B.TECH CIVIL ENGINEERING SYLLABUS
III SEMESTER

ENGINEERING MATHEMATICS - II 3041 C

Unit - I

Homogeneous and exact differential of first order. First order and first degree differential equations solvable for p,x and y includes clairatus forms. Application to problems specially related to Civil Engineering. Second and higher order differential equation with constant coefficients.

Unit - II

Simultaneous differential equation of both types, second order differential wquation with variable coefficients, solution by series method. Simultaneous total differential equations to type dx/pdy/Q=dz/R. Multiple Integral: Double and triple integrations, change of order of intergration. Application to problems in area and volume.

Unit - III

Matrix : Solution of Linear simultaneous equations by elementary transformation. Eigen values, Eigen vectors, Pivoting (complete and partial), traingularization method, Gauss reduction,Cholesky's method, Gauss siedel and Jocobi iterative methods.

Unit - IV

Probability : Theory including Bye's Theorem. Binomial, Poisson's and Normal distribution. Boolean algebra : Basic postulates,simplification of boolean function using these postulates. Application switching circuits.

Unit - V

Spherical Trigonometry : Spherical triangle and right-angled triangle.

Suggested Text Books and References :

1. A Text Book of Engineering Mathematics by Shrivastava and Dhawan.
2. Higher Engg. Mathematics by B.S. Grewal.
3. Engg. Mathematics by Chandrika Prasad.

SURVEYING - I 3111 C

Unit - I

Introduction : General principles & classification of surveying. Chain Surveying : Instrument, ranging and chaining lines, chaining on sloping ground, error in chaining, ranging and chaining past obstacles offset, setting up right angles by chain and tape and optical instruments, field and office work, conventional symbols. Study of topographic maps.

Unit - II

Measurement of Angles & Directions : principles of traverse survey, reference meridians, bearing, azimuth, magnetic declination and its variation, construction, adjustments and uses of compasses, local attraction, plotting of compass traverse and adjustment of closing error.

Plane Table Surveying : Principle, equipment, methods, two point and three point problem and their solutins, errors & precautions, advantages and disadvantages of plane tabling.

Unit - III

Angle and Directions with Theodolites : Theodolites - types, construction, uses and adjustment, measurement to horizontal angle, traversing by theodolite, latitude & departure, traverse computations & plotting, balancing of traverse, calculation of traverse area and omitted measurements.

Unit - IV

Levelling : Principle & Definition of terms, level-types, construction uses and adjustment, levelling staff, booking levelling readings, reduction of levels, difficulties, sources of error and precautions in leveling. Classification of levelling, profile levelling, cross sectioning, reciprocal levelling, curvature and refraction corrections, determination sensitivity of bubble tube and setting grade stakes.

Unit - V

Contouring - Definition, methods of contouring, interpolation and characteristics of contour, contour gradients and uses of contour plans and maps.

Computation of Area : Computation from field notes and plotted plan, area calculation using planimeter, reducing and enlarging maps.

Computation of volumes : Formulae for the calculation of cross sectional area & volume. computation of volume of earth work and storange contour plans using area method and prismoidal formula.

Suggested Text Books and Reference :

1. Surveying for Engineers by J.Uren and W.F.Price, The Macmillan Press Ltd., London.
2. Surveying Principles and Applications by B.F.Kavanagh and D.J.G. Bird, prentice Hall, Englewood Cliffs, New Jersey.
3. Surveying, Vol. I, S.K. Duggal, Tata Mc Graw Hill Publishing Co. Ltd., New Delhi.
4. Surveying Vol.I., B.C. Punmia, Laxmi Publications (P) Ltd. New Delhi.
5. Surveying and Levellings by N.N.Basaak, Tata Mc Graw Hill Publishing Co. Ltd

CONSTRUCTION TECHNOLOGY 3112 C

Unit - I

CPM - Project Management, Bar Chart and Milestone Charts, Elements of network, development of network, network analysis.

Unit - II

Concrete Technology - Concrete making materials : cements, aggregates, water, admixtures, properties of fresh and hardened concrete, variability of concrete strength, exterme weather concreting.

Testing of concrete mixes, prestressed concrete.

Unit - III

Mix Design-Principles of concrete mix design, basic considerations, Factors in the choice of mix design, outline of mix design procedure, ACI mix design practice, USBR method, Brithish mix design mehod IS guidelines.

Unit - IV

Heavy Construction-Construction of large structures, dams, bridges, multi-storeyed buildings etc.

Unit - V

Contruction Equipments-Introduction to heavy construction equipment, crushers, hot mix, plants, dozers etc.

Suggested Text Books and References :

1. Handbook of mix design - BIS
2. PERT & CPM by B.C. Punmia
3. Concrete Technology by M.S. Shetty.

ENGINEERING GEOLOGY 3113 C

Unit - I

Introduction of Geology : Origin of earth, Age of Earth and Internal structure of earth. Geological work of atmosphere : Weathering of rocks, Geological work of wind, Geological work of water, Geological work of river and sea. Volcanoes and earth quake.

Unit - II

Study of minerals : physical and chemical properties of minerals. Crystallography : Elements of crystals, crystals symmetry, crystallographic systems. Important rock forming minerals.

Unit - III

Petrology : Study of igneous, sedimentary and metamorphic rocks, their composition, structure and classification. Descriptive study of rocks.

Unit - IV

Structural Features of rocks.

General terms - Stratification, outer up dip and strike.

Folding and Faulting of rock - Terminology, classification and descriptive, studies. Unconformity and Joint : Terminology & types and causes.

Unit - V

Stratigraphy of India : Geological time scale, correlation and study of different groups and systeams of stratigraphy of India. Classification and economic importance.

Importance of Geology in the construction of Dams, Tunnels, Roads, Bridges. Engineering properties of rocks.

Suggested Text Books and References :

1. Principles of Engineering Geology by Robert B. Johnson.
2. Jerome V.Degraff.
3. Text Book of Geology by V.D. Muthayya.
4. Text Book of Geology by P.K. Mukherjee.
5. Engineering & General Geology - Parbeen Singh.
6. Physical and Engineering Geology by S.K. Garg.
7. A Text Book of Geology and Engineering - L.M. Bangar.
8. Geology for Engineering by Toseph M.TreFether.
9. Engineering Geology by B.S. Sathya Narayaan Swami.

STRUCTURAL ANALYSIS - I 3114 C

Unit - I

Simple Stresses & strains : Hooke's law, Poisson's ratio, Elastic constants, Bars of constant section, tapering bars, compounds bar, Temperature stresses, Lack of fit, energy.

Complex Stresses & Strains : Principal stresses and principal strains, Mohr's circle, Hoop Stresses, examples of civil engineering structures subjected to hoop stresses.

Unit - II

Bending Moment & Shear Force : Relationship between bending moment, shear force load, S.F. and B.M. diagrams for simply supported, overhanging and cantilever beams using numerical methods. Introduction of the use of Bending Moments & Shear Force Diagrams in civil engineering structures.

Bending & Shear Stresses : Theory of simple bending, moment of inertia, section modulus and theorem of parallel axes, Distribution of bending and shear stresses across the section.

Unit - III

Columns & Struts : Euler's theory of buckling for different end conditions, Effective length, Initial imperfection and residual stresses,Merchant-Rankine formula, Perry - Robertson formula, Application of numerical methods.

Direct & Bending Stresses : Core of the section, Lateral loading, Middle third rule, Biaxial bending, examples of civil engineering structures subjected to direct and bending stresses.

Unit - IV

Unsymmetrical Bending & Shear Center : Determination of principal axes, Product of inertia.

Torsion : Relation between torsional moment, twist and shear stress, Torsion of non circular sections.

Unit - V

Material Properties of steel and concrete : Behaviour of materials under tension, compression, bending, shear and torsion, Standard tests, Impact, hardness and fatigue testing, Introduction to nondestructive testing.

Suggested Text Books and References :

1. Timoshenko and young, 'Strength of Materials', Von Nostrand East West Press.

2. E.P. Popov 'Mechanics of Materials' Prentice Hall India.
3. B.C. Punmia 'Strength of Materials & Mechanics of Structures', Vol. 1, Standard Book House.

SURVEYING LAB 3115 C

LABORATORY WORK

Laboratory work will consists experiments and office work based on theory paper of Surveying -I (3111 C). At least one exercise should be taken up from each unit.

LIST OF PRACTICALS :

1. Conventional symbols.
2. Chain Surveying.
3. Determination of an area by cross staff survey (Comparison of area by digital planimeter).
4. Study of Prismatic Compass.
5. Compass Traverse.
6. Study of Dumpy Level and Leveling staff.
7. Differential Leveling.
8. Reciprocal Leveling.
9. Profile Leveling.
10. Contouring.
11. Study of Theodolite.
12. Plane Table Traverse.
13. 2 point and 3 point problem.

ENGG. GEOLOGY LAB 3116 C

LABORATORY WORK

Laboratory work will consist of experiments and office work based on theory paper of Geology (3113 C). At least one exercise should be taken up from each unit.

LIST OF PRACTICALS :

Qs. 1. Determination of Specific gravity of minerals by Steel Yard balance.
Qs. 2. Identification of physical properties of minerals such as hardness, cleavage, lusture, fracture, streak, colour, etc.
Qs. 3. Identification of important rock forming minerals in hard specimen by there physical properties.
Qs. 4. Identification of physical properties of important ore minerals.
Qs. 5. Petrological studies of important rocks-

- Igneous rocks
- Sedimentary rocks
- Metamorphic rocks

Qs. 6. Study of important crystal models.

Qs. 7. Study of Structural geology models.

Qs. 8. Study of Geological maps. describing its topography structure, history and drawing the Geological Cross Section.

STRUCTURAL ANALYSIS LAB 3117 C

List of experiments :

1. Compression test. (Concrete & mortar cubes, bricks)
2. Modulus of rupture of concrete.
3. Stress - strain curve of mild steel.
4. Flexural rigidity of beam.
5. Buckling of struts with different end conditions.
6. Reactions of statically determinate beams.
7. Non destructive testing of concrete using Rebound Hammer Method.
8. Non destructive testing of concrete using Pulse Velocity Methods.