

Scheme Of Instruction
B.Tech. : Civil Engineering
II - Year, III- Semester

S.NO.	COURSE CODE	SUBJECT	PERIODS			CREDIT
			L	T	P	
THEORY						
1	BHU-301/ BHU-302	Industrial Psychology /Industrial Sociology	2	0	0	2
2	BOE-031-038/ BAS-301	Science Based Open Elective/ Mathematics III	3	1	0	4
3	BCE-304	Strength Of Materials	3	1	0	4
4	BCE-301	Fluid Mechanics	3	1	0	4
5	BCE-302	Building Materials & Construction	4	0	0	4
6	BCE-303	Surveying	2	1	0	3
PRACTICAL/TRAINING/PROJECT						
7	BCE-351	Fluid Mechanics Lab	0	0	3	1
8	BCE-352	Building Materials Lab	0	0	3	1
9	BCE-353	Surveying Lab	0	0	3	1
10	BCE-354	Building Planning & Drawing Lab	0	0	3	1
11	GP-301	General Proficiency	-	-	-	1
TOTAL			17	4	12	26

Scheme Of Instruction
B.Tech. : Civil Engineering
II - Year, IV- Semester

S.NO	COURSE CODE	SUBJECT	PERIODS			CREDIT
			L	T	P	
THEORY						
1	BHU- 401/ BHU- 402	Industrial Psychology / Industrial Sociology	2	0	0	2
2	BOE-041-048/ BAS-401	Science Based Open Elective/ Mathematics III	3	1	0	4
3	BCE-401	Geotechnical Engineering I	3	1	0	4
4	BCE-402	Geoinformatics	3	1	0	4
5	BCE-403	Hydraulics & Hydraulic Machines	3	1	0	4
6	BCE-404	Engineering Geology*	2	1	0	3
PRACTICAL/TRAINING/PROJECT						
7	BCE-451	Geotechnical Engineering Lab	0	0	3	1
8	BCE-452	Geoinformatics Lab	0	0	3	1
9	BCE-453	Hydraulic Machines Lab	0	0	3	1
10	BCE-454	Computer based statistical & Numerical Techniques Lab	0	0	3	1
11	GP-401	General Proficiency	-	-	-	1
TOTAL			16	5	12	26

* In this Tutorial class students shall practice for mineral & rock identification.

BHU-301 / BHU-401 INDUSTRIAL PSYCHOLOGY

L T P C
2 0 0 2

MODULE-I

Introduction – Objectives and scope of Industrial Psychology. The Industrial Psychologist. Scientific management and Human Relations School – Hawthorne Experiments.

MODULE-II

Individual in Workplace -Motivation and Job satisfaction, stress management. Organizational culture, Leadership & group dynamics.

MODULE -III

Work Environment & Engineering Psychology-fatigue. Boredom, accidents and safety. Job Analysis, Recruitment and Selection – Reliability & Validity of recruitment tests. Performance Management - Training & Development.

Text books:

1. *Miner J.B. (1992) Industrial/Organizational Psychology. N Y : McGraw Hill.*
2. *Industrial psychology.S.N.chauhan, Sandeep Mittal,R.P.singh, Prateek Jain Pragati prakashan !st Ed*

Reference books:

1. *Blum & Naylor (1982) Industrial Psychology. Its Theoretical & Social Foundations CBS Publication.*

MODULE - I

Industrial Sociology:

Nature and Scope of Industrial Sociology-Development of Industrial Sociology. Rise and Development of Industry: Early Industrialism – Types of Productive Systems – The Manorial or Feudal system – The guild system – The domestic or putting-out system – and the factory system – Characteristics of the factory system –

MODULE - II

Industrialization:

Causes and consequences of industrialization.

Industrialization in India.

Industrial Poling Resolutions – 1956.

MODULE - III

Contemporary Issues :

Grievances and Grievance handling procedure.

Industrial Disputes: courses, strikes & lockouts,

Industrial Relations Machinery Bi-partite Tri-partite Agreement, Labour courts & Industrial Tribunals, Code of Discipline, Standing order.

References:

1. *Gisbert Pascal, Fundamentals of Industrial sociology, Tata McGraw Hill Publishing Co., New Delhi, 1972.*
2. *Schneider Engno v., Industrial Sociology 2nd Edition, McGraw Hill Publishing Co., New Delhi, 1979.*
3. *Mamoria c.b. And Mamoria s., Dynamics of Industrial Relations in India.*
4. *Sinha g.p. and p.r.n. Sinha, Industrial Relations and Labour Legislations, New Delhi, Oxford and IBH Publishing Co., 1977.*

MODULE-I

Function of Complex variable: Analytic function, C-R equations, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic function, Taylor's and Laurent's series, singularities, Residue theorem, Evaluation of real integrals.

MODULE-II

Statistical Techniques-I: Moments, Moment generating functions, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Polynomials, Exponential curves etc., Correlation, Linear, non –linear and multiple regression analysis, Probability theory.

Statistical Techniques-II: Binomial, Poisson and Normal distributions, Sampling theory (small and large), Tests of significations: Chi-square test, t-test, Analysis of variance (one way) , Application to engineering, medicine, agriculture etc.

Time series and forecasting (moving and semi-averages), Statistical quality control methods, Control charts, R, p, np and c charts.

MODULE-III

Numerical Techniques–I: Zeroes of transcendental and polynomial equation using Bisection method, Regula-falsi method and Newton-Raphson method, Rate of convergence of above methods.

Interpolation: Finite differences, difference tables, Newton's forward and backward interpolation, Lagrange's and Newton's divided difference formula for unequal intervals.

Numerical Techniques–II: Solution of system of linear equations, Gauss- Seidal method, Crout method. Numerical differentiation, Numerical integration , Trapezoidal , Simpson's one third and three-eight rules, Solution of ordinary differential (first order, second order and simultaneous) equations by Euler's, Picard's and forth-order Runga- Kutta mehthods.

Text books:

1. J.N. Kapur, *Mathematical Statistics*, S. Chand & company Ltd., 2000
2. Peter V. O'Neil, *Advance Engineering Mathematics Thomson (Cengage) Learning*

Reference books:

1. Jain, Iyenger & Jain, *Numerical Methods for Scientific and Engineering Computation*, New Age International, New Delhi , 2003.
2. R.K. Jain & S.R.K. Iyenger, *Advance Engineering Mathematics*, Narosa Publication House, 2002.
3. Chandrika Prasad, *Advanced Mathematics for Engineers*, Prasad Mudralaya, 1996.
4. E. Kreysig, *Advanced Engineering Mathematics*, John Wiley & Sons, 2005.
5. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, 2005.
6. Devi Prasad, *An introduction to Numerical Analysis*, Narosa Publication house, New Delhi 2006.

BME-302 STRENGTH OF MATERIALS

L T P C
3 1 0 4

MODULE- I

Simple stresses and strains: Concept of stress and strain: principle of stress and strain diagram, Hooke's law, Young's modulus, Poisson ratio, stress at a point, stresses and strains in bars subjected to axial loading, Modulus of elasticity, stress produced in compound bars subjected to axial loading, Temperature stress and strain calculations due to applications of axial loads and variation of temperature in single and compound walls.

Compound stresses and strains: Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr's circle of stress.

Stresses in Beams: Review of pure Bending. Direct and shear stresses in beams due to transverse and axial loads.

Deflection of Beams: Equation of elastic curve, cantilever and simply supported beams, Macaulay's method, area moment method.

MODULE- II

Columns and Struts: Combined bending and direct stress, middle third and middle quarter rules. Struts with different end conditions. Euler's theory and experimental results, Examples of columns in mechanical equipments and machines.

Thin cylinders & spheres: Hoop and axial stresses and strain. Volumetric strain.

Thick cylinders: Radial, axial and circumferential stresses in thick cylinders subjected to internal or external pressures, Compound cylinders. Stresses in rotating shaft and cylinders. Stresses due to interference fits.

MODULE- III

Torsion: Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts, torsion rigidity, combined torsion and bending of circular shafts.

Helical and Leaf Springs: deflection of springs by energy method, helical springs under axial load and under axial twist (respectively for circular and square cross sections) axial load and twisting moment acting simultaneously both for open and closed coiled springs, laminated springs.

Curved Beams: Bending of beams with large initial curvature, position of neutral axis for rectangular, trapezoidal and circular cross sections, stress in crane hooks, stress in circular rings subjected to tension or compression

Text books:

1. Pytel A H and Singer F L, “Strength of Materials”, 4th Edition, Harper Collins, New Delhi (1987).
2. Beer P F and Johnston (Jr) E R, “Mechanics of Materials”, SI Version, Tata McGraw Hill, India (2001).
3. Strength of Materials by S. Ramamurtham

Reference books:

1. Popov E P, “Engineering Mechanics of Solids”, SI Version 2nd Edition, Prentice Hall of India, New Delhi (2003).
2. Timoshenko S P and Young D H, “Elements of Strength of Materials”, 5th Edition, East West Press, New Delhi (1984).
3. Jindal U C, “Introduction to Strength of Materials”, 3rd Edition, Galgotia Publishing Private Limited New Delhi (2001).

BCE-301 FLUID MECHANICS

L T P C
3 1 0 4

Introduction: Fluid and continuum, Physical properties of fluids, Rheology of fluids

Kinematics of Fluid flow: Types of fluid flows: Continuum & free molecular flows. Steady and unsteady, uniform and non-uniform, laminar and turbulent flows, rotational and irrotational flows, compressible and incompressible flows, subsonic, sonic and supersonic flows, sub-critical, critical and supercritical flows, one, two and three dimensional flows, streamlines, continuity equation for 3D and 1D flows, circulation, stream function and velocity potential, source, sink, doublet and half-body.

Fluid Statics : Pressure-density-height relationship, manometers, pressure transducers, pressure on plane and curved surfaces, centre of pressure, buoyancy, stability of immersed and floating bodies, fluid masses subjected to linear acceleration and uniform rotation about an axis.

MODULE 2

Dynamics of Fluid Flow : Euler's Equation of motion along a streamline and its integration, Bernoulli's equation and its applications- Pitot tube, orifice meter, venturi meter and bend meter, Hot-wire anemometer and LDA, notches and weirs, momentum equation and its application to pipe bends.

Dimensional Analysis and Hydraulic Similitude: Dimensional analysis, Buckingham's Pi theorem, important dimensionless numbers and their significance, geometric, kinematics and dynamic similarity, model studies.

MODULE 3

Laminar and Turbulent Flow : Equation of motion for laminar flow through pipes, Stokes' law, transition from laminar to turbulent flow, turbulent flow, types of turbulent flow, isotropic, homogenous turbulence, scale and intensity of turbulence, measurement of turbulence, eddy viscosity, mixing length concept and velocity distribution in turbulent flow over smooth and rough surfaces, resistance to flow, minor losses, pipe in series and parallel, power transmission through a pipe, siphon, water hammer, three reservoir problems and networks

Boundary Layer Analysis : Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, application of momentum equation, turbulent boundary layer,

laminar sublayer, separation and its control, Drag and lift, drag on a sphere, a two dimensional cylinder, and an aerofoil, Magnus effect.

Text books:

1. Bansal R K, “A text book of Fluid mechanics and Hydraulic Machines”, 8th Edition, Laxmi Publications (P) Ltd. New Delhi (2002).
2. Dr. Jagdish Lal/ Fluid Mechanics & Machines Prentice Hall of India Private Limited, New Delhi (1996).

Reference books:

1. Douglas J F, Gasionckw, and Swaffield J P, “Fluid Mechanics”, 3rd Edition Addison Wesley Longman, Inc Pitman (1999).
2. Pao H F Richard, “Fluid Mechanics”, John Wiley and Sons (1995).
3. Kumar D S, “Fluid Mechanics and Fluid Power Engineering”, 6th Edition SK Kataria and Sons, Delhi (1998).
4. Fay J A, “Introduction to Fluid Mechanics”, Prentice Hall of India Private Limited, New Delhi (1996).

BCE-302 BUILDING MATERIALS & CONSTRUCTION

L T P C
4 0 0 4

MODULE- I

Classification of materials, materials and their performance, economics of the building materials.

Stones, Requirement of good building stone, characteristics of stones and their testing. Common building stones. Preservation of stones.

Bricks: Manufacture of clay bricks, and their classification. Properties of clay bricks and their testing. Problems of efflorescence & lime bursting in bricks & tiles.

Gypsum: properties of gypsum plaster, building products of gypsum and their uses.

Lime: Manufacture of lime, classifications of limes, and properties of lime.

Mortars: Introduction, Composition, Types and Functions

Puzzolona: Natural and Artificial fly ash, Surkhi (burnt clay puzzolona), rice husk and ash puzzolona, properties and specifications for use in construction.

Timber: Classification and identification of timber, Fundamental Engineering properties. Defects in timber, Factors affecting strength of timber, seasoning and preservation of timber. Wood based products.

Asphalt, Bitumen and Tar: Terminology, specifications and uses, bituminous materials.

MODULE- II

Chemistry of Plastics manufacturing process, classification, advantages of plastics, Mechanical properties and their use in construction.

Paints varnishes and distempers, Common constituents, types and desirable properties, Cement paints.

Ferrous metals, Desirable characteristics of reinforcing steel. Principles of cold working. Detailed Discussion on reinforcing steel mechanical and physical properties chemical composition. Brief discussion on properties and uses of Aluminium and lead.

Glass: Ingredients, properties types and use in construction.

Insulating Materials: Thermal and sound insulating material desirable properties and type.

MODULE- III

Components of building area considerations, Construction Principle and Methods for layout, Damp proofing ant termite treatment, Vertical circulation means staircases ramp design and construction.

Different types of floors, and flooring materials (Ground floor and upper floors).

Bricks and stone masonry construction,. Cavity wall hollow block and Waffle slab construction.

Doors, Windows and Ventilations its types & Construction details, type of roofs & its details, lintels & chajja.

Plastering different types, pointing, Distempering, Colour washing, Painting etc. Principles & Methods of building maintenance.

Text books:

1. *B.C. Punmia: A Text Book of Building Construction, Laxmi Publications, Delhi.*
2. *S.C.Rangwala, Engineering materials- Charotar Publications.*
3. *S.C.Rangwala, Building constructions- Charotar publications*

Reference books:

1. *O.H. Koenisberger: "Manual of tropical housing and building" Orient Longman*
2. *S.P. Arora at al., "A Text Book of Building Construction - Dhanpat Rai & Sons,*

BCE-303 SURVEYING

L T P C

2 1 0 3

MODULE- I

Importance of surveying to engineers, plane and geodetic surveying, principles of surveying, classification of surveys

Principles of different methods and their accuracies, measurement by tape, Reference meridians, bearing and azimuths, magnetic declination, compass, Vernier theodolite, temporary adjustments, measurements of horizontal angle, modern trends- EDM, electronic theodolites and Electronic Total Station.

Methods of determining elevations, Direct levelling- basic terms and definitions, principle, booking and reduction of field notes, curvature and refraction, automatic levels, Contouring- methods and uses

Definition, Principles of stadia systems, subtense bar and tangential methods

MODULE- II

Elements of simple circular curves, theory and methods of setting out simple circular curves, transition curves- types and their characteristics, ideal transition curve, equations of various transition curves, Introduction to vertical curves

Principles of traversing by compass and theodolite, computations of traverse coordinates, Principles and classification of triangulation systems, strength of figures, satellite stations, intervisibility of stations, triangulation field work

MODULE- III

Plane table surveying, Principles, Accessories of Plane table, orientation, Procedure of setting up Plane table over a station, Methods of plane tabling, special methods of resection, Procedure of Plane table traversing & advantages and disadvantages of Plane table surveying

Text books:

1.H. Kanitkar: *Surveying & Levelling*

2.S K Duggal: *Surveying Vol 1 & 2, TMH*

3.Dr.B.C.Punamia, *Surveying & Levelling vol-I & vol II, Laxmi publications*

Reference books:

1.R Subramanian, *Surveying & Levelling, Oxford University Press*

2.C Venkatramaih: *Surveying, University Press*

BCE-351 FLUID MECHANICS LAB

L T P C
0 0 3 1

1. To verify the momentum equation using the experimental set-up on impact of jet.
2. To determine the coefficient of discharge of an orifice of a given shape. Also to determine the coefficient of velocity and the coefficient of contraction of the orifice mouth piece.
3. To calibrate an orifice meter, venturimeter, and bend meter and study the variation of the co-efficient of discharge with the Reynolds number.
4. To study the transition from laminar to turbulent flow and to determine the lower critical Reynolds number.
5. To study the velocity distribution in a pipe and also to compute the discharge by integrating the velocity profile.
6. To study the variation of friction factor, 'f' for turbulent flow in commercial pipes.
7. To study the boundary layer velocity profile over a flat plate and to determine the boundary layer thickness.
8. Verification of meta-centric height

BCE-352 BUILDING MATERIALS LAB

L T P C
0 0 3 1

I. Cement (Two turns only)

1. Normal Consistency of cement.
2. Initial & final setting time of cement
3. Compressive strength of cement
4. Fineness of cement by air permeability and Le-chatelier's apparatus.
5. Soundness of cement.

II. Coarse Aggregate (Two turns only)

1. Crushing value of aggregate
2. Impact value of aggregate
3. Water absorption of aggregate
4. Sieve Analysis of Aggregate
5. Specific gravity & bulk density
6. Grading of aggregates.

III Fine Aggregate: (one turn only)

1. Sieve analysis of sand
2. Silt content of sand
3. Bulking of sand

IV Bricks:

1. Water absorption.
2. Dimension Tolerances
3. Compressive strength
4. Efflorescence

BCE-353 SURVEYING LAB

L T P C
0 0 3 1

1. Study of different types of topographical maps and to prepare conventional symbols chart.
2. To measure bearings of a closed traverse by prismatic compass and to adjust the traverse by graphical method.
3. To find out reduced levels of given points using dumpy/Auto level.
4. To perform fly levelling with a Auto /tilting level.
5. To study parts of a vernier / Electronic theodolite and practice for taking angle measurements.
6. To measure vertical angle of given points by Electronic theodolite.
7. To measure horizontal angle between two objects by repetition method with three repetitions.
8. To perform the field procedure of chain surveying.
9. To determine the elevation of chimney top by trigonometrical levelling by taking observations in single vertical plane.
10. To set out a simple circular curve by Rankin's method
11. To perform the methods of Radiation, Intersection & Traversing in plane table surveying

BCE-354 BUILDING PLANNING & DRAWING LAB.

L T P C
0 0 3 1

Design & Drafting of the following, Using Any CAD software

1. Symbols used in Civil Engineering drawing, Masonry Bonds
2. Doors, Windows and staircases drawing.
3. Plumbing & Electrical fitting drawing.
4. Comprehensive Drawing of Residential building (Layout, plan, elevation & sectional elevation, plumbing & electrical fittings in out)
5. Preparation of Layout planning of different civil engg. Projects

BCE-401 GEOTECHNICAL ENGINEERING I

L T P C
3 1 0 4

MODULE- I

Preview of Geotechnical field problems in Civil Engineering, Soil formation, transport and deposit, Soil composition, Basic definitions, Clay minerals, Index properties, Particle size analysis, Soil classification.

Soil-water systems, capillarity-flow, Darcy's law, permeability, field and lab tests, piping, quick sand condition, seepage, flow nets, flow through dams, filters. Soil compaction, water content – dry unit weight relationships, OMC, field compaction control, Proctor needle method.

MODULE- II

Effective stress principle, Stresses due to applied loads, Boussinesq and Westergaard equations. Compressibility and consolidation characteristics, Rate of consolidation, Terzaghi's one dimensional theory of consolidation and its applications, Over Consolidation Ratio, determination of coefficient of consolidation and secondary consolidation (creep), consolidation under construction loading.

MODULE- III

Shear strength - direct & triaxial shear tests, Mohr – Coulomb strength criterion, drained, consolidated, undrained and unconsolidated tests, strength of loose and dense sands, Normally Consolidated and Over Consolidated soils, dilation, pore pressure, Skempton's coefficient.

Stability of slopes with or without pore pressure, limit equilibrium methods, methods of slices and simplified Bishop Method, factor of safety.

Soil stabilization, Introduction to geosynthetics, classification, functions and its field application

Text books:

1. *Dr.B.C.Punamia, Soil Mechanics & Foundations-Laxmi Publications.*
2. *C. Venkataramaiah – geotechnical Engineering*
3. *Gopal Ranjan and A.S.R. Rao – Basic and Applied Soil Mechanics*
4. *G.V. Rao & G.V.S.S. Raju – Engineering with Geosynthetics*

Reference books:

1. *Alam Singh – Modern Geotechnical Engineering*
2. *Brij Mohan Das – Geotechnical Engineering*

BCE-402 GEOINFORMATICS

L T P C
3 1 0 4

MODULE- I

Aerial Photographs- Basic terms & Definitions, scales, relief displacements, Flight Planning, Stereoscopy, Characteristics of photographic images, Fundamentals of aerial photo-interpretation

Physics of remote sensing, Ideal remote sensing system, Remote sensing satellites and their data products, Sensors and orbital characteristics, Spectral reflectance curves, resolution and multi-concept, FCC

MODULE- II

Satellite Image - Characteristics and formats, Image histogram, Introduction to Image rectification, Image Enhancement, Land use and land cover classification system, Supervised Classification, Applications of remote sensing

Basic concepts of geographic data, GIS and its components, Data acquisition, Raster and Vector formats, topology and Data models, Spatial modelling, Data output, GIS Applications

MODULE- III

Introduction, Satellite navigation System, GPS- Space segment, Control segment, User segment, GPS satellite signals, Receivers, Static, Kinematic and Differential GPS

Text books:

1. N K Agarwal : *Essentials of GPS , Spatial Networks: Hyderabad.*
2. A M Chandra : *Higher Surveying*
3. Dr. B C Punamia : *Surveying & Levelling , Vol 2*
4. M Anjireddy : *Remote Sensing & GIS , BS Publications*

Reference books:

1. T M Lillesand et al: *Remote Sensing & Image Interpretation , Wiley India*
2. A M Chandra : *Remote Sensing & GIS , Narosa*
3. S K Duggal : *Surveying Vol 2 , TMH*

BCE-403 HYDRAULICS & HYDRAULIC MACHINES

L T P C
3 1 0 4

MODULE- I

Difference between open channel flow and pipe flow, geometrical parameters of a channel, continuity equation.

Critical depth, concepts of specific energy and specific force, application of specific energy principle for interpretation of open channel phenomena, flow through vertical and horizontal contractions.

Chezy's and Manning's equations for uniform flow in open channel, Velocity distribution, most efficient channel section.

MODULE- II

Equation of gradually varied flow and its limitations, flow classification and surface profiles, integration of varied flow equation by analytical, graphical and numerical methods, flow in channels of non-linear alignment

Classical hydraulic jump, evaluation of the jump elements in rectangular and non-rectangular channels on horizontal and sloping beds, open channel surge, celerity of the gravity wave, deep and shallow water waves.

MODULE- III

Rotodynamic pumps, classification on different basis, basic equations, Velocity triangles, manometric head, efficiencies, cavitation in pumps, characteristics curves.

Introduction, rotodynamic machines, Pelton turbine, equations for jet and rotor size, efficiency, spear valve, reaction turbines, Francis and Kaplan type, Head on reaction turbine, unit quantities, similarity laws and specific speed, cavitation, characteristic curves.

Text books:

1. Ranga Raju, K.G., *Flow through open channels*, T.M.H. 2nd edition
2. Rajesh Srivastava , *Flow through Open Channels* , Oxford University Press 3.
3. Subramanya , *Flow through Open Channels* , TMH

Reference books:

1. Vasandani , *Hydraulic Machines*
2. Garde, R.J., “ *Fluid Mechanics through Problems*”, New Age International
3. Streeter, V.L. and White, E.B., “*Fluid Mechanics*”, McGraw Hill, New York,
4. Asawa, G.L., “*Experimental Fluid Mechanics*”, Vol.1, NemChand and Bros

BCE-404 ENGINEERING GEOLOGY

L T P C

2 1 0 3

MODULE- I

Minerals: Their physical and detailed study of certain rock forming minerals.

Rocks: Their origin, structure, Texture and classification of igneous, sedimentary and metamorphic rocks and their suitability as engg. materials.

Stratification, Lamination bedding. Outcrop-its relation to topography, dip and strike of bed, overlap, outlier and inlier.

Rock deformation: Folds, Faults, joints unconformity and their classification, causes and relation to engg. Behaviour of rock masses.

MODULE- II

Earthquake, its causes, classification, seismic zones of India and Geological consideration for construction of building, projects in seismic areas.

Landslides, its causes, classification and preventive measures.

Underground water, Origin, Aquifer, Aquicludes, Artesian Wells, underground provinces of India and its role as geological hazard.

MODULE- III

Building Stones Engg, Properties of rocks, Alkali aggregate reaction, Grouting, Puzzolonaic materials.

Geological investigations for site selection of Dams and reservoirs tunnels, bridges and Highways. Principles of Geophysical explorations methods for subsurface structures.

Text books:

1. *Prabin Singh : Engg. and General Geology, Katson Publishing House.*
2. *Blyth F.G.M. : A Geology for Engineers, Arnold, London.*
3. *D.S. Arora : Geology for Engineers, Mohindra Capital Publishers, Chandigarh.*
4. *F G Bell : Funamentals of Engineering Geology , B S Publication*

Reference books:

1. *Tony Waltham : Fundamentals of Engineering Geology ,SPON Press*
2. *J.M. Treteth : Geology of Engineers, Princeton, Von. Nostrand.*
3. *K V G K Gokhale , Text Book of Engineering Geology , B S Publication*

BCE-451 GEOTECHNICAL ENGINEERING LAB.

L T P C
0 0 3 1

To perform the following experiments:

1. Sieve Analysis
2. Hydrometer Analysis
3. Liquid & Plastic Limit Tests
4. Shrinkage Limit Test
5. Proctor Compaction Test
6. Relative Density
7. In Situ Density – Core cutter & Sand Replacement
8. Permeability Test
9. Direct Shear Test
10. Auger Boring
11. Static Cone Penetration Test
12. Standard / Dynamic Cone Penetration Test

BCE-452 GEOINFORMATICS LAB

L T P C
0 0 3 1

1. Demonstration and working on Electronic Total Survey Station (TC-1800)
2. To layout a precise traverse in a given area and to compute the adjusted coordinates of survey stations
3. Demonstration and working with Pocket/ Mirror stereoscopes, Parallax bar and Aerial photographs
4. Demonstration and practice work with hand held GPS (GS-5).

BCE-453 HYDRAULIC MACHINES LAB

L T P C
0 0 3 1

1. To determine the Manning's coefficient of roughness 'n' for the bed of a given flume.
2. To study the velocity distribution in an open channel and to determine the energy and momentum correction factors
3. To study the flow characteristics over a hump placed in an open channel.
4. To study the flow through a horizontal contraction in a rectangular channel.
5. To calibrate a broad-crested weir.
6. To study the characteristics of free hydraulic jump.
7. To study rotodynamic pumps and their characteristics
8. To study characteristics of any two turbines (Francis/ Kaplan / Pelton)

BCE-454 COMPUTER BASED STATISTICAL & NUMERICAL TECHNIQUES LAB

L T P C
0 0 3 1

Write Programs in 'C' Language:

1. To Find out the root of the Algebraic and Transcendental equations using Bisection, Regula-falsi, Newton Raphson and Iterative Methods. Also give the rate of convergence of roots in tabular form for each of these methods.
2. To implement Newton's Forward and Backward Interpolation formula.
3. To implement Gauss Forward and Backward, Bessel's, Sterling's and Everett's Interpolation formula
4. To implement Numerical Differentiations & Integration
5. To implement Least Square Method for curve fitting.
6. Computation of central tendencies, coefficient of variance and skewness
7. Linear correlation and regression

