importance of normal distribution – Area properties of normal curve.

UNIT-III

CORRELATION AND REGRESSION :

Correlation : Definition - Measures of correlation – Correlation for bivariate distribution – Rank correlation coefficients.

Regression : Simple linear regression – Regression lines and properties.

UNIT-IV

SAMPLING DISTRIBUTIONS : Population and sample – Parameter and statistic – Sampling distribution of statistic – Standard error of statistic – Null and alternative hypotheses – Type I and II errors – Level of significance – Critical region –Degrees of freedom.

UNIT-V

LARGE SAMPLES TEST OF SIGNIFICANCE : Test of significance for single proportion – Test of significance for difference of proportions - Test of significance for a single mean - Test of significance for difference of means – Test of significance for difference of standard deviations.

UNIT – VI

SMALL SAMPLES TEST OF SIGNIFICANCE : Student's t-test – F-test for equality of population variance – Chi-square test of goodness of fit – Contingency table – Chi-square test for independence of attributes.

UNIT – VII

STATISTICAL QUALITY CONTROL : Introduction – Advantages and limitations of statistical quality control – Control charts – Specification limits - \bar{x} , R, np and c charts.

UNIT – VIII

QUEUING THEORY : Queuing theory – Pure birth and death process – M/M/1 Model – Problems.

TEXT BOOKS

1. T.K.V. Iyengar, B. Krishna Gandhi and Others, *Probability and Statistics*, 3rd Edition, S. Chand Group, New Delhi, 2011.
2. Shahnaz Bathul, *A Text Book of Probability and Statistics*, 2nd Edition, Ridge Publications, Hyderabad.
3. Kandaswamy and Tilagavathy, *Probability Statistics and Queuing Theory*, 1st Edition, S. Chand Group, New Delhi, 2004.

REFERENCES

1. Miller and John E. Freund, *Probability and Statistics for Engineers*, 7th Edition, Pearson Higher Education, 2010.
2. Ronald E. Walpole, *Probability and Statistics for Engineers and Scientists*, 8th Edition, Pearson Education India, New Delhi, 2007.
3. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, 11th Edition, Sutan and Chand, New Delhi, 2007.
4. S.C. Gupta and V.K. Kapoor, *Fundamentals of Applied Statistics*, 3rd Edition, Sultan and Chand, New Delhi, 2009.

II B.Tech. II Semester

10BT40101: STRUCTURAL ANALYSIS - I

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UNIT-I

PRINCIPAL STRESSES AND STRAINS : Stresses on an inclined plane under axial loading – Compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr’s circle of stresses – Principal stresses and strains.

UNIT-II

DEFLECTION OF BEAMS - I : Bending into a circular arc – Slope, deflection and radius of curvature – Differential equation for the elastic curve of a beam – Double integration and Macaulay’s methods - Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L. and uniformly varying load.

UNIT-III

DEFLECTION OF BEAMS - II : Mohr’s theorems – Moment area method – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L., Uniformly varying load - Application to simple cases including overhanging beams.

UNIT-IV

COLUMNS AND STRUTS : Types of columns – Short, medium and long columns – Axially loaded compression members – Euler’s theorem for long columns – Euler’s critical load – Equivalent length of a column – Slenderness ratio – Limitations of Euler’s theory – Rankine-Gordon formula – Long columns subjected to eccentric loading – Secant formula.

UNIT-V

THEORIES OF FAILURE : Maximum principal stress theory - Maximum principal strain theory - Maximum shear stress theory - Maximum strain energy theory - Maximum shear strain energy theory.

UNIT-VI

UNSYMMETRICAL BENDING AND SHEAR CENTRE : Centroidal principal axes of section - Moment of inertia referred to any set of rectangular axes - Stress in beams due to unsymmetrical bending - Principal axes - Resolution of bending moment into two rectangular axes through the centroid - Location of neutral axis – Shear centre of channel section and unequal section.

UNIT-VII

FIXED BEAMS AND PROPPED CANTILEVERS : Introduction to statically indeterminate beams – Fixed end moment due to uniformly distributed load, point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams – Deflection of fixed beams - Effect of sinking of support - Effect of rotation of a support - Shear force and Bending moment diagrams of propped cantilever.

UNIT-VIII

CONTINUOUS BEAMS : Clapeyron's theorem of three moments – Analysis of continuous beams with one or both ends fixed - Continuous beams with overhang.

TEXT BOOKS

1. R.S.Khurmi, *Theory of Structures*, 11th Edition, S.Chand Publications, New Delhi, 2010.
2. V.N. Vazirani, M.M.Ratwani and S.K.Duggal, *Analysis of Structures-Vol.I* (17th Edition) and *Vol.II* (16th Edition), Khanna Publications, New Delhi, 2011.

REFERENCES

1. H.J.Shah and S.B.Junnarkar, *Mechanics of Structures – Vol. II*, 21st Edition, Charotar Publishing House, Anand, Gujrat, 2010.
2. Pandit, G., Gupta, S. and Gupta, R., *Theory of Structures – Vol. I*, 2nd Edition, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 1999.
3. B.C.Punmia, *Strength of Materials and Mechanics of Structures*, 7th Edition, Standar Publishers Distributors, New Delhi, 1986.
4. Ramamrutham, S. and Narayanan, R., *Theory of Structures*, 9th Edition, Dhanpat Rai Publishing Co. Ltd., New Delhi, 2010.

II B.Tech. II Semester

10BT40102: FLUID MECHANICS - II

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UNIT – I

BOUNDARY LAYER THEORY : Boundary layer concepts - Thickness of boundary layer - Characteristics of boundary layer along a thin flat plate - Vonkarmen momentum integral equation - Laminar and turbulent boundary layers (no derivation) - Laminar sub-layer separation of boundary layer - Control of boundary layer- Flow around submerged objects – Drag and lift - Magnus effect.

UNIT – II

OPEN CHANNEL FLOW - I : Types of flows – Types of channels – Velocity distribution – Chezy's, Manning's and Bazin's formulae for uniform flow – Most Economical sections - Critical flow - Specific Energy - Critical depth – Computation of critical depth – Critical, sub-critical and super critical flows – Velocity measuring instruments.

UNIT – III

OPEN CHANNEL FLOW - II : Non uniform flow - Dynamic equation for gradually varied flow - Mild, critical, steep, horizontal and adverse slopes - Surface profiles - Direct step method – Rapidly varied flow - Hydraulic jump and its applications - Energy dissipation.

UNIT – IV

IMPACT OF JETS : Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - Series of vanes - Jet striking centrally and at tip - Velocity triangles at inlet and outlet - Expressions for work done and efficiency - Applications to radial flow turbines.

UNIT – V

HYDRAULIC TURBINES – I : Layout of a typical hydropower installation – Heads and efficiencies -classification of turbines - Pelton wheel - Francis turbine - Kaplan turbine - Working, working proportions - Velocity diagrams - Work done and efficiency - Hydraulic design – Runaway speed - Draft tube theory, function and efficiency.

UNIT – VI

HYDRAULIC TURBINES – II : Governing of turbines - Surge tanks - Unit quantities and specific speed – Performance characteristics - Geometric similarity - Cavitation, causes, effects.

UNIT – VII

CENTRIFUGAL PUMPS : Pump installation details – Classification - Heads – Losses and efficiencies - Limitation of suction lift - Work done - Minimum starting speed - Specific speed - Multistage pumps -Pumps in parallel - Performance of pumps - Characteristic curves - Net positive suction head – Priming devices - Cavitation.

UNIT – VIII

HYDROPOWER ENGINEERING: Classification of hydropower plants – Load factor - Utilization factor - Capacity factor - Estimation of hydropower potential.

TEXT BOOKS

1. P.N. Modi and S.M. Seth, *Hydraulics and Fluid Mechanics*, 18th Edition, Standard Book House, Delhi, 2011.
2. K. Subramanya, *Flow in Open Channels*, 3rd Edition, Tata McGraw-Hill Publishers, New Delhi, 2010.
3. D.S.Kumar, *Fluid Mechanics and Fluid Power Engineering*, 7th Edition, Kataria and Sons, Delhi, 2009.
4. R.K. Bansal, *Fluid Mechanics and Hydraulic Machines*, 9th Edition, Laxmi Publishers, New Delhi, 2011.

REFERENCES

1. Ranga Raju, *Flow Through Open Channels*, 7th Edition, Tata McGraw-Hill Publications, New Delhi, 2009.
2. R.K. Rajput, *Fluid Mechanics and Hydraulic Machinery*, 4th Edition, S. Chand Publishers, New Delhi, 2010.
3. V.T .Chow, *Open Channel Flow*, McGraw-Hill Publishers, New Delhi, 1996.
4. Banga and Sharma, *Hydraulic Machines*, 7th Edition, Khanna Publishers, New Delhi, 2007.
5. M.M. Dandekar and K.N. Sharma, *Water Power Engineering*, 1st Edition, Vikas Publishing House, New Delhi, 2009.

II B.Tech. II Semester

10BT40103: REINFORCED CEMENT CONCRETE STRUCTURES - I

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UNIT –I

CONCRETE : Constituents of concrete - IS 456 Recommendations - Grades of concrete - Working stress method - Design constants – Design for flexure - Singly reinforced beams.

UNIT –II

LIMIT STATE DESIGN : Concepts of limit state design – Comparison with working stress method - Basic statistical principles – Characteristic loads – Characteristic strength – Partial safety factors – Stress-strain curves for cold worked deformed bars and mild steel bars - Assumptions in limit state design – Stress-block parameters – Limiting moment of resistance.

UNIT –III

BEAMS : Limit state design of singly reinforced, doubly reinforced, T and L beams for flexure.

UNIT – IV

SHEAR, TORSION AND BOND : Limit state design of section for shear and torsion – Concept of bond, anchorage and development lengths - I.S. Code provisions - Design of simply supported and continuous beams, including detailing.

UNIT – V

COLUMNS : Short and long columns under axial loads, uniaxial bending and biaxial bending – Slender columns – I S Code provisions.

UNIT –VI

FOOTINGS : Different types of footings – Design of isolated square, rectangular and circular footings.

UNIT – VII

SLABS : Design of one way slab - Two-way slab - Continuous slab using I S Coefficients.

UNIT –VIII

SERVICEABILITY : Limit state design of serviceability for deflection and cracking – I S Code provisions.

TEXT BOOKS

1. S. Unnikrishna Pillai and Devdas Menon, *Reinforced Concrete Design*, 3rd Edition, Tata Mc.Graw Hill, New Delhi, 2010.
2. S.K. Ray and N.C. Sinha, *Fundamentals of Reinforced Concrete*, 5th Edition, S. Chand Publishers, 2010.

REFERENCES

1. P.C. Varghese, *Limit State Designed of Reinforced Concrete*, 2nd Edition, Prentice Hall of India, New Delhi, 2010.
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Reinforced Concrete Structures - Vol. I*, 19th Edition, Laxmi Publications Pvt. Ltd., New Delhi, 2010.
3. N. Krishna Raju and R.N. Pranesh, *Reinforced Concrete Design*, 3rd Edition, CBS Publishers Distributors, New Delhi, 2010.
4. M.L. Gambhir, *Fundamentals of Reinforced Concrete Design*, Printice Hall of India Pvt. Ltd., New Delhi, 2010.

Codes: IS 456-2000 code book is to be permitted into the examination hall.

II B.Tech. II Semester

10BT40104: CONSTRUCTION, PLANNING AND PROJECT MANAGEMENT

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UNIT – I

MASONRY AND FOUNDATIONS :

Masonry : Types of masonry – English and Flemish bonds – Rubble and Ashlar masonry – Cavity walls – Partition walls.

Foundations : Foundations: Shallow foundations – Spread, combined, strap and mat footings.

UNIT – II

BUILDING COMPONENTS : Lintels, arches, vaults, stair cases – Different types of floors - Concrete, mosaic, terrazzo floors – Pitched, flat and curved roofs – Lean-to-Roof, coupled roofs, trussed roofs - King and Queen post trusses - RCC Roofs - Madras Terrace/Shell Roofs.

UNIT – III

FINISHINGS : Damp Proofing , water proofing, Termite proofing, Fire proof- materials used – Plastering – Pointing – White washing and distempering – Painting – Constituents of a paint – Types of paints – Painting of new/old Wood – Varnish – Form work and scaffolding.

UNIT – IV

ORGANIZATION : Types of organization – Merits and demerits of different types of organization – Authority – Policy – Recruitment process and training – Development of personnel department – Labour Problems – Labour legislation in India – Workmen’s Compensation Act of 1923 and Minimum Wages Act of 1948, and subsequent amendments– Safety in construction.

UNIT – V

RESOURCE MANAGEMENT :

Manpower: Resource smoothing – Resource leveling – Establishing workers productivity.

Materials: Objectives of material management – Costs – Functions of material management departments – ABC classification of materials – Inventory of materials – Material procurement – Stores management.

Machinery : Classification of construction equipment – Earth moving equipment - Excavation equipment - Hauling equipment - Earth compaction equipment - Hoisting equipment - Concreting plant and equipment – Time and motion study – Selection of equipment –

Task consideration – Cost consideration – Factors affecting the selection - Factors affecting cost owning and operating the equipment – Equipment maintenance.

UNIT – VI

PROJECT MANAGEMENT, BAR CHARTS AND MILESTONE CHARTS:

Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives - Operation research – Methods of planning and programming problems – Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts – Development of PERT network problems.

UNIT – VII

ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK :

Introduction – Event – Activity – Dummy – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles Problems – Planning for network construction – Modes of network construction – Steps in development of network – Work breakdown structure – Hierarchies – Illustrative examples.

UNIT – VIII

PERT AND CPM : Network analyses - PERT – Slack – Critical path – Illustrative examples – Probability of meeting scheduled date Problems – CPM Process – CPM Networks – Activity time estimate – Earliest event time – Latest allowable occurrence time – Combined tabular computations for T_E and T_L - Start and finish times of activity – Float – Critical activities and critical path – Illustrative examples.

TEXT BOOKS

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Building Construction*, 10th Edition, Laxmi Publications (P) Ltd., New Delhi, 2010.
2. B.C.Punmia, K.K. Khandelwal, *Project Planning and Control with PERT and CPM*, 4th Edition, Lakshmi Publications(P). Ltd., New Delhi, 2010.
3. Jha, *Construction Project Management*, 1st Edition, Pearson Publications, New Delhi, 2011.

REFERENCES

1. S. Seetharaman, *Construction Engineering and Management*, 3rd Edition, Umesh Publications, Delhi, 2010.
2. R. Chudly, *Construction Technology – Vol. I and Vol. II*, 4th Edition, Longman, UK, 1987.
3. P.K. Joy, *Total Project Management: The Indian Context*, 1st Edition, Mac Millan Publishers India Limited, 1993.

II B.Tech. II Semester

10BT3BS02: ENVIRONMENTAL SCIENCES

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UNIT-I

INTRODUCTION TO ENVIRONMENTAL SCIENCES :Definition and concept of the term Environment – Various components of Environment – Abiotic and biotic – Atmosphere – Hydrosphere – Lithosphere – Biosphere – Inter relationships – Need for public awareness – Role of important National and International individuals and organizations in promoting Environmentalism.

UNIT-II

NATURAL RESOURCES, CONSERVATION AND MANAGEMENT : Renewable and Non renewable resources and associated problems – Forests: Deforestation, Causes, effects and remedies – Effects of mining, dams and river valley projects – case studies; Water resources: Water use and over exploitation – Conflicts over water – Large dams – benefits and problems; Food resources : World food problems – Adverse effects of modern agriculture – Fertilizer and pesticide problems; Land resources: Land degradation – Land slides- Soil erosion – desertification- water logging – salinity – Causes, effects and remedies; Mineral resources: Mining – Adverse effects; Energy resources: Growing needs – Renewable and Non renewable resources – Alternate resources: Coal, Wind, Oil, Tidal wave, Natural gas, Biomass and Biogas, Nuclear Energy, Hydrogen fuel, Solar - Impact on environment - Sustainable life styles.

UNIT-III

ECOLOGY AND ECOSYSTEMS : Definitions and concepts – Characteristics of ecosystem – Structural and functional features – Producers, consumers and decomposers and food webs – Types of ecosystems – Forests, grassland, desert, crop land, pond, lake, river and marine ecosystems – Energy flow in the ecosystem – Ecological pyramids – Ecological successions.

UNIT-IV

BIODIVERSITY, CONSERVATION AND MANAGEMENT :

Introduction – Definition and concept of biodiversity – Value of biodiversity – Role of biodiversity in addressing new millennium challenges – Global, national biodiversity – Hot spots of biodiversity– Threats to biodiversity – Man and wild life conflicts – Remedial measures – Endemic, endangered and extinct species – In-situ and Ex-situ conservation of biodiversity.

UNIT-V

ENVIRONMENTAL POLLUTION AND CONTROL : Definition, causes, adverse effects and control measures of air pollution, indoor pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear pollution – Solid waste management – Causes, effects, control and disposal methods – Role of individuals in the prevention of pollution – Hazards and disaster management – Floods – Earthquakes – Tsunamis – Cyclones – Land slides – Case studies.

UNIT-VI

SOCIAL ISSUES AND THE ENVIRONMENT : Concept of sustainable development – Methods of rainwater harvesting – Watershed management – waste land reclamation – Green cover – Green power – Green technology – Resettlement and rehabilitation of people and related problems – Case studies – Issues and possible solutions - Greenhouse effect and global warming – Carbon credits – Acid rains – Ozone layer depletion – Causes, effects and remedies – Consumerism and waste production – Environment protection acts – Air (Prevention and Control of Pollution) Act – Water Act – Forest Conservation Act – Wild Life Protection Act – Issues involved in the enforcement.

UNIT-VII

HUMAN POPULATION AND ENVIRONMENT : Population growth and its impact on environment – Environmental ethics – Family welfare programmes – Human health: T.B., Cancer, HIV/AIDS – Causes, effects and remedies – Occupational health hazards – Human rights – Important international protocols and conventions on Environment.

UNIT-VIII

FIELD WORK/ ENVIRONMENTALIST'S DIARY / ASSIGNMENTS/ SEMINARS

TEXT BOOKS

1. Erach Barucha, *Environmental Studies*, 1st Edition, Universities Press, Hyderabad, 2010.
2. A. Kaushik and Kaushik, *Environmental Studies*, 3rd Edition, New Age International Publishers, 2011

REFERENCES

1. Deshwal, *Environmental Studies*, 2nd Edition, Khanna Publications, New Delhi, 2010.
2. Rajagopalan, *Environmental Studies*, 1st Edition, Oxford University Press, 2009.
3. Joseph Benny, *Environmental Studies*, 2nd Edition, Tata McGraw-Hill, New Delhi, 2010.

II B.Tech. II Semester
10BT40111: SURVEYING LAB – II

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LIST OF EXERCISES

A) THEODOLITE SURVEY

1. Study of theodolite - Measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and method of reiteration.
3. Finding out distance between two inaccessible points.
4. Trigonometric levelling - Measurement of heights and distances (Two Exercises)
5. Tacheometric surveying - Measurement of heights and distances (Two Exercises)
6. Setting out a circular curve by Rankine's method of tangential angles.
7. Setting out a circular curve by Double Theodolite method.
8. Setting out works for buildings and pipe lines.

B) TOTAL STATION SURVEY

9. Study of total station - Measurement of horizontal angles, vertical angles and distances
10. Determination of area using total station.
11. Determination of remote height using total station
12. Distance, gradient, and differential height between two inaccessible points using total station
13. Stake-out using total station
14. Traversing using total station
15. Contouring using total station

II B.Tech. II Semester

10BT40112: FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

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LIST OF EXPERIMENTS

Any **TWELVE** experiments are to be conducted .

1. Calibration of venturimeter
2. Calibration of orificemeter
3. Determination of coefficient of discharge for a small orifice by a constant head method.
4. Determination of coefficient of discharge for an external mouth piece by variable head method.
5. Calibration of rectangular notch
6. Calibration of triangular notch
7. Determination of loss of head due to sudden contraction
8. Determination of loss of head due to sudden expansion
9. Determination of friction factor for pipes
10. Verification of Bernoulli's equation.
11. Impact of jet on vanes
12. Study of hydraulic jump.
13. Performance test on Pelton wheel turbine
14. Performance test on Francis turbine
15. Performance test on Kaplan turbine.
16. Performance test on single stage centrifugal pump
17. Performance test on multi stage centrifugal pump
18. Performance test on reciprocating pump