

CIVIL ENGINEERING DEPARTMENT 20

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 3	COURSE TITLE	Engineering Mathematics III				COURSE ID			
						TMA 302			
COURSE COMPONENT	CREDITS					L	P	T	
Mathematics (FC)	3	CONTACT HOURS				2	0	1	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	3	0				25	25	50	100

COURSE OUTCOMES:

CO 1:	Formulation and solving engineering problems involving transformations of complex-variable .
CO 2:	Identify problems involving use of integral and Fourier transforms and solving them
CO 3:	Solve transcendental equations and definite integrals using numerical methods
CO 4:	Understand probability distribution functions and evaluating their properties
CO 5:	Fit curves of various formulations to given data
CO 6:	Formulate and solve engineering problems by applying advanced mathematical principles.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Integral Transforms: Applications of integral transform in engineering, Fourier integral, Fourier complex transform, Fourier sine and cosine transforms and applications to simple heat transfer equations.	9
2.	Complex Variable: Applications of complex variable in engineering, Analytic functions, C-R equations and harmonic functions, Complex Integration. Cauchy integral theorem, Cauchy integral formula.	9
3.	Numerical Methods: Solution of Algebraic and Transcendental Equation: Bisection Method, Iteration method, Newton-Raphson method, Method of false position, Rate of convergence of Iterative methods. Numerical Integration: Introduction, Newton Quadrature formula, Trapezoidal rule, Simpson's 1/3 and 3/8 rule.	9
4.	Statistics: Random Variable: Discrete and Continuous, Probability mass and Probability density Functions Bayes' Theorem and its applications, Moments, Moment Generating Functions and their properties, Binomial , Poisson and Normal Distributions.	9
5.	Curve Fitting and Solution of Equations: Method of least squares and curve fitting of straight line and parabola, Skewness and Kurtosis, Correlation: Linear Regression.	9

TEXT BOOKS:

TB 1:	Higher Engineering Mathematics, B.S. Grewal, Khanna Publication
TB 2:	Text Book of Engineering Mathematics, . Bali, N. P, Narayana Iyengar, Laxmi Publication
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	E. Kreyszing: Advanced Engineering Mathematics, Wiley Eastern
Ref 2:	Higher Engineering Mathematics , B.V. Ramana , Tata-McGraw Hill publication
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 21										
PROGRAM:		BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 3		COURSE TITLE	Mechanics of Fluids			COURSE ID				
COURSE COMPONENT		CREDITS				TCE 301				
Water Resources (CC)		4	CONTACT HOURS			L	P	T		
EXAMINATION DURATION		THEORY	PRACTICAL				CWA	MSE	ESE	Total
		3	0				25	25	50	100
COURSE OUTCOMES:										
CO 1:	Practically apply properties of fluids and basic principles of fluid statics for manometers and other systems in the measurement of fluid flows.									
CO 2:	Solve kinematic problems such as finding particle paths and stream lines.									
CO 3:	Interpret Continuity equation, Bernoulli's equation and turbulence to solve engineering problems.									
CO 4:	Demonstrate the application of basic principles of Fluid Dynamics to civil engineering problems.									
CO 5:	Application Laminar and Turbulent flow concepts to water flow problems like channels streams etc.									
CO 6:	Determine the energy losses in pipes in a distribution system									
SYLLABUS										
UNIT	CONTENT									Hrs
1.	Scope and importance of the subject, Definition of Fluids, Distinction between solids, liquids & gas, fluid continuum. Fluid Properties and Classification of Fluid: Mass density, Specific Volume, Specific Weight, Relative density, Viscosity, Shear stress and Newton's law of viscosity, Newtonian and Non-Newtonian Fluids, Ideal and Real fluids, rheological classification. Compressibility, Vapour pressure, Surface tension, Pressure inside a drop and a bubble, capillarity and capillary rise. Dimensional Analysis & Model Similitude: Introduction to Dimensional Analysis, units & dimensions, table of Dimensions, Dimensional Homogeneity, Methods of Analysis (Raleigh's & Buckingham's method). Model Studies, Introduction and comparison with Dimensional Analysis, Similitude, Dimensionless parameters. Types of models, Model laws and Principles.									9
2.	Fluid Pressure and its Measurement: Definition of pressure, units and dimensions, Pressure at a point, Hydrostatic pressure law, Pressure head, atmospheric pressure, Barometer, Inverted Manometers, Measurement of pressure head, Simple and Differential manometer, Mechanical pressure gauges. Hydrostatics: Definition of total pressure, Centre of pressure, depth of centre of pressure for different geometric shapes, Hydrostatic force and depth of centre of pressure on plane surfaces (vertical and inclined), Hydrostatic force on submerged curved surfaces, Pressure diagram. Buoyancy - Concept, Centre of Buoyancy, Meta centre, Stability of immersed and floating bodies Fluid Kinematics: Description of Fluid flow: Lagrangian and Eulerian approach; Types of fluid Flows: Steady and unsteady, Uniform and non-uniform, Laminar and turbulent flows, 1, 2 and 3-D flows; Stream lines, Path lines and Streak lines; Stream tube; Acceleration of a fluid particle along a straight and curved path; Differential and Integral form of Continuity equation; Rotation, Vorticity and Circulation; Elementary explanation of Stream function and Velocity potential; Flow net characteristics and uses									9
3.	Dynamics of Fluid Flow: Definitions, Concept of Inertia force and other forces causing motion, Derivation of Euler's equation and Bernoulli's equation with assumptions and limitations. Modification of Bernoulli's equation, problem on Bernoulli's equation without and with losses. Application of Bernoulli's equation - Pitot tube; Venturimeter and Orificemeter, Flow Measurements: Flow through Orifices; classification, Hydraulic co-efficients of an Orifice and relation between them, Equation for co-efficient of velocity, Flow through mouth pieces, classification, equation for discharge and pressure head, Flow over notches, classification, Equation for discharge over V-notch, rectangular and Cippoletti notches, Types of Nappe, ventilation of weirs, Broad crested weirs, problems, Submerged weirs, equation for discharge.									9
4.	Momentum equation and applications to pipe bends, Problems related to combined application of energy and momentum equations, Laminar Flow: Reynolds Experiment; Equation of motion for laminar flow through pipes; Flow between parallel plates; Kinetic energy and Momentum correction factors; Stokes law; Flow through porous media; Darcy's Law; Fluidization; Measurement of viscosity; Transition from laminar to turbulent flow. Turbulent Flow: Turbulence; Equation for turbulent flow; Reynolds stresses; Eddy viscosity; Mixing length concept and velocity distribution in turbulent flow.									9
5.	Flow Through Pipes: Major and Minor energy losses; Resistance coefficient and its variation; Hydraulic gradient and total energy lines; Flow in sudden expansion, contraction, diffusers, bends, valves and siphons; Concept of equivalent length; Branched pipes; Pipes in series and parallel; Simple pipe networks. Water hammer in pipes Definition, Equation for pressure rise due to gradual closure of valves. Equation for pressure due to sudden closure of valves in rigid and Elastic pipes, problems, Surge tanks, their functions and types									9
TEXT BOOKS:										
TB 1:	Hydraulics and Fluid Mechanics- P.N. Modi and S.M. Seth, Standard Book House, New Delhi.									
TB 2:	Fluid Mechanics and Hydraulic Machines-R. K. Bansal, Laxmi Pub., Delhi.									
TB 3:	Fluid Mechanics- Streeter and Victor, McGraw Hill.									
TB 4:	Fluid Mechanics and Machinery Ojha, Berndtsson and Chandramouli, Oxford University Press.									
TB 5:										
REFERENCES:										
Ref 1:	Elementary Hydraulics (1st Edition)- James F Cruise, Vijay P. Singh, Mohsan M.Sherif, Thomson Learning.									
Ref 2:	Fluid Mechanics, Hydraulic and Hydraulics - K.R. Arora, Standard Book House, New Delhi.									
Ref 3:	Fluid Mechanics - John F. Douglas et al., Pearson Education, India.									
Ref 4:	Fluid Mechanics - Jain, A.K., Khanna Publishers, New Delhi.									
Ref 5:	K L Kumar, Engineering Fluid Mechanics									

CIVIL ENGINEERING DEPARTMENT 22												
PROGRAM:		BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING										
SEMESTER: 3		COURSE TITLE	Basic Surveying					COURSE ID				
COURSE COMPONENT		CREDITS	CONTACT HOURS					TCE 302				
Surveying (CC)		3						L	P	T		
EXAMINATION DURATION		THEORY	PRACTICAL						CWA	MSE	ESE	Total
		3	0						25	25	50	100
COURSE OUTCOMES:												
CO 1:	Study a map or plan and make linear measurements.											
CO 2:	Solve angular and directional measurement problems.											
CO 3:	Conduct survey of an area in form of a polygon.											
CO 4:	Determine the ground profile and contours through elevation/depression calculations.											
CO 5:	Plot survey results on a drawing sheet.											
CO 6:	Get acquainted with the traditional surveying procedures and plotting.											
SYLLABUS												
UNIT	CONTENT								Hrs			
1.	Introduction: Introduction to Surveying, Importance of surveying to Engineers, Plane and Geodetic Surveying, Control Points, Classification of surveys, Methods of locating a point, Sources and types of errors in measurement, Principle of working from whole to part. Introduction to Maps, Types of Maps and their use, Scale of Map, Plotting accuracy, Coordinate system and map projection, Maps published by Survey of India, Index and numbering of Map sheets, Conventional symbols in maps. Measurement of distances: Different methods of linear measurement and their accuracy, Measurement by chain and tape, Sources of errors and precautions, Corrections to tape measurements, Field problems in chaining and ranging, Introduction to modern instruments: EDM and Total Stations.								9			
2.	Measurements of Angles and Directions: Compass: Magnetic compass, Use and adjustment of compass, Reference meridians, Bearings and azimuths, Magnetic declination and its variations, Theodolite Surveying: Vernier theodolite, micro-optic theodolite, electronic theodolites, Temporary and permanent adjustments in theodolite, Measurement of horizontal and vertical angles, Accuracy and sources of errors in angle measurement.								9			
3.	Traversing: Introduction, Different methods of Traversing, Field work and checks, Computation of coordinates, Sources of errors in traversing, Checking and adjustment of errors in traversing, Precision of traversing, Problems related to omitted measurements. Tachometry: Definitions, Principles of stadia systems, Instruments constants, Subtense and tangential systems, Errors and Precision.								9			
4.	Measurement of Elevation and Contouring: Different methods of determining elevation; Definition and terms in Spirit levelling, Levelling instruments, Temporary and permanent adjustments of levels, Automatic levels, Types of levelling staves, Methods of spirit levelling, Booking and reduction of field observations, Effect of earth curvature and refraction, Reciprocal levelling, Construction and use of altimeter, Trigonometric levelling, simple and reciprocal observations, Sources of errors and precision in levelling, Methods of relief representations, Definition and characteristics of contours, Direct and Indirect methods of contouring, Use of contour maps, Digital Elevation Model.								9			
5.	Plane Table Surveying: Introduction, Equipment for Plane Table survey and their use, Different methods of Plane Table Surveying, Two point and three point problems, Errors in Plane Table Surveying, Advantages and disadvantages of Plane Table Surveying.								9			
TEXT BOOKS:												
TB 1:	Agor, R. "Surveying", Vol. I&II, Khanna Publications, Delhi											
TB 2:	Arora, K.R., "surveying", Vol. I & II, Standard Book House, Delhi											
TB 3:	Clark, David "Plane Surveying", CBS Publishers & Distributors, New Delhi											
TB 4:	Punmia, B.C., "Surveying", Vol. I &II, Laxmi Publications New Delhi											
TB 5:												
REFERENCES:												
Ref 1:	Duggal, S.K., "Surveying Vol. I&II											
Ref 2:	Kanetkar T.P. and Kulkarni S.V., "Surveying" Vol. I&II											
Ref 3:	Chandra, A.M., "Plane Surveying", New Age International Publishers, Delhi											
Ref 4:	Chandra, A.M., "Higher Surveying", New Age International Publishers, Delhi											
Ref 5:	Bannister, A. and Baker, R., "Solving Problems in Surveying", Longman Scientific Technical, U.K.											

CIVIL ENGINEERING DEPARTMENT 23										
PROGRAM:		BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 3		COURSE TITLE	Building Materials and Construction Technology					COURSE ID		
COURSE COMPONENT		CREDITS	CONTACT HOURS					L	P	T
Materials (CC)		3						3	0	0
EXAMINATION DURATION		THEORY	PRACTICAL				CWA	MSE	ESE	Total
		3	0				25	25	50	100
COURSE OUTCOMES:										
CO 1:	Summarizes basic knowledge about various kinds of materials used in construction									
CO 2:	Comprehend between different types of cements and admixtures, their uses in construction work									
CO 3:	Administer the knowledge of material and foundation in the choice of economic and effective construction methods.									
CO 4:	Analyse and summarizes the basic knowledge of staircase, door and windows in the economic and effective development.									
CO 5:	Comprehend between the methods used in construction with I.S specification.									
CO 6:	Administer the basic and advance level knowledge of all the materials and methods used in construction for the better and effective development.									
SYLLABUS										
UNIT	CONTENT								Hrs	
1.	Building Materials : Classification, Properties and selection criteria of Bricks Burning of Bricks, tests for bricks, stone Classification, characteristics of good building stone, common building stones in India, lime , IS specifications , Field tests of Building limes, timber, Characteristics of good timber, defects in timber, seasoning of timber, tests on timber, plywood, glass, plastics, P.V.C. Mortar: Types, classification and strength, I.S. specifications.								9	
2.	Cement: Manufacture of cement, Different types of cement such as slag Cement, Portland Pozzolona Cement and high Alumina cement, their characteristics, composition, use and properties, Tests on Cements, Admixtures, Aggregates and Testing of Aggregates: Classification, source, physical and mechanical properties. Testing of Aggregates for physical and mechanical properties.								9	
3.	Building Construction: Classification of buildings, Recommendations of NBC, Building planning and byelaws, modular co-ordination; orientation of buildings, desirable conditions of comforts, and components of building area considerations. Types of foundations and selection criteria, Brick masonry, stone masonry. Types of walls, partition and cavity walls. Prefabricated construction. Plastering and pointing. Damp proofing materials and techniques, Anti termite treatment.								9	
4.	Types of floors, construction details and selection criteria. Types of roofs and roof covering, Treatment for water proofing. Staircases: Types, materials, proportions. Doors and windows: sizes and locations, proportions.								9	
5.	Lifts and escalators. White washing, colour washing, painting, distempering. Shuttering, scaffolding and centring. Expansion and construction joints. Sound and fire proof construction, I.S. specifications.								9	
TEXT BOOKS:										
TB 1:	Jha, J. & Sinha, S.K., "Building Construction", Khanna Publishers, Delhi.									
TB 2:	Kulkarni, C.J., "A text book of Engineering Materials", Ahmedabad book Depot, Ahmedabad.									
TB 3:	Kulkarni, C.J., "A text book of Engineering Construction", Ahmedabad Book Depot, Ahmedabad.									
TB 4:	Kumar Sushil, "Engineering Materials", Standard Publishers Distributors, Delhi.									
TB 5:	McKay W.B., "Building Construction", Vol.1 to 4, Orient Longman Ltd., Hyderabad, Bombay, Madras, Delhi, Vol.1 & 2 -1995, Vol. 3-1996, Vol. 4.									
REFERENCES:										
Ref 1:	Civil Engg. Materials, TTTI Chandigarh, Tata McGraw- New Delhi.									
Ref 2:	Allen, E and Iano, J. "Fundamentals of Building construction." John Willey and sons.									
Ref 3:										
Ref 4:										
Ref 5:										

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 3	COURSE TITTLE	Strength of Materials				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 304	
Structures (CC)	3	CONTACT HOURS				L	P
						2	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	3	0				25	25
						ESE	Total
						50	100

COURSE OUTCOMES:

CO 1:	Examine various physical and mechanical properties and strength of various engineering materials.
CO 2:	Determine the stresses, strains, and displacements in structures and their components due to the loads acting on them.
CO 3:	Know about the stress distributions inside simple structural elements such as bars, beams, shafts under their specific external load, axial load, bending and shear force as well as torsion.
CO 4:	Find out the value of stresses when external loads are applied on columns.
CO 5:	Estimate the stresses on thin vessels due to the application of pressure.
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	Stress, strain and deformation of solids: Rigid and deformable bodies – Stability, strength and stiffness - Axial and Shear Stresses –Deformation of simple and compound bars – Thermal stresses. Compound stresses and strains – Biaxial state of stress –Stresses on inclined planes – Principal Stresses and principal planes – Mohr’s circle of stress.	9
2.	Shear force and bending moment diagrams of statically determinate beams: –beam types – loading types – Shear force and bending moment – sign convention – relationship between load intensity, shear force and bending moment. Stress in beams: – Theory of simple bending –assumptions, relation between bending stress, radius of curvature and moment – bending stress distribution – moment carrying capacity of a section – Flitched beams – Shear stress distribution.	9
3.	Deflection of beams: Double Integration method – Macaulay’s method for computation of slopes and deflections in determinate beams.	9
4.	Torsion: – Pure torsion – Assumptions in the theory of pure torsion – derivation of torsional equations – polar modulus – Power transmitted – torsional rigidity / stiffness of shafts. Helical Springs	9
5.	Columns and Cylinders: –Behaviour of short and long columns – Euler’s theory of long columns – Critical loads for prismatic columns Rankine-Gordon Formula – Eccentrically loaded long columns and short columns. Thin and thick cylinders –Stresses in thin cylinders– changes in dimensions of cylinder	9

TEXT BOOKS:

TB 1:	Timoshenko S. P., Strength of Materials (Vol. 1 & 2), 2nd Edition, D Van Nostrand Company, Inc, New York.
TB 2:	Vazirani, N, Ratwani, M. “Analysis of Structures” Khanna Publishers, New Delhi 2001
TB 3:	Rajput, R.K “Strength of Materials”, S Chand & Company Ltd., New Delhi 2006
TB 4:	Bhavikatti S. S., Strength of Materials, 3rd Edition, Vikas Publication House Pvt Ltd, Noida, UP, 2008.
TB 5:	

REFERENCES:

Ref 1:	Irwing H. Shames, James M. Pitarresi, “Introduction to Solid Mechanics”, Prentice Hall of India, New Delhi, 2002
Ref 2:	Roger T.Fenner, “Mechanics of Solids”, ELBS, Oseny Mead, Oxford, 1990
Ref 3:	Malhotra, D.R. Gupta, H.C., “The Strength of Materials”, Satya Prakashan (Tech. India Publications), New Delhi, 1995.
Ref 4:	MOM, Beer-Johnston
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 25									
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 3	COURSE TITTLE	Engineering Mechanics					COURSE ID		
COURSE COMPONENT	CREDITS						TCE 305		
Structures (CC)	3	CONTACT HOURS					L	P	
							2	0	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	3	0				25	25	50	100
COURSE OUTCOMES:									
CO 1:	Determine the resultant force and moment for a given system of forces								
CO 2:	Analyse planar and spatial systems to determine the forces in members of trusses, frames and problems related to friction								
CO 3:	Calculate the motion characteristics of a body subjected to a given force system								
CO 4:	Determine the deformation of a shaft and understand the relationship between different material constants								
CO 5:	Determine the centroid and second moment of area								
CO 6:									
SYLLABUS									
UNIT	CONTENT								Hrs
1.	Introduction to Engineering mechanics: Basic idealizations - Particle, Continuum and Rigid body; Force and its characteristics, types of forces, Classification of force systems; Principle of physical independence of forces, Principle of superposition of forces, Principle of transmissibility of forces; Newton's laws of motion, Introduction to SI units, Moment of a force, couple, moment of a couple, characteristics of couple, Equivalent force - couple system; Resolution of forces, composition of forces; Numerical problems on moment of forces and couples, on equivalent force - couple system.								9
2.	Composition of forces - Definition of Resultant; Composition of coplanar - concurrent force system, Principle of resolved parts; Numerical problems on composition of coplanar concurrent force systems. Composition of coplanar - non-concurrent force system, Varignon's principle of moments; Numerical problems on composition of coplanar non-concurrent force systems. Equilibrium of forces - Definition of Equilibrant; Conditions of static equilibrium for different force systems, Lami's theorem; Numerical problems on equilibrium of coplanar – concurrent and non concurrent force systems.								9
3.	Beams- Introduction, Types of beams, types of supports, statically determinate beams, Numerical problems on support reactions for statically determinate beams. Trusses- Introduction, simple force, determination of forces in simple truss members, method of joint and method of sections.								9
4.	Centroid of plane figures; Locating the centroid of triangle, semicircle, quadrant of a circle and sector of a circle using method of integration, Centroid of simple built up sections; Numerical problems. Moment of inertia of an area, polar moment of inertia, Radius of gyration, Perpendicular axis theorem and Parallel axis theorem; Moment of Inertia of rectangular, circular and triangular areas from method of integration; Moment of inertia of composite areas; Numerical problems.								9
5.	Friction - Types of friction, Laws of static friction, Limiting friction, Angle of friction, angle of repose; Impending motion on horizontal and inclined planes; Wedge friction; Ladder friction; Numerical problems.								9
TEXT BOOKS:									
TB 1:	Mechanics for engineers: Statics by Ferdinand P B and E.Russel Jhonston								
TB 2:	Engineering Mechanics by S.S. Bhavikatti, New Age International Publisher, New Delhi, 2nd edition 2010								
TB 3:	Engineering Mechanics by K L Kumar, TATA McGraw-Hill Book Company, New Delhi								
TB 4:									
TB 5:									
REFERENCES:									
Ref 1:	Engineering Mechanics by S.Timoshenko, D.H.Young, and J.V.Rao TATA McGraw-Hill Book Company, New Delhi								
Ref 2:	Engineering Mechanics: Statics and Dynamics by Irving H. Shames, Pearson Education India, 2006								
Ref 3:									
Ref 4:									
Ref 5:									

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 3	COURSE TITTLE	Fluid Mechanics Lab				COURSE ID	
COURSE COMPONENT	CREDITS					PCE 301	
Water Resources (CC)	2	CONTACT HOURS				L	P
						1	2
						T	Total
						0	
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE	ESE
	0	3			25	25	50
							100

COURSE OUTCOMES:

CO 1:	Apply dimensional analysis for design of experimental procedures
CO 2:	Calibrate flow measuring devices used in pipes, channels and tanks
CO 3:	Determine fluid and flow properties
CO 4:	Characterize laminar and turbulent flows
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	List of Experiments: (any eight) 1. To measure the surface tension of a liquid. 2. To determine the metacentric height of a ship model experimentally.	
2.	3. To verify the Bernoulli's theorem. 4. To find the velocity distribution in a pipe and hence to compute the discharge by integrating the velocity profile obtained.	
3.	5. To calibrate an Orifice meter and/or venturi meter and to study the variation of the coefficient of discharge with the Reynolds number. 6. To calibrate and to determine the coefficient of discharge for rectangular and/or triangular notches.	
4.	7. To determine the coefficients of velocity, contraction and discharge of an orifice of a given shape. 8. To determine the coefficients of velocity and discharge of a mouth piece of a given shape.	
5.	9. To study the transition from laminar to turbulent flow and to determine the lower critical Reynolds number. 10. To study the variation of friction factor, 'f' for turbulent flow in smooth and rough commercial pipes.	

TEXT BOOKS:

TB 1:	
TB 2:	
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	G.L Asawa, "Laboratory work in Hydraulic Engineering", New Age International publishers, New Delhi
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 27											
PROGRAM:		BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING									
SEMESTER: 3		COURSE TITLE	Basic Survey Field Work					COURSE ID			
COURSE COMPONENT		CREDITS						PCE 302			
Surveying (CC)		2	CONTACT HOURS					L	P	T	
EXAMINATION DURATION		THEORY	PRACTICAL					CWA	MSE	ESE	Total
		0	3					25	25	50	100
COURSE OUTCOMES:											
CO 1:	Obtain the Required Information like Length, Area, Physical Features on a Map.										
CO 2:	Make Linear Measurements by Using Basic Surveying Instruments.										
CO 3:	Measure the horizontal angles using compass and theodolite on ground										
CO 4:	Determine relative height of various points using Levelling Instruments.										
CO 5:	Solve Plane Table Surveying Problems										
CO 6:											
SYLLABUS											
UNIT	CONTENT									Hrs	
1.	List of Experiments: (any eight) 1. To study different types of maps published by Survey of India and Conventional Symbol Charts. 2. To study instruments used in conventional chain and compass surveying and to measure distance between two points by ranging.										
2.	3. To measure the bearing of sides and length of a given traverse by prismatic compass and tape, and plotting of the traverse after adjustment. 4. To conduct temporary adjustments of a Vernier Theodolite and measure Horizontal and Vertical angles by Reiteration method.										
3.	5. To measure Horizontal angle by repetition method. 6. To find out the reduced levels of given points using Dumpy/IOP level (Reduction by height of Collimation method and Rise and Fall method) and transfer of bench mark.										
4.	7. To determine the Tacheometric constants of a given tacheometric instrument and measurement of distance between two points by Tacheometry. 8. To plot details using radiation and intersection methods in plane tabling.										
5.	9. To solve two point/ three point problem using resection method plane table traverse survey. 10.To determine and draw the longitudinal profile and cross-section along a given route.										
TEXT BOOKS:											
TB 1:											
TB 2:											
TB 3:											
TB 4:											
TB 5:											
REFERENCES:											
Ref 1:	Agor, R. "Surveying", Vol. I&II, Khanna Publications, Delhi										
Ref 2:	Arora, K.R., "surveying", Vol. I & II, Standard Book House, Delhi										
Ref 3:	Punmia, B.C., "Surveying", Vol. I &II, Laxmi Publications New Delhi										
Ref 4:	Duggal, S.K., "Surveying Vol. I&II										
Ref 5:	Kanetkar T.P. and Kulkarni S.V., "Surveying" Vol. I&II										

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 3	COURSE TITTLE	Material Testing Lab.				COURSE ID			
COURSE COMPONENT	CREDITS					PCE 303			
Materials (CC)	2	CONTACT HOURS				L	P	T	
						1	2	0	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	0	3				25	25	50	100
COURSE OUTCOMES:									
CO 1:	Conduct tension test on mild steel								
CO 2:	Conduct compression test on concrete, wood and brick								
CO 3:	Conduct and determine the elastic constants of metal specimen								
CO 4:	Test the quality of pavement blocks and tiles								
CO 5:									
CO 6:									
SYLLABUS									
UNIT	CONTENT								Hrs
1.	List of Experiments: (any five from each category) Category- A (Tests On Materials) 1. Tension test on mild steel / tor steel rod (Tensile strength-Density-Proof Stress- Stress Strain Curve -Young's Modulus) 2. Compression test on wood								
2.	3. Double shear test on metal 4. Torsion test on mild steel rod								
3.	5. Impact test on metal specimen 6. Hardness test on metals								
4.	7. Deflection test on metal beam 8. Tests on bricks								
5.	9. Testing on pavement blocks and different tiles. 10. Test on Ply Wood.								
TEXT BOOKS:									
TB 1:									
TB 2:									
TB 3:									
TB 4:									
TB 5:									
REFERENCES:									
Ref 1:	Relevant Indian Standards								
Ref 2:									
Ref 3:									
Ref 4:									
Ref 5:									

CIVIL ENGINEERING DEPARTMENT 29

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING					
SEMESTER: 3	COURSE TITLE	Career Skills			COURSE ID	
					XCS 301	
COURSE COMPONENT	CREDITS	CONTACT HOURS			L	P
Communication Skills (CK)	2				2	0
					T	Total
					0	0
EXAMINATION DURATION	THEORY	PRACTICAL	CWA	MSE	ESE	Total
	0	3	25	25	50	100

COURSE OUTCOMES:

CO 1:	Develop gestural, formal, behavioural and social soft skills
CO 2:	Improve Communication, logical and reasoning skills.
CO 3:	Get documentation and office formality skills
CO 4:	Apply resume preparation and self presentation skills
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	Meeting Etiquette – Introductions - The Handshake– Exchange of Visiting Cards Personal Etiquette – Hygiene, Grooming, and Good sense, Travel Etiquette, Sharing Apartments. Behaviour at Work – Formal behaviour with seniors and Colleagues – Etiquette with Women/men – Adherence to Office Rules – Discipline. Table Manners and Small Talk, Group Discussions: Group Discussion Techniques/ Do’s and Dont’s/ body language/mock sessions.	
2.	Logical Reasoning: Series completion, Coding decoding, direction sense test, logical Venn diagram.	
3.	Logical Reasoning: mathematical operation, number ranking, time sequence test, arithmetical reasoning.	
4.	Job application: Importance of Business Communication in today’s world, Designing Business Letters, Types of Letters. Writing Effective Emails, Report Writing Essential parts - Cover Letter and the ‘resume’. Types of ‘resumes’ (Curriculum Vitae) Chronological ‘resume’, functional ‘resume’	
5.		

TEXT BOOKS:

TB 1:	For Verbal Section: Spoken English for India by R.K.Bansal and J.B. Harrison- Orient Longman
TB 2:	A practical English Grammar by Thomson and Martinet-Oxford University Press
TB 3:	Professional Communication by Malti Aggarwal
TB 4:	English grammar, composition and correspondence by M.A.Pink and A.E.Thomas –S.Chand and Sons.
TB 5:	Word Power by Blum Rosen-Cambridge University Press

REFERENCES:

Ref 1:	A Dictionary of Modern Usage-Oxford University Press
Ref 2:	For Aptitude Section: • Quantitative aptitude by R.S Agarwal
Ref 3:	Verbal and Non Verbal Reasoning by R.S Agarwal
Ref 4:	All books of puzzles to puzzle to puzzle you by Shakuntala Devi.
Ref 5:	Question Bank on the practice exercise (Created for internal use)

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 3	COURSE TITLE	General Proficiency				COURSE ID	
						GP 301	
COURSE COMPONENT	CREDITS					L	P
Communication Skills (GP)	1	CONTACT HOURS				0	0
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				0	0
						ESE	Total
						0	100
COURSE OUTCOMES:							
CO 1:	Develop reading and comprehensive skills						
CO 2:	Get advanced general aptitude skills.						
CO 3:	Get advanced mathematical aptitude skills						
CO 4:	Develop Critical Reasoning skills						
CO 5:							
CO 6:							
SYLLABUS							
UNIT	CONTENT						Hrs
1.	Effective Reading Skills: Reading Comprehension Purpose of reading, skimming and scanning. Tips for improving comprehension skills. (For effective reading skills practice papers on Reading Comprehension will be provided to students)						9
2.	Aptitude section: Clocks, Calendar, Profit/loss, Percentage, Average						9
3.	Aptitude Section: Ages, Trains & Boats, Simplification, Ratio & proportion, Partnership						9
4.	Critical Reasoning: Analyse logical arguments.						9
5.							9
TEXT BOOKS:							
TB 1:	For Verbal Section: Spoken English for India by R.K.Bansal and J.B. Harrison- Orient Longman						
TB 2:	A practical English Grammar by Thomson and Martinet-Oxford University Press						
TB 3:	Professional Communication by Malti Aggarwal						
TB 4:	English grammar, composition and correspondence by M.A.Pink and A.E.Thomas –S.Chand and Sons.						
TB 5:	Word Power by Blum Rosen-Cambridge University Press						
REFERENCES:							
Ref 1:	A Dictionary of Modern Usage-Oxford University Press						
Ref 2:	For Aptitude Section: Quantitative aptitude by R.S Agarwal						
Ref 3:	Verbal and Non Verbal Reasoning by R.S Agarwal						
Ref 4:	All books of puzzles to puzzle to puzzle you by Shakuntala Devi.						
Ref 5:	Question Bank on the practice exercise (Created for internal use)						

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 4	COURSE TITLE	Hydraulics and Hydraulic Machines				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 401	
Water Resources (CC)	3	CONTACT HOURS				L	P
						2	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	3	0				25	25
						ESE	Total
						50	100

COURSE OUTCOMES:

CO 1:	Solve the problems of uniform and non uniform flow in open channel
CO 2:	Apply concept of dimensional analysis and simulate in order to account for the implication of scale in model experiments
CO 3:	Understand the working principles of various hydraulic machines
CO 4:	select the appropriate turbines and pumps to meet the field requirements
CO 5:	Know the layout of a typical hydropower stations
CO 6:	understand the applications of engineering in distribution and use of machinery in hydraulics.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Introduction: Difference between open channel flow and pipe flow, geometrical parameters of a channel, Velocity and pressure distribution in an open channel, Continuity equation. Uniform Flow: Chezy's and Manning's equations for uniform flow in open channel, Equivalent roughness, most efficient channel section, simple problems of compound channel sections. Energy and Momentum Principles: 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.	9
2.	Non-Uniform flow in Open Channel: Equation of gradually varied flow and its limitations, flow classification and surface profiles, integration of varied flow equation by analytical, graphical and numerical methods. Hydraulic Jump, Surges, Water Waves: Classification of hydraulic jump, Evaluation of the jump elements in rectangular channels on horizontal and sloping beds, Use of jump, End depth in a free over fall, Equation of motion for unsteady flow, open channel surge,.	9
3.	Boundary Layer Analysis: Boundary layer thicknesses; Boundary layer over a flat plate; Laminar boundary layer; Application of Von-Kerman Integral Momentum Equation; Turbulent boundary layer; Laminar sub-layer; Hydro-dynamically Smooth and rough boundaries; Local and average friction coefficient; Total drag; Boundary layer separation and its control. Flow Past Submerged Bodies: Drag and lift, Types of drag force, Drag on sphere, Cylinder and air foil; Circulation and Lift on a cylinder and air foil; Magnus effect.	9
4.	Impact of jet on vanes: Force exerted by a jet on a fixed target, Force exerted by a Jet on a moving target, Force exerted by a jet on a series of curved vanes, Concept of velocity triangles, Equation for work done & efficiency. Pump: Types of pumps, Introduction of Reciprocating pumps. Centrifugal Pump: Definition, Classification, Description & general principle of working, priming & methods, efficiency, Minimum starting speed Specific speed of Pump and characteristics of a centrifugal pump, Cavitation's in pumps.	9
5.	Hydraulic turbines: Introduction, Types and classifications, Pelton Wheel, theory, equation for work done and efficiency, design parameters, Francis Turbine – Theory, equation for work done and efficiency, design parameters, Kaplan turbine – Theory, equation for work done & efficiency, Design parameters, Draft tube theory, Equation for efficiency, Cavitation's in turbines, Governing of turbines, Specific speed of a turbine, Model studies. Classifications; Unit quantities of a turbine, definitions, equations, Characteristic curves of a turbine.	9

TEXT BOOKS:

TB 1:	"Hydraulics & Fluid Mechanics"- Modi & Seth., Standard Book House, New Delhi
TB 2:	"Flow in Open Channels"-Subramanya K., Tata McGRAW HILL
TB 3:	"Flow Through Open Channels"-Ranga Raju, Tata McGRAW HILL
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	Fluid Mechanics and Hydraulic Machines - S.C. Gupta, Pearson Education, India
Ref 2:	Elementary Hydraulics - James F Cruise, Vijay P. Singh, Mohsan M. Sherif, Thomson Learning, 1st Edition.
Ref 3:	Chow, V.T., "Open channel Hydraulics", McGraw Hill International
Ref 4:	Hydraulics & Fluid Mechanics - , K.R. Arora, Standard Book house, New Delhi.
Ref 5:	Fluid Mechanics & Machinery - Raghunath. H M., CBS Publishers

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING					
SEMESTER: 4	COURSE TITLE	Structural Analysis- I			COURSE ID	
					TCE 402	
COURSE COMPONENT	CREDITS				L	P
Structures (CC)	3				2	0
					T	1
					CWA	MSE
EXAMINATION DURATION	THEORY	PRACTICAL			ESE	Total
	3	0			25	100

COURSE OUTCOMES:

CO 1:	Evaluate the stability and determinacy of plane frames and then Analyse determinate plane trusses using tension coefficients and equilibrium of joints/sections
CO 2:	Estimate the deflections and slopes of elastic curves using area-moment theorems, conjugate beams and strain energy principles
CO 3:	Analyse the effects of moving loads on determinate beams
CO 4:	Analyse given determinate arch and draw AFD, SFD, and BMD for the same
CO 5:	Analyse indeterminate beams and draw SFD and BMD for the same
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	Degree of freedoms, Static and kinematic indeterminacy. ANALYSIS OF PLANE TRUSSES: Stability and equilibrium of plane frames – perfect frames - types of trusses – Analysis of forces in truss members – Method of joints – Method of sections – Method of tension co-efficient.	
2.	DEFLECTION IN BEAMS AND ENERGY PRINCIPLES: Deflection in beams-Area moment method – Conjugate beam method Strain energy and strain energy density – Strain energy in axial force - shear, flexure and torsion – Castigliano’s theorem – Principle of virtual work – Application of energy theorems for computing deflections in beams, pin jointed frames – Maxwell’s reciprocal theorem. slope and deflection for standard cases of loading –	
3.	MOVING LOADS AND INFLUENCE LINES: Influence lines for reactions in statically determinate structures Muller Breslau’s principle – – influence lines for members forces in pin-jointed frames – Influence lines for shear force and bending moment in beam sections – Calculation of critical stress resultants due to concentrated and distributed moving loads.	
4.	ARCHES: Arches as structural forms – Types of arches – Analysis of three hinged, parabolic and circular arches.	
5.	INDETERMINATE BEAMS: Propped Cantilever and Fixed Beams – By Force Method, Fixed end moments reactions, Theorem of three moments for continuous beams– Shear Force and Bending Moment Diagrams by super position	

TEXT BOOKS:

TB 1:	Vaidyanathan, R. and Perumal, P., “Comprehensive structural Analysis – Vol. I & II”, Laxmi Publications, New Delhi, 2003
TB 2:	BhaviKatti, S.S, “Structural Analysis – Vol. 1 Vol. 2”, Vikas Publishing House Pvt. Ltd., New Delhi, 2008
TB 3:	Menon D. “Structural Analysis” Narosa publishing house, New Delhi.
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	Ghali, A, Naville, A.M. and Brown, T.G. “Structural Analysis” A unified classical and Matrix approach” –5th edition. Spon Press, London and New York, 2003.
Ref 2:	Coates R.C, Coutie M.G. and Kong F.K., “Structural Analysis”, ELBS and Nelson, 1990
Ref 3:	Structural Analysis – A Matrix Approach – G.S. Pandit & S.P. Gupta, Tata McGraw Hill 2004.
Ref 4:	Analysis, Design And Details Of Structures – 2003 by V N Vazirani (Author), Khanna Publications Vol. 1:
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 4	COURSE TITLE	Advanced Surveying				COURSE ID			
						TCE 403			
COURSE COMPONENT	CREDITS					L	P	T	
Surveying (CC)	3	CONTACT HOURS				2	0	1	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	3	0				25	25	50	100

COURSE OUTCOMES:

CO 1:	Understand the principles of triangulation and trilateration.
CO 2:	Adjust errors in observations accumulated during surveying.
CO 3:	Design and layout of curves for roads and railways.
CO 4:	Plan and layout the route survey for small engineering projects.
CO 5:	Understand fundamentals of GPS and GIS.
CO 6:	Apply advanced methods of surveying to find engineering solutions.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Triangulation and Trilateration: Control Surveying and its necessity, Principle of Triangulation and Trilateration, Classification of Triangulation System, Station Marks, Towers and Signals, Satellite station, Intersected and Resected points, Reconnaissance, Intervisibility of stations, Base line measurement and its extension.	9
2.	Adjustment Computations: Treatment of random errors, Normal law of errors, Most Probable Value, Weight of observations, Propagation of errors and variances, Principle of least squares, Observation and correlative Normal Equations, Adjustment of triangulation figures and level nets.	9
3.	Curves: Classification of curves, Elements of Simple Circular, Transition and Vertical curves, Theory and methods of setting out circular, transition and vertical curves, special field problems.	
4.	Engineering Project and Route Surveys: General requirements and specifications for Engineering Project surveys, Reconnaissance, Preliminary and Location surveys for highways, railways and canals, Correlation of surface and underground surveys in case of Mines and Tunnels, Basics of hydrographic surveys, Layout of culverts, canals, bridges and buildings. Basic Astronomy: Astronomical terms, co-ordinate systems, Spherical trigonometry, Astronomical triangle, Relationship between coordinates,	9
5.	Aerospace surveying, GPS & GIS: Aerospace images, aerial photography and Satellite images. Introduction to photogrammetry, Scale of photograph, Tilt and height displacement, Stereoscopic vision, use of stereoscope and parallax bar, Techniques of photo-interpretation, Mapping from aerial photographs. Remote sensing - Introduction, Electro Magnetic radiation (EMR), energy interaction with atmosphere and earth features, spectral signatures, Remote sensing satellite and their data products, methods of interpretation of remotely sensed data, Digital Image Processing of Remote Sensing data. Global Positioning System (GPS)-Introduction, principle, and applications of GPS in different fields of Surveying. Geographic Information System (GIS)- Introduction, Elements of GIS, Hardware and Software for GIS, GIS Components, GIS applications.	9

TEXT BOOKS:

TB 1:	Arora, K.R., "surveying", Vol. II & III Standard Book House, Delhi
TB 2:	Agor, R. "Surveying", Vol. II&III Khanna Publications, Delhi
TB 3:	Bannister, A. and Baker, R., "Solving Problems in Surveying", Longman Scientific Technical, U.K.
TB 4:	Chandra, A.M., "Higher Surveying", New Age International Publishers, Delhi
TB 5:	Clark, David "Higher Surveying", CBS Publishers & Distributors, New Delhi

REFERENCES:

Ref 1:	Duggal, S.K., "Surveying Vol. I, II
Ref 2:	Kanetkar T.P. and Kulkarni S.V., "Surveying" Vol. I&II
Ref 3:	Lillesand, T.M. and Kiefer, R.W., "Remote Sensing and Image Interpretation"
Ref 4:	Punmia, B.C., "Surveying", Vol. II & III, Laxmi Publications New Delhi
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 34

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING				
SEMESTER: 4	COURSE TITLE	Concrete Technology			COURSE ID
					TCE 404
COURSE COMPONENT	CREDITS	CONTACT HOURS			
Materials (CC)	3	L	P	T	
		2	0	1	
EXAMINATION DURATION	THEORY	PRACTICAL	CWA	MSE	ESE
	3	0	25	25	50
			Total		100

COURSE OUTCOMES:

CO 1:	Identify and Test the concrete ingredients based on their physical properties.
CO 2:	Control the quality of fresh concrete production on the work need
CO 3:	Study the influence of various properties of the ingredients for required grade of concrete
CO 4:	Determine the properties of the ingredients for required grade of concrete
CO 5:	Regulate the final concrete properties using the concrete additives
CO 6:	Plan and Produce required quality of concrete to meet the site specific need.

SYLLABUS

UNIT	CONTENT	Hrs
1.	CONCRETE INGREDIENTS: Cement: Grades and different types of cement, Constituents of cements, Hydration of cement, Water requirement, Physical properties and testing of cement- Field testing, Fineness by sieve analysis and Blaine's air permeability test, Normal consistency, testing time, soundness.. Hardening and compressive strength. Aggregates: Fine aggregate –grading, analysis, Specific gravity, bulking, moisture content, and deleterious materials. Coarse aggregate – Importance of size, shape and texture. Grading of aggregates – Sieve analysis, specific gravity, Flakiness and elongation index, crushing, impact and abrasion tests. Water : water quality for mixing and curing, Acceptable water, pH value, Seawater chlorides content. Provisions in IS: 456	
2.	FRESH CONCRETE: Batching, Mechanical mixers, automatic batching and mixing plants, efficiency of mixing, – Workability and its Measurement, Factor affecting workability, setting time, Significance of w/c ratio, cohesiveness of concrete, Segregation, bleeding, voids, permeability. Hot weather concreting, Conveyance of concrete, placing of concrete, compaction, vibrators, curing of concrete, significance and methods, temperature effects on curing and strength gain, IS provisions, Maturity of concrete, Formwork for concrete- IS provisions . Introduction to Ready mix, pumped and self-compacting concrete.	
3.	HARDENED CONCRETE: Factors affecting strength, w/c ratio, gel/space ratio, maturity concept, Effect of aggregate properties, relation between compressive strength, and tensile strength, bond strength, modulus of rupture, Accelerated curing, aggregate – cement bond strength, Elasticity – Relation between modulus of elasticity and Strength, factors affecting modulus of elasticity, Poisson , Ratio, Shrinkage – plastic shrinkage and drying shrinkage, Factors affecting shrinkage, Creep – Measurement of creep, factors affecting creep, effect of creep, Durability – definition, significance, permeability, Sulphate attack, Chloride attack, carbonation, freezing and thawing, Factors contributing to cracks in concrete – plastic shrinkage, settlement cracks, construction joints, Thermal expansion, transition zone, structural design deficiencies, Testing of hardened concrete – compressive strength, split tensile strength, Flexural strength, factors influencing strength test results.	
4.	CONCRETE MIX DESIGN: Process, statistical relation between main and characteristic strength, variance, standard deviation, factors affecting mix properties, grading of aggregates, aggregate/cement ratio etc. Degree of quality control, design of mix by IS 10262-1982 method, introduction to ACI method.	
5.	Additives and admixtures: Types of admixtures, natural products, diatomaceous earth, calcined clays of shales, volcanic glasses, byproducts – pozzolona, fly ash, silica fume, rice husk ash, metakaoline, G.G. blast furnace slag, admixtures - air entraining, water reducing, accelerators, retarders, plasticizers and superplasticizers, permeability reducer, grouting agents, surface hardeners, Porous concrete. Shrinkage and creep: Early volume changes, drying shrinkage, mechanism and factors affecting shrinkage, influence of curing conditions, differential shrinkage, carbonation, creep- factors influencing, relation between creep and time, nature of creep, effect of creep.	

TEXT BOOKS:

TB 1:	"Concrete Technology" - Theory and Practice, M.S.Shetty, S.Chand and Company, New Delhi, 2002.
TB 2:	"Properties of Concrete" Neville, A.M. : , ELBS, London
TB 3:	Concrete Technology, "M L Gambhir" Tata McGraw-Hill Education, 2004
TB 4:	"Concrete Technology" - Shetty, M.S., S.Chand & Co., New Delhi.
TB 5:	

REFERENCES:

Ref 1:	"Concrete Manual" - Gambhir Dhanpat Rai & Sons, New Delhi.
Ref 2:	"Concrete Mix Design" - N.Krishna Raju, Sehgal – publishers.
Ref 3:	IS:10262, IS 269-1989, IS 383-1970, IS 456-2000, IS 516-1959, IS 1199-1954, IS 2386 (Part 1 to 8), BIS publication.

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING					
SEMESTER: 4	COURSE TITLE	Geotechnical Engineering-I			COURSE ID	
COURSE COMPONENT	CREDITS				TCE 405	
Geo Technical Engineering (CC)	3	CONTACT HOURS			L	P
					2	0
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE
	3	0			25	25
					ESE	Total
					50	100

COURSE OUTCOMES:

CO 1:	Determine the index properties of soil and generalize the process of soil classification.
CO 2:	Understand the effect of water on soil properties and soil strength.
CO 3:	Determine the shear strength parameters of the soil sample.
CO 4:	Understand the mechanics behind the strengthening of soil by compaction and devastating effect on soil subjected to consolidation.
CO 5:	Estimate the location and intensity of lateral stresses on various geotechnical structures.
CO 6:	Appreciate the significance of soil properties and soil mechanics in solving basic field problems.

SYLLABUS

UNIT	CONTENT	Hrs
1.	content, Specific Gravity of soil solids and soil mass, Densities and Unit weights - Bulk, Dry, Saturated & Submerged and their inter relationships. Index properties of soils: Water content, Specific Gravity, Particle size distribution, Relative Density, Consistency limits and indices, in-situ density, Activity of Clay, Laboratory methods of determination of index properties of soil: Water content (Oven Drying method & Rapid Moisture method), Specific gravity of soil solids (Pycnometer and density bottle method), Particle size distribution (Sieve analysis and Hydrometer analysis only), Liquid Limit- (Casagrande and Cone penetration methods), Plastic limit and shrinkage limit. Soil classification: Purpose of soil classification, Classification based on particle size, IS classification and Plasticity chart, Field Identification of soils. Clay mineralogy and soil structure: Single grained, honey combed,	9
2.	Flow of water through soils: Darcy's law- assumption and validity, coefficient of permeability and its determination (laboratory and field), factors affecting permeability, permeability of stratified soils, Seepage velocity, Superficial velocity, Capillary Phenomena. Seepage Pressure, Quicksand condition, Derivation of Laplace's equation, Flow net, its characteristics, construction (Graphical method), its applications – Computation of seepage, exit gradient.	9
3.	Shear strength of soil: Concept of shear strength, Mohr-coulomb theory, Effective stress concept-total stress, effective stress and Neutral stress, Concept of pore pressure, Total and effective shear strength parameters, factors affecting shear strength of soils- soil type, degree of saturation, drainage conditions, Direct shear Test and Triaxial test. Unconfined compressive strength, Vane shear Test.	9
4.	Compaction of soil: Definition, Principle of compaction, Standard and Modified proctor's compaction tests, factors affecting compaction, effect of compaction on soil properties, Field compaction control – compactive effort & method, lift thickness and number of passes, Proctor's needle, Compacting equipment and measurement of field density by various methods. Compressibility and consolidation: Definition, Mass-spring analogy, Normally consolidated, Under consolidated and over consolidated soils, pre-consolidation pressure and its determination by Casagrande's method. Consolidation characteristics of soil (Cc, av, mv and Cv), Estimation of settlement due to consolidation. Terzaghi's one dimensional consolidation theory-assumption and limitations, Relevance of one –dimensional consolidation to field condition. Consolidation test and determination of coefficient of consolidation by square root of time fitting and logarithm of time fitting method, Time rate of consolidation.	9
5.	Lateral earth pressure: Active and Passive earth pressures, Earth pressure at rest. Rankine's and Coulomb's Earth pressure theories—assumptions and limitations, Graphical solutions for active earth pressure (cohesionless soil only) – Culmann's and Rebhann's methods, Lateral earth pressure in cohesive and cohesionless soils, critical depth of open cut in cohesive soil, Earth pressure distribution.	9

TEXT BOOKS:

TB 1:	Gopal Ranjan and Rao A.S.R. (2000) "Basic and Applied Soil Mechanics", New Age International (P) Ltd., New Delhi.
TB 2:	Murthy V.N.S. (1996), "Soil Mechanics and Foundation Engineering" 4th Edition, UBS Publishers and Distributors, New Delhi.
TB 3:	Venkatrahmaiah C. (2006), "Geotechnical Engineering" 3rd Edition New Age International (P) Ltd., New Delhi.
TB 4:	Punmia B.C. (2005) "Soil Mechanics and Foundation Engg"-, 16th Edition Laxmi Publications Co., New Delhi.
TB 5:	Arora K.R. "Soil Mechanics and Foundation Engineering" Pub: Standard Publishers & Distributors.

REFERENCES:

Ref 1:	Braja, M. Das (2002), "Principles of Geotechnical Engineering" Fifth Edition, Thomson Business Information India (P) Ltd., India
Ref 2:	S Eng in Th and Pr Singh Cowdhary

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 4	COURSE TITTLE	Engineering Geology				COURSE ID			
						TCE 406			
COURSE COMPONENT	CREDITS					L	P	T	
Materials (CC)	3					2	0	1	
						CONTACT HOURS			
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	3	0				25	25	50	100

COURSE OUTCOMES:

CO 1:	Understand the internal structure of earth and about earth science
CO 2:	Understand the general structure and texture of Igneous, Sedimentary and Metamorphic rocks
CO 3:	Able to understand the various geological formations of lithosphere and Landslides
CO 4:	Able to understand the concepts of Earthquake , geological considerations and ground water provinces of India
CO 5:	Able to understand the geological considerations for site selection of Dams, Reservoirs, Tunnels, Bridges and Highway as well as methods of Geophysical explorations.
CO 6:	Able to understand various geological formations, internal structure of earth and plan various constructions and site selections

SYLLABUS

UNIT	CONTENT	Hrs
1.	Earth Sciences and its importance in Civil Engg. Minerals and their physical properties. Study of common rock forming minerals. Internal structure of the earth. Suitability of rocks as engineering materials. Building stones occurrences and characteristics, selection	9
2.	Rocks origin, Characteristics, Texture, structure and classification of igneous, sedimentary and metamorphic rocks. Engineering properties of rocks.	9
3.	Strike and dip of strata, folds, faults, joints, unconformity and their classification, Causes and relation to engineering behaviour of rock masses. Overlap. Landslides causes, classification and preventive measures.	9
4.	Earthquake causes, classification, earthquake waves, intensity and magnitude, Seismic zones for India, Geological consideration for construction of building. Underground water, sources, Aquifer, Artesian well, Ground water provinces of India and its role as geological hazard.	9
5.	Geological investigations for site selection of dams & reservoirs, tunnels, bridges and highways. Reservoir induced seismicity. Methods of Geophysical explorations-gravity, electrical and seismic, methods.	9

TEXT BOOKS:

TB 1:	Prabin Singh, "Engineering and General Geology", Katson publishing house.
TB 2:	B.S. Sathya, Narayanswamy, "Engg. Geology" Dhanpat Rai & Co. New Delhi.
TB 3:	Legget, R.F., "Geology and Engineering", McGraw Hill, New York.
TB 4:	Blyth, F.G.M., "A Geology for Engineers" , Arnold, London.
TB 5:	P.K. Mukerjee, "A Text Book of Geology", Calcutta, world publisher.

REFERENCES:

Ref 1:	Krynine and Judd: "Principles of Engg. Geology & Geotech.," Mc Graw Hill, New York.
Ref 2:	K.S. Valdiya: "Environmental Geology", Tata Mc Graw Hill, New Delhi.
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 37

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING									
SEMESTER: 4	COURSE TITLE	Hydraulics and Hydraulic Machine Lab				COURSE ID				
						PCE 401				
COURSE COMPONENT	CREDITS					L	P			
Water Resources (CC)	2	CONTACT HOURS				1	2			
						T	Total			
EXAMINATION DURATION	THEORY	PRACTICAL					CWA	MSE	ESE	Total
	0	3					25	25	50	100

COURSE OUTCOMES:

CO 1:	Test the performance and efficiency of water lifting equipment.
CO 2:	Determine manning's and chezys coefficients for smooth and rough channels
CO 3:	Study the boundary layer and velocity profile , thus to determine the boundary layer thickness
CO 4:	Test the performance and efficiency of turbines
CO 5:	Observe the practical operations of the hydraulic equipment
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	List of Experiments (any eight) 1. To determine the Manning's coefficient of roughness 'n' for the given channel bed. 2. To study the velocity distribution in an open channel and to find the energy and momentum correction factors.	
2.	3. To calibrate a broad-crested weir and find the coefficient of discharge of the weir. 4. To study the flow characteristics through a vertical contraction (hump) in an open channel.	
3.	5. To study the flow through a horizontal contraction in a rectangular channel. 6. To study the characteristics of free hydraulic jump.	
4.	7. To study the flow over an abrupt drop and to determine the end (brink) depth for a free over fall in an open channel. 8. To study the boundary layer velocity profile and to determine boundary layer thickness and displacement thickness. Also to determine the exponent in the power law of velocity distribution.	
5.	9. To verify the momentum equation. 10. To study centrifugal pumps and their characteristics. 11. To study the operation of a Pelton Wheel Turbine.	

TEXT BOOKS:

TB 1:	1. G.L Asawa, "Laboratory work in Hydraulic Engineering", New Age International publishers, New Delhi
TB 2:	
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 4	COURSE TITTLE	Advanced Field Survey				COURSE ID	
COURSE COMPONENT	CREDITS					PCE 402	
Surveying (CC)	2	CONTACT HOURS				L	P
						1	2
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				25	25
						ESE	Total
						50	100

COURSE OUTCOMES:

CO 1:	Understand and use the advanced optical surveying instruments.
CO 2:	Plot a triangulation polygon with the help of plane table.
CO 3:	Set out simple curves using linear and angular methods.
CO 4:	Study and interpretation of aerial photographs, and conduct GPS survey for small area.
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	List of Experiments: (any eight) 1. Study and use of different types of micro-optic theodolite and total station, and carry out Triangulation and Trilateration of a given area, compute the adjusted coordinates of triangulation stations.	
2.	2. To plot the coordinates of triangulation stations at a given scale on Plane Table and checking them in field. 3. To Layout a simple circular curve on the ground using linear methods.	
3.	4. To Layout a simple circular curve on the ground using Angular methods. 5. Setting out works for construction of building and a culvert on the ground.	
4.	6. Study of aerial photographs, to find out scale and flying height of a photograph. and Prepare a Base Map on a tracing paper. 7. Use of mirror stereoscope and parallax bar for measurements on aerial photographs and plotting details on a tracing paper.	
5.	8. Use of GPS for measurement of coordinates and GPS survey of small area. 9. Study and familiarization of GIS and its applications in Civil Engineering.	

TEXT BOOKS:

TB 1:	
TB 2:	
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	Arora, K.R., "surveying", Vol. II & III Standard Book House, Delhi
Ref 2:	Agor, R. "Surveying", Vol. II&III Khanna Publications, Delhi
Ref 3:	Chandra, A.M., "Higher Surveying", New Age International Publishers, Delhi
Ref 4:	Clark, David "Higher Surveying", CBS Publishers & Distributers, New Delhi
Ref 5:	Duggal, S.K., "Surveying Vol. I, II

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING									
SEMESTER: 4	COURSE TITLE	Computer Aided Civil Engineering Drawing				COURSE ID				
COURSE COMPONENT	CREDITS					PCE 403				
Drawing (CC)	2	CONTACT HOURS				L	P			
						1	2			
EXAMINATION DURATION	THEORY	PRACTICAL					CWA	MSE	ESE	Total
	0	3					25	25	50	100

COURSE OUTCOMES:

CO 1:	Draw the plan, section and elevation of a building
CO 2:	Create, analyse and produce 2D drawings of buildings and components in AUTO CAD environment
CO 3:	Detailing building plans in CAD environment
CO 4:	
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	INTRODUCTION TO CAD AND ITS RELATED SOFTWARES AUTOCAD screen, Setting the options, Menu commands, Opening a drawing, Drawing tools, Editing tools, Creating drawings using wizards, Dimensioning, Text in AUTOCAD, Layers concept, Blocks, Hatching, Working with Multiple drawings, Drawing 2D objects using above tools..	
2.	DRAWING COMPONENTS OF BUILDING : Symbols used in Civil Engineering drawing, Masonry Bonds (Brick and Stone masonry), pointing Types, masonry Columns and wall Junctions. Drawing following components of building using AUTOCAD tools - Masonry foundations, Doors and Windows, Staircases, Trusses.	
3.	BUILDING DRAWINGS : Drawing plans of buildings using drawing tools, creating openings in plans using modify tools, creating and inserting blocks of doors and windows, Inserting text and dimensions, Drawing elevation and sections, Creating sanction drawing. Preparation of working drawings of single storey and double storey residential buildings. Plumbing & Electrical fitting drawing.	
4.	STRUCTURAL DRAWINGS : Preparation of column lay out and excavation drawings, footing, Lintel and Chejja, beams and slabs of framed structures	
5.	THREE DIMENSIONAL DRAWINGS: Co-ordinate systems, creating 3D objects, View ports, drawing isometric view of standard objects, Preparation of perspective views of buildings using given plan and elevations .	

TEXT BOOKS:

TB 1:	M.M Goyal, Hand book of Building construction, Amrindrea Consultancy (P) Ltd., 220, Sector 21-A Faridabad.
TB 2:	B.C. Punmia, A text book of Building Construction, Laxmi P.
TB 3:	Beall Christine, Masonry design and detailing for architects. Engineers and builders (5th ed.) New York, Mc-Graw-Hill, 2003
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 40											
PROGRAM:		BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING									
SEMESTER: 4		COURSE TITTLE	Career Skills					COURSE ID			
COURSE COMPONENT		CREDITS						XCS 401			
Communication Skills (CK)		2						CONTACT HOURS			
EXAMINATION DURATION		THEORY	PRACTICAL					CWA	MSE	ESE	Total
		0	3					25	25	50	100
COURSE OUTCOMES:											
CO 1:	Develop English communication skills										
CO 2:	Improve Communication, logical and reasoning skills.										
CO 3:	Learn techniques to improve vocabulary, thus by achieve effective communication.										
CO 4:											
CO 5:											
CO 6:											
SYLLABUS											
UNIT	CONTENT									Hrs	
1.	Functional Grammar: Parts of speech, articles, parallel construction, subject verb agreement.										
2.	Logical Reasoning : Blood relation, puzzle test, syllogism, classification, seating/placing arrangements.										
3.	Logical Reasoning: ranking and comparison, sequential order and things, selection based on conditions, data interpretation										
4.	Building Vocabulary: Analogy, Para jumbles, antonyms and synonyms.										
5.											
TEXT BOOKS:											
TB 1:	For Verbal Section: Spoken English for India by R.K.Bansal and J.B. Harrison- Orient Longman										
TB 2:	A practical English Grammar by Thomson and Martinet-Oxford University Press										
TB 3:	Professional Communication by Malti Aggarwal										
TB 4:	English grammar, composition and correspondence by M.A.Pink and A.E.Thomas –S.Chand and Sons.Word Power by Blum Rosen-Cambridge University Press										
TB 5:	A Dictionary of Modern Usage-Oxford University Press										
REFERENCES:											
Ref 1:	For Aptitude Section: Quantitative aptitude by R.S Agarwal										
Ref 2:	Verbal and Non Verbal Reasoning by R.S Agarwal										
Ref 3:	All books of puzzles to puzzle to puzzle you by Shakuntala Devi.										
Ref 4:	Question Bank on the practice exercise (Created for internal use)										
Ref 5:											

CIVIL ENGINEERING DEPARTMENT 41								
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING							
SEMESTER: 4	COURSE TITLE	General Proficiency					COURSE ID	
COURSE COMPONENT	CREDITS						GP 401	
Communication Skills (GP)	1	CONTACT HOURS					L	P
							0	0
EXAMINATION DURATION	THEORY	PRACTICAL					CWA	MSE
	0	3					0	0
							ESE	Total
							0	100
COURSE OUTCOMES:								
CO 1:	Develop reading and comprehensive skills							
CO 2:	Get advanced general aptitude skills.							
CO 3:	Get advanced mathematical aptitude skills							
CO 4:	Develop Critical Reasoning skills							
CO 5:								
CO 6:								
SYLLABUS								
UNIT	CONTENT						Hrs	
1.	Effective Reading Skills: Reading Comprehension Purpose of reading, skimming and scanning. Tips for improving comprehension skills. (For effective reading skills practice papers on Reading Comprehension will be provided to students)						9	
2.	Aptitude section: Clocks, Calendar, Profit/loss, Percentage, Average						9	
3.	Aptitude Section: Ages, Trains & Boats, Simplification, Ratio & proportion, Partnership						9	
4.	Critical Reasoning: Analyze logical arguments.						9	
5.							9	
TEXT BOOKS:								
TB 1:	For Verbal Section: Spoken English for India by R.K.Bansal and J.B. Harrison- Orient Longman							
TB 2:	A practical English Grammar by Thomson and Martinet-Oxford University Press							
TB 3:	Professional Communication by Malti Aggarwal							
TB 4:	English grammar, composition and correspondence by M.A.Pink and A.E.Thomas –S.Chand and Sons.							
TB 5:	Word Power by Blum Rosen-Cambridge University Press							
REFERENCES:								
Ref 1:	A Dictionary of Modern Usage-Oxford University Press							
Ref 2:	For Aptitude Section: Quantitative aptitude by R.S Agarwal							
Ref 3:	Verbal and Non Verbal Reasoning by R.S Agarwal							
Ref 4:	All books of puzzles to puzzle to puzzle you by Shakuntala Devi.							
Ref 5:	Question Bank on the practice exercise (Created for internal use)							

CIVIL ENGINEERING DEPARTMENT 42								
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING							
SEMESTER: 5	COURSE TITLE	Environment Engineering –I				COURSE ID		
						TCE 501		
COURSE COMPONENT	CREDITS	CONTACT HOURS				L	P	T
Environmental Engineering (CC)	3					3	0	0
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE	ESE	Total
	3	0			25	25	50	100
COURSE OUTCOMES:								
CO 1:	Understand the concept of water demand, population forecasting, sources of water and reservoir silting							
CO 2:	Able to design and plan an effective water supply pipeline system as per the demand							
CO 3:	Knowledge about distribution system of water supply							
CO 4:	Understand treatment of water for a water supply scheme							
CO 5:	Insight about air pollution, noise pollution their prevention and control							
CO 6:	Planning of a water supply scheme for any given area as well as control of noise pollution							
SYLLABUS								
UNIT	CONTENT							Hrs
1.	Water supply: Water demand and domestic use, variation in demand; population forecasting by various methods using logistic curve method; per capita supply, basic needs and factors affecting consumption; design period.Sources of water: Kinds of water sources and their characteristics, collection of surface and ground water; quality of surface and ground waters; factors governing the selection of a source of water supply; intakes and their design for lakes, streams and rivers, impounding reservoir and canal; determination of the capacity of impounding reservoir.							9
2.	Transmission of water: Various types of conduits, capacity and sizes including economical sizes of rising main, structural requirements; laying and testing of water supply pipelines; pipe materials, joints, appurtenances and valves; leakages and control; water hammer and its control measures.							9
3.	Storage and distribution of water: Methods of distribution, pressure and gravity distribution systems, concept of service and balancing reservoirs, capacity of distribution reservoirs; general design guidelines for distribution system, Hardy - Cross method, Newton - Raphson method and equivalent pipe method of pipe network analysis; rural water supply distribution system.Water supply, plumbing systems in buildings and houses: water connections, different cocks and pipe fittings, hot water installation. Institutional and industrial water supply.							9
4.	Drinking water standard and quality, Water treatment system, design of sedimentation, filtration and disinfection units. Detailing and maintenance of treatment units.							9
5.	Air pollution: Composition and structure of atmosphere; units of measurement, sources of pollutants, classification of pollutants and their effects, air quality monitoring and standards. Brief introduction to Control devices for particulate contaminants – gravitational settling chambers, centrifugal collectors, wet collectors, fabric filters and electrostatic precipitators; control devices for gaseous contaminants; automotive emission control, concept of clean and biofuels. Noise pollution: Definition of decibel, sound power level, sound intensity level and sound pressure level; measurement of noise level; basic concept of community noise, transportation noise and industrial noise; acceptable outdoor and indoor noise levels; effects of noise and control measures							9
TEXT BOOKS:								
TB 1:	H.S. Peavy, DR Rowe and G. Tchobanoglous: Environmental Engineering							
TB 2:	Metcalf and Eddy Inc.: Wastewater Engineering							
TB 3:	Fair and Geyer: Water Supply and Wastewater Disposal							
TB 4:	Birdie: Water Supply and Sanitary Engineering							
TB 5:								
REFERENCES:								
Ref 1:	Garg: Water Supply Engineering (Environmental Engineering Vol. – I)							
Ref 2:	ET Chanlef; McGraw, Hill Ltd.,							
Ref 3:	Manual on Water Supply and Treatment, C.P.H.E.E.O., Ministry of Urban Development, Government of India, New Delhi							
Ref 4:	Steel and McGhee: Water Supply and Sewerage							

CIVIL ENGINEERING DEPARTMENT 43

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 5	COURSE TITLE	Reinforced Cement Concrete - I				COURSE ID			
						TCE 502			
COURSE COMPONENT	CREDITS					L	P	T	
Structures (CC)	4	CONTACT HOURS				3	0	1	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	3	0				25	25	50	100

COURSE OUTCOMES:

CO 1:	Understand the engineering properties of concrete and their interdependencies in fresh and hardened stages
CO 2:	Assess the suitability of right design philosophy for a typical RCC element design.
CO 3:	Design and analyse a simple RCC flexural member with rough detailing of reinforcement.
CO 4:	Design a simple RCC slab panel with rough detailing of reinforcement
CO 5:	Design a Simple column subjected to Axial and Biaxial Loading, and an isolated footing.
CO 6:	Appreciate Design of safe and economical RCC structural elements as per Indian Code recommendation

SYLLABUS

UNIT	CONTENT	Hrs
1.	Properties of Concrete: Compressive strength, Tensile strength, stress-strain curve, Modulus of Elasticity, shrinkage and creep, workability, ingredient of concrete, Characteristic strength, Grades of concrete, Design stress – Strain curve and non-destructive test. Reinforcing Steel: Types and Grades, stress strain curves, Design stress-strain curve.	9
2.	Basic concepts of Reinforced concrete design: Working stress method: Behavior of beam under flexure, Stress distribution diagram, Basic concept in design for flexure, assumptions, design constants. Limit State methods: Characteristic values, partial safety factor, and stress strain relationship, stress block parameters, failure criteria. Limit state of collapse in flexure, basic assumptions. Design and Analysis of Singly Reinforced rectangular beams using Working stress method.	9
3.	Behaviour of RC Beams: Behaviour in flexure, Design for flexure: Singly / Doubly reinforced sections (Rectangular and Flanged) by limit state methods Behaviour in Shear and Bond: Design for Shear, Anchorage and Splicing of Reinforcement. Limit States of Deflection and Cracking.	9
4.	Design and Detailing of Beams (Simply supported & Cantilever Beams). Design and detailing of Slabs: One way / two way Rectangular Slabs, Design Parameters and design of a straight flight Staircase.	9
5.	Design of Columns: Column – Interaction curves, short/ slender columns, slenderness effect, use of design charts. Types of Column footings: Design of isolated footings.	9

TEXT BOOKS:

TB 1:	S. Unnikrishna Pillai & D. Menon, "Reinforced Concrete Design", Tata Mc-Graw Hill Book Publishing Company Limited, New Delhi.
TB 2:	O. P. Jain & Jai Krishna, "Plain and Reinforced Concrete", Vol. I & II Nem Chand & Bros.
TB 3:	A. K. Jain, "Reinforced Concrete – Limit State Design" Nem Chand & Bros., Roorkee.
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	R. Park and Pauley, "Reinforced Concrete Structures"
Ref 2:	P. Dayaratnam, "Reinforced Concrete Design"
Ref 3:	IS : 456 – 2000.
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 44							
PROGRAM:		BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING					
SEMESTER: 5		COURSE TITLE	Geotechnical Engineering –II			COURSE ID	
COURSE COMPONENT		CREDITS	CONTACT HOURS			TCE 503	
Geo Technical Engineering (CC)		3				L	P
EXAMINATION DURATION		THEORY	PRACTICAL	CWA	MSE	ESE	Total
		3	0	25	25	50	100
COURSE OUTCOMES:							
CO 1:		Differentiate and analyse the stability of various earthen slopes.					
CO 2:		Estimate the intensity of vertical stresses at any point in the soil.					
CO 3:		Determine the bearing capacity of a shallow foundation.					
CO 4:		Determine the bearing capacity of a deep foundation.					
CO 5:		Adopt suitable soil exploration and various ground improvement techniques					
CO 6:		Suggest and apply the principles of soil mechanics for solving foundation related field problems					
SYLLABUS							
UNIT	CONTENT						Hrs
1.	Stability of earth slopes: Types of slopes, causes and type of failure of slopes. Definition of factor of safety, Stability of infinite slopes, Stability of finite slopes by Method of slices and Friction Circle method, Fellinius method. Taylor's stability number and its uses. Slope protection measures.						9
2.	Bearing capacity: Definitions of ultimate, net and safe bearing capacities, Allowable bearing pressure. Terzaghi's and Brinch Hansen's bearing capacity equations - assumptions and limitations, Bearing capacity of footing subjected to eccentric loading. Effect of ground water table on bearing capacity. Bearing capacity of footing on layered soil. Field methods of evaluation of bearing capacity, their limitations- Plate load test, Standard penetration test and cone penetration test. IS Code bearing capacity equation -Mayerhoff bearing capacity equation. Stress Distribution under loaded area: Boussinesq's and Westergaard's theories for concentrated, circular and rectangular loads. Pressure distribution diagrams, Contact pressure, Newmark's chart. Approximate methods.						9
3.	Shallow Foundations- Settlement and Proportioning: Importance and Concept of Settlement Analysis, Immediate, Consolidation and Secondary settlements (no derivations, but, computation using relevant formula for Normally Consolidated soils), Tolerance. BIS specifications for total and differential settlements of footings and rafts. Allowable Bearing Pressure, Factors influencing the selection of depth of foundation, Factors influencing Allowable Bearing Pressure, Factors influencing the choice of foundation, Proportioning isolated, combined, strip and mat foundations.						9
4.	Pile foundations: Classification and their suitability, pile capacity by static methods, Negative skin friction, pile capacity by dynamic formulae, their limitations. Group action of piles, Number and spacing of piles in group. Group efficiency, Under-reamed piles- design, equipment and construction. Well & Caissons foundation: Types- grip length, well sinking remedial measures, Sheet Piles: Types, analysis of cantilever and anchored sheet Piles, Cofferdams: Types and Application						9
5.	Subsurface exploration and ground improvement techniques: Importance of exploration program, Methods of exploration: Boring, Seismic refraction method of geophysical exploration, Types of samples - undisturbed, disturbed and representative samples, Samplers, sample disturbance, area ratio, Recovery ratio, clearance, Stabilisation of boreholes - Typical bore log. Number and depth of borings for various civil engineering structures, soil exploration report. Ground water level determination by Hvorslev's method, Control of ground water during excavation: Dewatering - Ditches and sumps, well point system, Vacuum method, Electro- Osmosis method. Problematic soils. Mechanical Stabilisation methods, Preloading, Sand drains, Grouting, Vibroflotation, Dewatering, Geosynthetics. Chemical Stabilisation by Cement, Lime.						9
TEXT BOOKS:							
TB 1:	Soil Mechanics and Foundation Engg.- Punmia B.C. (2005), Laxmi Publications Co. , New Delhi.						
TB 2:	Soil Engineering in Theory and Practice- Alam Singh and Chowdhary G.R. (1994), CBS Publishers and Distributors Ltd., New Delhi						
TB 3:							
REFERENCES:							
Ref 1:	Foundation Analysis and Design- Bowles J.E. (1996), 5th Edition, McGraw Hill Pub. Co. New York.						
Ref 2:	Foundation Engineering - Braja M. Das – Thomson						
Ref 3:	Foundation Design by W.C. Teng, PHI Publishers Ltd.						
Ref 4:	Basic and Applied Soil Mechanics- Gopal Ranjan and Rao A.S.R. (2000), New Age International (P) Ltd., New Delhi.						
Ref 5:	Geotechnical Engineering- Venkatrahmaiah C. (2006), 3rd Edition New Age International (P) Ltd., New Delhi.						

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 5	COURSE TITLE	Water Resources Engineering -I				COURSE ID	
COURSE COMPONENT	CREDITS	CONTACT HOURS				TCE 504	
Water Resources (CC)	4					L	P
						3	0
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE	ESE
	3	0			25	25	50
					Total		100

COURSE OUTCOMES:

CO 1:	Find precipitation data for a station close to them and interpret this data by plotting it graphically
CO 2:	Estimate the magnitude of runoff and predict flood .
CO 3:	Estimate the availability of ground water and crop water requirements.
CO 4:	Determine the reservoir capacity and general methods of irrigation.
CO 5:	Know about the civil structures in water distribution.
CO 6:	Appreciate and plan the occurrence and distribution of water through civil structures.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Introduction: Scope of hydrology, occurrence of water. Historical developments, Hydrological cycle, Hydrological processes. Precipitation: Definition and forms of precipitation, Types of precipitation, Measurement of precipitation - Non recording and recording type rain gauges, Computation of average depth of precipitation over an area, Optimum number of rain gauges, Estimation of missing precipitation record, Mass curve and consistency of rainfall data, Rain gauges networks, Rainfall distribution in India, I-D, D-A-D Curves, Frequency and return period Evaporation: Physics involved, factors affecting measurement & control of evaporation on reservoirs, Evapotranspiration, Penman's equation, definition and measurement. Process of infiltration, factors affecting infiltration, infiltration indices, Application to a practical problem.	9
2.	Surface runoff: Determination of factors affecting yield calculations. Hydrograph: Components of hydrograph, Separation of base flow, flow recession, Unit hydrograph theory, assumptions limitations Derivation and application of unit hydrograph, Computation of unit hydrographs ordinates of different durations, S-Curve and its use. Floods: Definition, factors affecting, determination by formulae, Gumble's method, curves, gauging, design flood hydrograph, Recurrence period, Flood Routing.	9
3.	Ground water hydrology and well hydraulics: Scope and importance of ground water hydrology, Occurrence of ground water, Aquifer parameters, Darcy's law and its validity, Steady radial flow into a well in confined and unconfined aquifers, Safe yield, yield of an open well, recuperation test. Demand for waters, crops - water requirements of different crops, Definition of consumptive use, duty, delta and base period, KOR depth, Factor affecting duty of water, Definition of gross command area, culturable command area, intensity of irrigation, time factor, crop factor, Irrigation efficiencies, calculation of water required.	9
4.	Definition and necessity of irrigation, Different systems of irrigation, Flow, Lift, Inundation, Bandhara, Storage, Percolation of tank, Sources of water, River, Well, Tank. Methods of lifting water and application of water to soils, sprinkler, drip, basin, furrow. Storage calculation, selection of site, Area capacity curve - preparation and use, Determination of live, dead flood carry - over storage, Determination of control levels in Reservoir, Determination of height of dam, silting of reservoirs, Losses in reservoirs. Lift irrigation, Necessity, general layout, Main components. Simple design of a scheme.	9
5.	Canals - Types of canals, alignment of canals, Design of canals in non-alluvial and alluvial soils, Kennedy's and Lacey's silt theories. Tractive force theory, canal losses, silt control in canals, typical section of canals in cutting, embankment partial cutting, canal lining purpose types, selection and economics. Canal structures - Necessity, Aqueduct culvert, Super-passage, level crossing, Head regulator, cross regulator, canal siphon, canal fall, canal escape and standing waves flume.	9

TEXT BOOKS:

TB 1:	G.L. Asawa, "Irrigation and water Resources Engg." New age International Publishers.
TB 2:	Bharat Singh, "Irrigation Engineering"
TB 3:	S.K. Garg, "Irrigation Engineering".
TB 4:	P.N.Modi, "Irrigation Engineering".
TB 5:	B.C. Punmia, "Irrigation Engineering".

REFERENCES:

Ref 1:	N. Subramanya "Hydrology"
Ref 2:	K.C.Patra "Hydrology and Water resources engineering"
Ref 3:	
Ref 4:	Larry W. Mays, "Water Resources Engg.", John Wiley India
Ref 5:	R.K. Linsley, "Water Resources Engg.", McGraw Hill

CIVIL ENGINEERING DEPARTMENT 46								
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING							
SEMESTER: 5	COURSE TITTLE	Structural Analysis- II					COURSE ID	
COURSE COMPONENT	CREDITS						TCE 505	
Structures (CC)	4	CONTACT HOURS					L	P
							3	0
EXAMINATION DURATION	THEORY	PRACTICAL					CWA	MSE
	3	0					25	25
							ESE	Total
							50	100
COURSE OUTCOMES:								
CO 1:	Analyse indeterminate arches and stiffening girders of suspension bridges manually							
CO 2:	Formulate and Analyse indeterminate frames using energy methods							
CO 3:	Formulate slope deflection equations and solve indeterminate beams and frames							
CO 4:	Formulate stiffness matrix, load matrix and displacement matrix for a given structure, and thus carryout analysis their analysis							
CO 5:	analyse the plastic behaviour of sections, beams and frames using material plasticity							
CO 6:								
SYLLABUS								
UNIT	CONTENT						Hrs	
1.	ARCHES AND SUSPENSION BRIDGES Analysis of two hinged and fixed arches– Settlement and temperature effects. Suspension cables – suspension bridges with two and three hinged stiffening girders						9	
2.	FORCE METHOD: Equilibrium and compatibility – Determinate vs Indeterminate structures – Indeterminacy - Primary structure – Compatibility conditions – Analysis of indeterminate pin-jointed plane frames, continuous beams, rigid jointed plane frames (with redundancy restricted to two).						9	
3.	SLOPE DEFLECTION METHOD: Continuous beams and rigid frames (with and without sway) – Symmetry and antisymmetry – Simplification for hinged end – Support displacements MOMENT DISTRIBUTION METHOD: Distribution and carryover of moments – Stiffness and carry over factors – Analysis of continuous beams – Plane rigid frames with and without sway.						9	
4.	STIFFNESS MATRIX METHOD: Element and global stiffness matrices – Analysis of continuous beams – Co-ordinate transformations – Rotation matrix – Transformations of stiffness matrices, load vectors and displacements vectors – Analysis of pin-jointed plane frames and rigid frames						9	
5.	PLASTIC ANALYSIS OF STRUCTURES: Statically indeterminate axial problems – Beams in pure bending – Plastic moment of resistance – Plastic modulus – Shape factor – Load factor – Plastic hinge and mechanism – Plastic analysis of indeterminate beams and frames – Upper and lower bound theorems						9	
TEXT BOOKS:								
TB 1:	Vaidyanathan, R. and Perumal, P., “Comprehensive structural Analysis – Vol. I & II”, Laxmi Publications, New Delhi, 2003							
TB 2:	L.S. Negi & R.S. Jangid, “Structural Analysis”, Tata McGraw-Hill Publications, New Delhi, 2003.							
TB 3:	BhaviKatti, S.S, “Structural Analysis – Vol. 1 Vol. 2”, Vikas Publishing House Pvt. Ltd., New Delhi, 2008							
TB 4:								
TB 5:								
REFERENCES:								
Ref 1:	Ghali.A, Nebille,A.M. and Brown,T.G. “Structural Analysis” A unified classical and Matrix approach” –5th edition. Spon Press, London and New York, 2003.							
Ref 2:	Coates R.C, Coutie M.G. and Kong F.K., “Structural Analysis”, ELBS and Nelson, 1990							
Ref 3:	Structural Analysis – A Matrix Approach – G.S. Pandit & S.P. Gupta, Tata McGraw Hill 2004.							
Ref 4:	Analysis of Indeterminate Structures – C.K. Wang, Tata McGraw-Hill, 1992.							
Ref 5:								

CIVIL ENGINEERING DEPARTMENT 47

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING									
SEMESTER: 5	COURSE TITLE	Geotechnical Engineering lab				COURSE ID				
COURSE COMPONENT	CREDITS					PCE 501				
Geo Technical Engineering (CC)	2	CONTACT HOURS				L	P			
						1	2			
EXAMINATION DURATION	THEORY	PRACTICAL					CWA	MSE	ESE	Total
	0	3					25	25	50	100

COURSE OUTCOMES:

CO 1:	Determine the index properties of soil
CO 2:	Classify the different types of soil based on grain size distribution
CO 3:	Estimate the moisture content to achieve maximum compaction
CO 4:	Determine the strength parameters of soil sample by simulating field conditions in laboratory.
CO 5:	Learn the basic and important soil tests which are essential in various civil engineering field.
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	List of Experiments 1. Tests for determination of Specific gravity (for coarse and fine grained soils) and Water content (Oven drying method).	
2.	2. Grain size analysis of soil sample (sieve analysis) and relative density of sands. 3. In situ density by core cutter and sand replacement methods.	
3.	4. Consistency Limits – Liquid Limit (Casagrande and Cone Penetration Methods), plastic limit and shrinkage limit. 5. Standard Proctor Compaction Test and Modified Proctor Compaction Test.	
4.	6. Permeability test a. constant head method b. variable head method 7. Capillary permeability test	
5.	8. Strength Tests a. Direct Shear Test b. Triaxial Compression Test (undrained) 9. a. Demonstration of Standard Penetration Test. b. Demonstration of Static Cone Penetration Test. c. Demonstration of Hydrometer Analysis of soil. d. Demonstration of Consolidation Test.	

TEXT BOOKS:

TB 1:	Soil Mechanics and Foundation Engg.- Punmia B.C. 2005, 16th Edition Laxmi Publications Co. , New Delhi.
TB 2:	BIS Codes of Practice: IS 2720
TB 3:	Soil Testing for Engineers- Lambe T.W., Wiley Eastern Ltd., New Delhi.
TB 4:	Manual of Soil Laboratory Testing- Head K.H., (1986)- Vol. I, II, III, Princeton Press, London.
TB 5:	Engineering Properties of Soil and Their Measurements- Bowles J.E. (1988), - McGraw Hill Book Co. New York.

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 48								
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING							
SEMESTER: 5	COURSE TITLE	Structural Analysis lab					COURSE ID	
COURSE COMPONENT	CREDITS						PCE 502	
Structures (CC)	2	CONTACT HOURS					L	P
							1	2
EXAMINATION DURATION	THEORY	PRACTICAL					CWA	MSE
	0	3					25	25
							ESE	Total
							50	100
COURSE OUTCOMES:								
CO 1:	Carryout physical testing of model structures to measure their deformations							
CO 2:	Calculate the deformations using idealized mathematical models and Compare the test results with calculated values							
CO 3:	Judge the scopes of errors in physical testing and analytical calculations							
CO 4:								
CO 5:								
CO 6:								
SYLLABUS								
UNIT	CONTENT						Hrs	
1.	List of Experiments 1. To find the Flexural Stiffness (E.I) of a given beam and compare it with the theoretical value. 2. To verify Clark Maxwell's theorem by means of a mild steel beam. 3. To verify the Maxwell's reciprocal theorem using a two hinged arch.							
2.	4. To determine the forces in the members of a three bar suspension system and the component displacement of the loaded joint D for vertical loads. Comparison of experimental & theoretical results. 5. To determine the deflection of a truss analytically and graphically and verify the same experimentally.							
3.	6. To determine the horizontal thrust in a three hinged arch for a given system of loads experimentally and verify the same with calculated values. Also, to obtain influence in diagram for horizontal thrust in a three hinged arch experimentally and to compare it with the calculated values. 7. To determine experimentally the horizontal displacement of the roller end of a two hinged arch for a given load and the influence line for horizontal thrust in a two hinged arch by moving a load along the span							
4.	8. To find the experimental values of deflection of a cantilever beam subjected to symmetrical and unsymmetrical bending and to compare the same with theoretically calculated values. 9. To calculate experimentally and theoretically the loads in the three suspension rods supporting an elastic beam with a concentrated load hung midway between two of the suspension rods under two conditions.							
5.	10. When the suspension rods are attached at their upper ends to rigid supports. 11. When upper end of the central suspension rod is attached to the centre of a similar elastic beam. 12 To obtain the influence line diagram for reactions in indeterminate structures by introducing large measurable deformation and using Muller Breslau's principle.							
TEXT BOOKS:								
TB 1:	Jain, O.P. and Jain, B.K, "Theory and Analysis of Structures", Nem Chand and Bros, Roorkee.							
TB 2:	Reddy, C.S., "Basic Structural Analysis", Tata Mc Graw Hill Publishing Co., New Delhi.							
TB 3:								
TB 4:								
TB 5:								
REFERENCES:								
Ref 1:								
Ref 2:								
Ref 3:								
Ref 4:								
Ref 5:								

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 5	COURSE TITLE	Concrete Lab.				COURSE ID	
COURSE COMPONENT	CREDITS					PCE 503	
Materials (CC)	2					L	P
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				25	25
						ESE	Total
						50	100

COURSE OUTCOMES:

CO 1:	Determine the Quality of the Ingredients of Concrete
CO 2:	Conduct Strength tests on Materials and Products.
CO 3:	Understand the Non Destructive Tests
CO 4:	Design a Required Grade Of Concrete.
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	List of Experiments: (any five from each category) Category- B (Material & Tests of Concreting) 1. Fineness test and Consistency test 2. Soundness test & Initial and Final Setting time tests	1.
2.	3. Compressive strength test and Tensile strength test. 4. Specific Gravity of Cement, specific gravity and bulking of sand, moisture content of aggregates.	
3.	5. Workability tests: (Slump cone test or Flow table test or Compaction factor). 6. Compressive strength - Cube & Cylinder	
4.	7. Flexure test . 8. Modulus of elasticity of Concrete	
5.	9. Non Destructive Test – on ordinary concrete and on fly ash concrete. 10. Design Mix.	

TEXT BOOKS:

TB 1:	
TB 2:	
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	Relevant Indian Standards
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 50											
PROGRAM:		BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING									
SEMESTER: 5		COURSE TITLE	Career Skills					COURSE ID			
COURSE COMPONENT		CREDITS						XCS 501			
Communication Skills (CK)		2	CONTACT HOURS					L	P	T	
								2	0	0	
EXAMINATION DURATION		THEORY	PRACTICAL					CWA	MSE	ESE	Total
		0	3					25	25	50	100
COURSE OUTCOMES:											
CO 1:	Develop reading and comprehensive skills										
CO 2:	Get advanced general aptitude skills.										
CO 3:	Get advanced mathematical aptitude skills										
CO 4:	Develop Critical Reasoning skills										
CO 5:											
CO 6:											
SYLLABUS											
UNIT	CONTENT								Hrs		
1.	Effective Reading Skills: Reading Comprehension Purpose of reading, skimming and scanning. Tips for improving comprehension skills. (For effective reading skills practice papers on Reading Comprehension will be provided to students)								9		
2.	Aptitude section: Clocks, Calendar, Profit/loss, Percentage, Average								9		
3.	Aptitude Section: Ages, Trains & Boats, Simplification, Ratio & proportion, Partnership								9		
4.	Critical Reasoning: Analyze logical arguments.								9		
5.									9		
TEXT BOOKS:											
TB 1:	For Verbal Section: Spoken English for India by R.K.Bansal and J.B. Harrison- Orient Longman										
TB 2:	A practical English Grammar by Thomson and Martinet-Oxford University Press										
TB 3:	Professional Communication by Malti Aggarwal										
TB 4:	English grammar, composition and correspondence by M.A.Pink and A.E.Thomas –S.Chand and Sons.										
TB 5:	Word Power by Blum Rosen-Cambridge University Press										
REFERENCES:											
Ref 1:	A Dictionary of Modern Usage-Oxford University Press										
Ref 2:	For Aptitude Section: Quantitative aptitude by R.S Agarwal										
Ref 3:	Verbal and Non Verbal Reasoning by R.S Agarwal										
Ref 4:	All books of puzzles to puzzle to puzzle you by Shakuntala Devi.										
Ref 5:	Question Bank on the practice exercise (Created for internal use)										

CIVIL ENGINEERING DEPARTMENT 51								
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING							
SEMESTER: 5	COURSE TITLE	General Proficiency					COURSE ID	
COURSE COMPONENT	CREDITS						GP 501	
Communication Skills (GP)	1	CONTACT HOURS					L	P
							0	0
EXAMINATION DURATION	THEORY	PRACTICAL					CWA	MSE
	0	3					0	0
							ESE	Total
							0	0
COURSE OUTCOMES:								
CO 1:	Develop reading and comprehensive skills							
CO 2:	Get advanced general aptitude skills.							
CO 3:	Get advanced mathematical aptitude skills							
CO 4:	Develop Critical Reasoning skills							
CO 5:								
CO 6:								
SYLLABUS								
UNIT	CONTENT						Hrs	
1.	Effective Reading Skills: Reading Comprehension Purpose of reading, skimming and scanning. Tips for improving comprehension skills. (For effective reading skills practice papers on Reading Comprehension will be provided to students)						9	
2.	Aptitude section: Clocks, Calendar, Profit/loss, Percentage, Average						9	
3.	Aptitude Section: Ages, Trains & Boats, Simplification, Ratio & proportion, Partnership						9	
4.	Critical Reasoning: Analyze logical arguments.						9	
5.							9	
TEXT BOOKS:								
TB 1:	For Verbal Section: Spoken English for India by R.K.Bansal and J.B. Harrison- Orient Longman							
TB 2:	A practical English Grammar by Thomson and Martinet-Oxford University Press							
TB 3:	Professional Communication by Malti Aggarwal							
TB 4:	English grammar, composition and correspondence by M.A.Pink and A.E.Thomas –S.Chand and Sons.							
TB 5:	Word Power by Blum Rosen-Cambridge University Press							
REFERENCES:								
Ref 1:	A Dictionary of Modern Usage-Oxford University Press							
Ref 2:	For Aptitude Section: Quantitative aptitude by R.S Agarwal							
Ref 3:	Verbal and Non Verbal Reasoning by R.S Agarwal							
Ref 4:	All books of puzzles to puzzle to puzzle you by Shakuntala Devi.							
Ref 5:	Question Bank on the practice exercise (Created for internal use)							

CIVIL ENGINEERING DEPARTMENT 52							
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 6	COURSE TITLE	Environmental Engineering II				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 601	
Environmental Engineering (CC)	3	CONTACT HOURS				L	P
						3	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	3	0				25	25
						ESE	Total
						50	100
COURSE OUTCOMES:							
CO 1:	Knowledge about the sources of sewage & wastewater and their composition						
CO 2:	Able to design a sewer system along with futuristic estimation						
CO 3:	Able to design preliminary treatment system based on sewage characteristics						
CO 4:	Able to design secondary treatment system based on sewage characteristics and advancements of sewage treatments						
CO 5:	Knowledge of different disposal standards of sewage and sludge						
CO 6:	Able to estimate and plan the sewerage system for a given area as well as the treatment and final disposal of the effluents occurring						
SYLLABUS							
UNIT	CONTENT						Hrs
1.	Planning for sewerage systems: Sources of wastewater generation – Estimation of sanitary sewage flow – Estimation of storm runoff – Factors affecting Characteristics and composition of sewage and their significance – Effluent standards – Legislation requirements.						9
2.	Sewer design: Sewerage – Hydraulics of flow in sewers – Objectives – Design period - Design of sanitary and storm sewers – Small bore systems - Computer applications – Laying, joining & testing of sewers – appurtenances – Pumps – selection of pumps and pipe Drainage -. Plumbing System for Buildings – One pipe and two pipe system.						9
3.	Primary treatment of sewage: Objective – Unit Operation and Processes – Selection of treatment processes – Onsite sanitation - Septic tank, Grey water harvesting – Primary treatment – Principles, functions design and drawing of screen, grit chambers and primary sedimentation tanks – Operation and Maintenance aspects.						9
4.	Secondary treatment of sewage: Objective – Selection of Treatment Methods – Principles, Functions, Design and Drawing of Units - Activated Sludge Process and Trickling filter, other treatment methods – Oxidation ditches, UASB – Waste Stabilization Ponds – Reclamation and Reuse of sewage – Recent Advances in Sewage Treatment – Construction and Operation & Maintenance of Sewage Treatment Plants.						9
5.	Disposal of sewage and sludge: Standards for Disposal - Methods – dilution – Self purification of surface water bodies – Oxygen sag curve – Land disposal – Sewage farming – Deep well injection – Soil dispersion system - Sludge characterization – Thickening – Sludge digestion – Biogas recovery – Sludge Conditioning and Dewatering – disposal – Advances in Sludge Treatment and disposal.						9
TEXT BOOKS:							
TB 1:	Solid waste: Municipal solid waste, characteristic, generation, collection, transportation of solid waste. Engineering system for solid waste, management/reuse/recycle/energy recovery treatment and disposal						
TB 2:	Garg, S.K., Environmental Engineering Vol. II, Khanna Publishers, New Delhi, 2003.						
TB 3:	Punmia, B.C., Jain, A.K., and Jain.A., Environmental Engineering, Vol.II, Lakshmi Publications, Newsletter, 2005.						
TB 4:	Kshirsagar: Water Supply and Treatment and Sewage Treatment Vol. I and II						
TB 5:	Metcalf L. and Eddy H.P. “ Sewerage and Sewage disposal” Mc.Graw-Hill-1922.						
REFERENCES:							
Ref 1:	Manual on Sewerage and Sewage Treatment, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1997.						
Ref 2:	Wastewater Engineering – Treatment and Reuse, Tata Mc.Graw-Hill Company, New Delhi, 2003.						
Ref 3:							
Ref 4:							
Ref 5:							

CIVIL ENGINEERING DEPARTMENT 53									
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 6	COURSE TITTLE	Reinforced cement concrete-II					COURSE ID		
COURSE COMPONENT	CREDITS						TCE 602		
Structures (CC)	3	CONTACT HOURS					L	P	T
							2	0	1
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	3	0				25	25	50	100
COURSE OUTCOMES:									
CO 1:	Design for flexural member using prestress concept, and ability to estimate the losses due to relaxation.								
CO 2:	Able to design continuous and beams circular in plan for bending, torsion and shear.								
CO 3:	Analyse for wind and earthquake resistant design.								
CO 4:	Design a Simple Water tank for a required need.								
CO 5:	Can design an appropriate type of retaining wall for the practical conditions.								
CO 6:	Analyse and Design fundamental Indeterminate RCC elements.								
SYLLABUS									
UNIT	CONTENT								Hrs
1.	Introduction to Prestressed Concrete: Basic Concept, Types of Prestressing, Advantages and limitations of Prestressing, Pre-tensioning Systems and Devices. Design for flexure. Losses in Prestress: Elastic Shortening, Friction, Anchorage Slip, Force Variation Diagram, Creep of Concrete, Shrinkage of Concrete, Relaxation of Steel, Total Time-dependent Loss.								9
2.	Design of Continuous R.C Beams: Moment Redistribution. Design of Circular Beams: Bending, Torsion and Shear.								9
3.	Earthquake and wind analysis of RCC building using Respective IS Codes								9
4.	Underground rectangular tanks, Circular overhead tanks – Design of staging and foundations. Design aspects of intze Tank.								9
5.	Design of cantilever and counter-fort retaining walls								9
TEXT BOOKS:									
TB 1:	1. Jain, O.P, and Krishna, Jai, "Plain and Reinforced Concrete," Vol.I & II, Nem Chand & Bros., Roorkee.								
TB 2:	2. Jain A.K "Reinforced Concrete, Limit State Design", Nem Chand & Bros. Roorkee								
TB 3:	3. Krishna Raju, N, "Prestressed Concrete," Tata McGraw Hill, New Delhi								
TB 4:	R, Park and Pauley, Reinforced concrete Structures								
TB 5:									
REFERENCES:									
Ref 1:	Krishna Raju, N, "Advanced Reinforced Concrete Designs".								
Ref 2:	Navy, E.G, Prestressed Concrete: A Fundamental Approach", Printice Hall, N.J								
Ref 3:	IS: 1343-1980, Indian Standard Codes of Practice for Prestressed Concrete.								
Ref 4:	IS:3370-1976 (Pt I to IV), Indian Standard Codes of Practice for Liquid Retaining Structures.								
Ref 5:	Lin, T.Y, "Design of Prestressed Concrete Structures", John Wiley & Sons, New Delhi								

CIVIL ENGINEERING DEPARTMENT 54								
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING							
SEMESTER: 6	COURSE TITLE	Water Resources Engineering-II					COURSE ID	
COURSE COMPONENT	CREDITS						TCE 603	
Water Resources (CC)	3	CONTACT HOURS					L	P
							2	0
EXAMINATION DURATION	THEORY	PRACTICAL					CWA	MSE
	3	0					25	25
							ESE	Total
							50	100
COURSE OUTCOMES:								
CO 1:	Determine the stability aspects of gravity dams.							
CO 2:	Understand earth dam components and design aspects and methods							
CO 3:	Knowledge on various types of spillways and their suitability for various situations.							
CO 4:	Know the concepts for analysis and design principles of storage and diversion head works.							
CO 5:	Learn the River training, Navigation and water logging problems.							
CO 6:	Get Detailed understanding on Storage, Relief and Diversion related civil engineering.							
SYLLABUS								
UNIT	CONTENT						Hrs	
1.	Dams: introduction, necessity and types of dams. Selection of site for dams, Selection of type of dams. Masonry & concrete dams, forces acting on dams. Design criteria. Theoretical and practical profile of high and low dam. Stability calculations, openings in masonry & concrete dams, methods of construction, joints in dams.						9	
2.	Earth dam, components and their functions, check list for design, control of seepage through earth dam and foundation stability of slopes. Slip circle methods, filters in each dam and their design. Drainage of earth dam. Construction of earth dam. Introduction to Arch dam, thin cylinder theory method.						9	
3.	Spillway, necessity & function components of spillway, different types of spillways i.e. ogee, chute side channel siphon, shaft factors affecting choice of type of spillway, Elementary hydraulic design for ogee spillway, Energy dissipation below spillway, Jump height curve & tail water rating curve, types of energy dissipation arrangements & factors affecting their selection. Gates for spillway.						9	
4.	Diversion works: Definition, Layout, components and their functions, Design of impermeable floors – Bligh's Methods and Khosla's theory, Slit control works – silt ejectors and silt excluder						9	
5.	River & river training works, characteristics of alluvial rivers. River training works purpose different types, advantages & disadvantages, River navigation. Water logging and drainage causes, effects Preventive & curative measures Alkaline soils. Soil efflorescence. Drainage arrangements. Tile drains and its spacing. Elements of hydro-power water power importance, types of water power plants layout & components of each type, intakes conveyance systems. Surge function & types power- house components & layout tail race.						9	
TEXT BOOKS:								
TB 1:	Bharat Singh, "Irrigation Engineering"							
TB 2:	S.K. Garg, "Irrigation Engineering"							
TB 3:	P.N.Modi, "Irrigation Engineering".							
TB 4:	B.C. Punmia, "Irrigation Engineering".							
TB 5:								
REFERENCES:								
Ref 1:	Larry W. Mays, "Water Resources Engg.", John Wiley India							
Ref 2:	Wurbs and James, "Water Resources Engg." John Wiley India							
Ref 3:	R.K. Linsley, "Water Resources Engg.", McGraw Hill							
Ref 4:	AM Michel, "Irrigation Theory and Practices"							
Ref 5:	Creager and Hinds, "Engineering for dams" Vol. I, II, III Justine.							

CIVIL ENGINEERING DEPARTMENT 55								
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING							
SEMESTER: 6	COURSE TITLE	Quantity Estimation and Costing					COURSE ID	
COURSE COMPONENT	CREDITS						TCE 604	
Surveying (CC)	3	CONTACT HOURS					L	P
							2	0
EXAMINATION DURATION	THEORY	PRACTICAL					CWA	MSE
	3	0					25	25
							ESE	Total
							50	100
COURSE OUTCOMES:								
CO 1:	understand general methods of detailed estimates							
CO 2:	perform different rate analysis to find optimal							
CO 3:	prepare detailed estimates for typical civil engineering projects							
CO 4:	determine cost of work considering influential factor							
CO 5:	evaluate the cost of property							
CO 6:	arrive at considerable quantity and rate analysis							
SYLLABUS								
UNIT	CONTENT						Hrs	
1.	Introduction: Purpose and importance of estimates, principles of estimating. Methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet; bill of quantities. Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.						9	
2.	Rate Analysis: Task for average artisan, various factors involved in the rate of an item, material and labor requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.)						9	
3.	Estimates: Preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts Services for building such as water supply, drainage and electrification.						9	
4.	Cost of Works: Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building.						9	
5.	Valuation: Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.						9	
TEXT BOOKS:								
TB 1:	B.N. Dutta, Estimating and Costing in Civil Engineering Theory and Practice.- 2010							
TB 2:	M. Chakroborti, Estimating, Costing & Specifications in Civil Engineering. - 2007							
TB 3:	S. C. Rangawala - Valuation of Real Properties, Charotar Publishing House - 2008							
TB 4:	K. K. Chitkara – Construction project management, Tata Mc Graw –Hill -							
TB 5:								
REFERENCES:								
Ref 1:								
Ref 2:								
Ref 3:								
Ref 4:								
Ref 5:								

CIVIL ENGINEERING DEPARTMENT 56

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 6	COURSE TITLE	Transportation Engineering - I				COURSE ID	
COURSE COMPONENT	CREDITS	CONTACT HOURS				TCE 605	
Transportation Engineering (CC)	3					L	P
						3	0
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE	ESE
	3	0			25	25	50
					Total		100

COURSE OUTCOMES:

CO 1:	Understand the development and geometric design of highway
CO 2:	Evaluate the quality of road materials
CO 3:	Conduct traffic studies and design traffic signals and intersection
CO 4:	Design flexible and rigid pavement
CO 5:	Design and plan of airport
CO 6:	Interpret and apply engineering knowledge to solve problems related to highway and airport Engineering.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Introduction: Role of Transportation, Modes of Transportation, History of road development, Nagpur road plan, Bombay road plan & 3 rd 20 Year Road Plan, Road types and pattern. Financing Highway Alignment – Requirements, Alignment of Hill Roads. Geometric Design : Cross sectional elements, camber, shoulder, sight distance, horizontal curves, super elevation, extra widening, transition curves and gradient, vertical curves, summit and valley curves.	9
2.	Highway Materials: properties of subgrade and pavement component materials, Test on subgrade soil, Aggregates and Bituminous materials.	9
3.	Traffic Engineering: Traffic characteristic, volume studies, speed study, capacity, density, traffic control devices, signs, signals, Island, Intersection at grade and grade separated intersections, Rotary intersection. Causes and Types of Accidents	9
4.	Design of Highway Pavement: Types of Pavements, Design factors, Design of Flexible Pavement by CBR method (IRC: 37-2001), Design of rigid pavement, Westergaard theory, load and temperature stresses, joints, IRC method of rigid pavement design. (IRC: 58 – 2002). Road Construction Methods: WBM, Surface dressing, bituminous carpeting, Bituminous Bound Macadam and Asphaltic Concrete, Cement Concrete road construction. Introduction of Benkelman beam.	9
5.	Engineering: Air craft characteristics, types of airports, layout of airports, airport planning & design, runway orientation, wind-rose diagram, estimation of runway length & correction, Taxiway.	9

TEXT BOOKS:

TB 1:	S. K. Khanna & C.E.G. Justo, "Highway Engineering", Nem Chand & Bros, Roorkee.
TB 2:	S. K. Khanna, "Airport Planning & Design", M. G. Arora & S. S. Jain", Nem Chand & Bros,
TB 3:	L. R. Kadiyali, "Transportation Engineering". (Vol I & II)
TB 4:	Yoder E.J., "Principles of Pavement Design".
TB 5:	

REFERENCES:

Ref 1:	S. K. Sharma, "Highway Engineering".
Ref 2:	P. Chakraborty & A. Das, "Principles of Transportation Engineering".
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 57

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 6	COURSE TITLE	Environmental Engineering Lab.				COURSE ID	
COURSE COMPONENT	CREDITS					PCE 601	
Environmental Engineering (CC)	2	CONTACT HOURS				L	P
						1	2
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				25	25
						ESE	Total
						50	100

COURSE OUTCOMES:

CO 1:	Able to analyse physical and chemical analysis of any given water sample
CO 2:	Able to determine the important drinking water parameters
CO 3:	Knowledge of sound levels and air pollutants analysis
CO 4:	Able to analyse various oxygen demands of Water sample
CO 5:	Able to determine fluorides and rate of aerobic reactions
CO 6:	Able to analyse the various physical and chemical properties of water as well as noise and air pollution determination

SYLLABUS

UNIT	CONTENT	Hrs
1.	List of Experiments: (any ten) 1. Determination of turbidity, colour, and conductivity. 2. Determination of pH, alkalinity and acidity.	
2.	3. Determination of hardness and chlorides. 4. Determination of residual chlorine and chlorine demand. 5. Determination of dissolved oxygen.	
3.	6. Measurement of air pollutants with high volume sampler 7. Measurement of sound level with sound level meter. 8. Determination of total suspended and dissolved solids.	
4.	9. Determination of BOD of sample. 10. Determination of COD of sample. 11. Determination of Kjeldahl nitrogen.	
5.	12. Determination of fluorides. 13. Determination of rate kinetics constant of aerobic reactions	9

TEXT BOOKS:

TB 1:	Mathur: Water and Wastewater Testing.
TB 2:	Pradeep Kumar and Indu Mehrotra, water and waste water Analysis.
TB 3:	Standard Methods for the Examination of Water and Wastewater, A. P. H. A., New York
TB 4:	Peavy and Rowe, Environmental Engineering
TB 5:	

REFERENCES:

Ref 1:	Sawyer, McCarty and Parkin: Chemistry for Environmental Engineering
Ref 2:	W. H. O.: Selected Methods of Measuring Air Pollutants
Ref 3:	Cunniff: Environmental Noise Pollution
Ref 4:	Mc Devis and A. Cornwell, Introduction to Environmental Engineering, McGraw, Hill
Ref 5:	Gilbest and Masters, Introduction to Environmental Engineering & Science.

CIVIL ENGINEERING DEPARTMENT 58

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 6	COURSE TITLE	Highway Material Testing Lab.				COURSE ID	
COURSE COMPONENT	CREDITS					PCE 602	
Transportation Engineering (CC)	2	CONTACT HOURS				L	P
						1	2
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				25	25
						ESE	Total
						50	100

COURSE OUTCOMES:

CO 1:	Determine and judge the quality of bitumen sample
CO 2:	Determine the suitability of aggregate sample based on physical properties
CO 3:	Test and determine the strength properties of aggregate sample
CO 4:	Check the performance of bituminous mix
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.		9
2.	4. Specific Gravity test 5. Stripping Test 6. Flash and fire point Test 7. Viscosity Test	9
3.	TESTS ON AGGREGATES 1. Shape Test-Flakiness, Elongation and Angularity number 2. Los Angeles Abrasion Value of Aggregate	9
4.	3. Crushing Value of Aggregate 4. Impact test 5. CBR test for disturbed and undisturbed (soaked or unsoaked) soil sample	9
5.	TESTS ON BITUMINOUS MIXES 1. Determination of Binder Content 2. Marshall Stability and Flow Values 3. Specific Gravity and Density	9

TEXT BOOKS:

TB 1:	Jain OP and Krishna, Jai, Plain and Reinforced Concrete Vol. I & II, Nem Chand & Bros. Roorkee.
TB 2:	Dayaratnam. P, Design of Reinforced Concrete Structures, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
TB 3:	Shetty, M.S., Concrete Technology, S. Chand and Company Ltd., New Delhi.
TB 4:	S. K. Khanna & C.E.G Justo, "Highway Material Testing", Nem Chand & Bros. Roorkee.
TB 5:	S.K Khanna & C.E.G Justo, "Highway Engineering", Nem Chand & Bros. Roorkee.

REFERENCES:

Ref 1:	L.R. Kadiyali, "Transportation Engineering" Vol. I & II
Ref 2:	S.P. Arora, Civil Engineering Materials, Dhanpat Rai Publications, Delhi.
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 6	COURSE TITLE	Computer Aided Structural Design Lab				COURSE ID	
COURSE COMPONENT	CREDITS					PCE 603	
Drawing (CC)	2	CONTACT HOURS				L	P
						T	
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE	ESE
	0	3			25	25	50
					Total		100

COURSE OUTCOMES:

CO 1:	Create models for structures using STAAD.Pro software
CO 2:	Modelling of RC structures and designing for Earthquake resistance
CO 3:	Analyse and design different types of foundations for multi-storey buildings
CO 4:	Analyse and design bridge decks, Water tanks and steel structures
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	The following problems have to be solved using any structural analysis and design software 1. Introduction to the software and creating the model by various methods. 2. Introduction to various commands and to give the different property (cross section) to any member.	9
2.	3. Initial steps for analyzing Simply Supported Beam, Cantilever beam, frames, fixed beam and loading steps. 4. Earthquake analysis of framed structure by static method and response spectra method.	9
3.	5. Analysis and design of multi-storey building. 6. Design of different types of foundations for multi-storey building.	9
4.	7. Analysis and design of industrial roof truss. 8. Modelling and analysis of over head water tank.	9
5.	9. Modelling and analysis of bridge deck. 10. Design of a Framed Residential building structure	9

TEXT BOOKS:

TB 1:	"STAAD.Pro Manual"- Bentley,
TB 2:	"SAP Manual".
TB 3:	"Using STAAD.Pro 2006"- Munir Hamad, Shroff publishers and Distributors
TB 4:	"Reference book on Computer Aided Design Laboratory"- Dr M.N.Shesha Prakash, Dr.G.S.Suresh, Lakshmi Publications
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 6	COURSE TITLE	Survey Camp Training				COURSE ID	
COURSE COMPONENT	CREDITS	CONTACT HOURS				PCE 604	
Surveying (CC)	2					L	P
						0	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				0	0
						ESE	Total
						0	0
						0	100

COURSE OUTCOMES:

CO 1:	Conduct reconnaissance and to adopt an appropriate methodology for surveying an area
CO 2:	Carry out necessary field measurements and calculations.
CO 3:	Establish control points and plot the details on a drawing sheet by plane table survey.
CO 4:	Prepare the final maps for future reference.
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.		9
2.	(i) Triangulation - 1 day (ii) Trilateration - 1 day	9
3.	(iii) GPS observation to determine latitude, longitude and azimuth – 1-2 days (iv) Plotting the details by plane table survey - 1-2 days	9
4.	PREPARATION OF TOPOGRAPHIC MAP: - 2 days Reconnaissance, establishment of control points, computation/determination of coordinates of stations, surveying the details using total station, data transfer and map compilation using appropriate software.	9
5.	Area selected should be such that important features such as agriculture land, orchards, roads, water bodies etc. exist. Students shall submit a map (with appropriate symbols and colours) of the area showing topographic features.	9

TEXT BOOKS:

TB 1:	
TB 2:	
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 61

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING									
SEMESTER: 6	COURSE TITTLE	Career Skills				COURSE ID				
COURSE COMPONENT	CREDITS					XCS 601				
Communication Skills (CK)	2	CONTACT HOURS				L	P			
						2	0			
EXAMINATION DURATION	THEORY	PRACTICAL					CWA	MSE	ESE	Total
	0	3					25	25	50	100

COURSE OUTCOMES:

CO 1:	Develop Advanced Vocabulary skills
CO 2:	Get advanced mathematical aptitude skills.
CO 3:	Get Logical aptitude skills
CO 4:	Improve Grammatical skills
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	Building Advanced Vocabulary Sentence completion: Single and double vocabulary Job Application : Personal Interviews and C.V Writing Essential parts - Cover Letter and the 'resume'. Types of 'resumes' (Curriculum Vitae) Chronological 'resume', functional 'resume'	9
2.	Aptitude Section: Number system, P& C, Probability, Log,	9
3.	Aptitude Section: Time & Work, S.I & C.I, Time & Distance, Mixture, Chain Rule, Pipes & Cisterns	9
4.	Advanced Grammar: Spotting errors, subject verb agreement based errors.	9
5.		9

TEXT BOOKS:

TB 1:	For Verbal Section: Spoken English for India by R.K.Bansal and J.B. Harrison- Orient Longman
TB 2:	A practical English Grammar by Thomson and Martinet-Oxford University Press
TB 3:	Professional Communication by Malti Aggarwal
TB 4:	English grammar, composition and correspondence by M.A.Pink and A.E.Thomas –S.Chand and Sons.Word Power by Blum Rosen-Cambridge University Press
TB 5:	A Dictionary of Modern Usage-Oxford University Press

REFERENCES:

Ref 1:	For Aptitude Section: Quantitative aptitude by R.S Agarwal
Ref 2:	Verbal and Non Verbal Reasoning by R.S Agarwal
Ref 3:	All books of puzzles to puzzle to puzzle you by Shakuntala Devi.
Ref 4:	Question Bank on the practice exercise (Created for internal use)
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 62

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 6	COURSE TITLE	General Proficiency				COURSE ID	
COURSE COMPONENT	CREDITS					GP 601	
Communication Skills (GP)	1	CONTACT HOURS				L	P
						0	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				0	0
						ESE	Total
						0	100

COURSE OUTCOMES:

CO 1:	Develop reading and comprehensive skills
CO 2:	Get advanced general aptitude skills.
CO 3:	Get advanced mathematical aptitude skills
CO 4:	Develop Critical Reasoning skills
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	Effective Reading Skills: Reading Comprehension Purpose of reading, skimming and scanning. Tips for improving comprehension skills. (For effective reading skills practice papers on Reading Comprehension will be provided to students)	9
2.	Aptitude section: Clocks, Calendar, Profit/loss, Percentage, Average	9
3.	Aptitude Section: Ages, Trains & Boats, Simplification, Ratio & proportion, Partnership	9
4.	Critical Reasoning: Analyze logical arguments.	9
5.		9

TEXT BOOKS:

TB 1:	For Verbal Section: Spoken English for India by R.K.Bansal and J.B. Harrison- Orient Longman
TB 2:	A practical English Grammar by Thomson and Martinet-Oxford University Press
TB 3:	Professional Communication by Malti Aggarwal
TB 4:	English grammar, composition and correspondence by M.A.Pink and A.E.Thomas –S.Chand and Sons.
TB 5:	Word Power by Blum Rosen-Cambridge University Press

REFERENCES:

Ref 1:	A Dictionary of Modern Usage-Oxford University Press
Ref 2:	For Aptitude Section: Quantitative aptitude by R.S Agarwal
Ref 3:	Verbal and Non Verbal Reasoning by R.S Agarwal
Ref 4:	All books of puzzles to puzzle to puzzle you by Shakuntala Devi.
Ref 5:	Question Bank on the practice exercise (Created for internal use)

CIVIL ENGINEERING DEPARTMENT 63

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7	COURSE TITLE	Design of Steel Structures				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 701	
Structures (CC)	3	CONTACT HOURS				L	P
						2	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	3	0				25	25
						ESE	Total
						50	100

COURSE OUTCOMES:

CO 1:	Appreciate the use of IS Codes in the design of steel structures
CO 2:	Can submit economical designs for various simple structural steel members
CO 3:	Appreciate economization and conservation of material without compromise of safety.
CO 4:	Produce the drawings pertaining to different components of steel structures based on the design.
CO 5:	Design the industrial elements like plate girder, gantry girder and Foundation bases.
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	INTRODUCTION: Properties of steel – Structural steel sections – Limit State Design Concepts – Loads on Structures – Metal joining methods using rivets, welding, bolting – Design of bolted, riveted and welded joints – Eccentric connections - Efficiency of joints – High Tension bolts	9
2.	TENSION MEMBERS: Types of sections – Net area – Net effective sections for angles and Tee in tension – Design of connections in tension members – Use of lug angles – Design of tension splice – Concept of shear lag	9
3.	COMPRESSION MEMBERS: Types of compression members – Theory of columns – Basis of current codal provision for compression member design – Slenderness ratio – Design of single section and compound section compression members – Design of lacing and battening type columns – Design of column bases – Gusseted base, Slab base.	9
4.	BEAMS: Design of laterally supported and unsupported beams – Built up beams – Beams subjected to biaxial bending – Design of plate girders riveted and welded – Intermediate and bearing stiffeners – Web splices.	9
5.	ROOF TRUSSES AND INDUSTRIAL STRUCTURES: Elements of Roof trusses – Roof and side coverings – Design loads, design of purlin.	9

TEXT BOOKS:

TB 1:	Ramachandra, S. and Virendra Gehlot, "Design of Steel Structures – Vol. I & II", Standard Publication, New Delhi, 2007.
TB 2:	Bhavikatti "Design of steel structure" New age international.
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	"Teaching Resources for Structural Steel Design – Vol. I & II", INSDAG, Kolkatta.
Ref 2:	Gaylord, E.H., Gaylord, N.C., and Stallmeyer, J.E., "Design of Steel Structures", 3rd edition, McGraw-Hill Publications, 1992
Ref 3:	IS 800-2007 Indian Standard - General Construction in Steel – code of practice (3rd Revision).
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7	COURSE TITLE	Construction Management and Planning				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 702	
Materials (CC)	3	CONTACT HOURS				L	P
						2	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	3	0				25	25
						ESE	Total
						50	100

COURSE OUTCOMES:

CO 1:	understand the financial aspects and prospects of project proposal
CO 2:	appreciate the role of construction management and planning for project
CO 3:	apply scheduling techniques to project execution
CO 4:	monitor the time and cost of relation of project
CO 5:	understand the documentation and safety aspects of project
CO 6:	plan and optimize various aspects of project through applying financial and management techniques

SYLLABUS

UNIT	CONTENT	Hrs
1.	FINANCIAL EVALUATION OF PROJECTS AND PROJECT PLANNING: Capital investment proposals, net present value, benefit cost ratio, internal rate of return, Risk cost management, main causes of project failure.	9
2.	Categories of construction projects, objectives, project development process, Functions of project management, Project management organization and staffing, Stages and steps involved in project planning, Plan development process, objectives of construction project management.	9
3.	PROJECT SCHEDULING: Importance of project scheduling, project work breakdown process, determining activities involved, work breakdown structure, assessing activity duration, duration estimate procedure, Project work scheduling, Project management techniques – CPM and PERT, networks analysis, concept of precedence network analysis.	9
4.	PROJECT COST AND TIME CONTROL: Monitoring the time progress and cost controlling measures in a construction project, Time cost trade-off process: direct and indirect project costs, cost slope, Process of crashing of activities, determination of the optimum duration of a project, updating of project networks, resources allocation.	9
5.	CONTRACT MANAGEMENT: Elements of tender operation, Types of tenders and contracts, Contract document, Legal aspects of contracts, Contract negotiation & award of work, breach of contract, determination of a contract, arbitration. Safety aspects.	9

TEXT BOOKS:

TB 1:	Chitkara, K.K. "Construction Project Management Planning", Scheduling and Control, Tata McGraw-Hill Publishing Co., New Delhi, 1998.
TB 2:	Srinath,L.S., "PERT and CPM Principles and Applications ", Affiliated East West Press, 2001
TB 3:	B.C.Punmia, "PERT and CPM Principles and Applications" .
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	Chris Hendrickson and Tung Au, "Project Management for Construction – Fundamentals Concepts for Owners", Engineers, Architects and Builders, Prentice Hall, Pittsburgh, 2000.
Ref 2:	Moder.J., C.Phillips and Davis, "Project Management with CPM", PERT and Precedence Diagramming, Van Nostrand Reinhold Co., Third Edition, 1983.
Ref 3:	Willis., E.M., "Scheduling Construction projects", John Wiley and Sons 1986.
Ref 4:	Halpin,D.W., "Financial and cost concepts for construction Management", John Wiley and Sons, New York, 1985.
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 65

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7	COURSE TITLE	Transportation Engineering - II				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 703	
Transportation Engineering (CC)	3	CONTACT HOURS				L	P
						3	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	3	0				25	25
						ESE	Total
						50	100

COURSE OUTCOMES:

CO 1:	Understand the components and functionalities of railway track
CO 2:	Design ballast section and rail requirements
CO 3:	Design railway track
CO 4:	Configure various signalling & interlocking systems for typical railway track
CO 5:	Understand the various methods of tunneling
CO 6:	Interpret and apply engineering knowledge to solve problems related to railway and tunnel Engineering.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Principles of transportation, different modes and their importance, Universal Scenario and Indian Railways, Railway track development, component parts, gauges, wheel and axle arrangement. Resistance to Traction & Stresses in Track – various resistances and their evaluation, hauling capacity, tractive effort, locomotives and their classification, stresses in rail, sleeper, ballast and formation.	9
2.	Permanent Component Parts- Coning of wheels, rail requirements, creep wear and joints in rail, welding of rails, theory of long welded rails, sleeper requirements and their type, ballast requirements, specifications, design of ballast section, rail to rail fittings and rail to sleeper fittings, check rails and guard rails.	9
3.	Geometric Design of Railway track- Alignment, various types of gradient, horizontal curve, super elevation, equilibrium cant, cant deficiency, transition curves and design of vertical curves.	9
4.	Points and crossing- Working and Design of turn out, various types of track junction and their configuration, design of cross over and diamond crossing. Signaling and Interlocking- Types of signals in station and yards, upper quadrant and lower quadrant signals, automatic signaling, multi aspect signaling, principle of interlocking, high speed tracks, ballast less track, improvement in existing track for high speed.	9
5.	Introduction, need and importance of tunnel and its uses, considerations in tunneling, shape and size of tunnels shafts, Pilot tunnels. Tunneling in hard rock, methods of attack, drilling blasting mucking and tunnel lining. Tunneling in soft materials: Mining, Timbering mucking forepoling and shield methods, Safety measures ventilation lighting and drainage of tunnels. Modern tunneling methods. Equipments used in tunneling, TBM (tunnel boring machine)	9

TEXT BOOKS:

TB 1:	S. P. Arora & S. C. Saxena, "A Text Book of Railway Engineering"
TB 2:	M. M. Aggrawal, "Railway Engineering"
TB 3:	B. L. Gupta, "Roads, Railway, Bridge & Tunnel Engineering"
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	JS Mundrey, "Railway Track Engineering"
Ref 2:	Birdi Ahuja, "Roads, Railways Bridges and Tunnel Engg"
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 66

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 7	COURSE TITLE	Elective I*				COURSE ID			
						TCE 711-720			
COURSE COMPONENT	CREDITS					L	P	T	
Elective (DE)	3					CONTACT HOURS	3	0	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	3	0				25	25	50	100

COURSE OUTCOMES:

CO 1:	
CO 2:	
CO 3:	
CO 4:	
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.		9
2.		9
3.		9
4.		9
5.		9

TEXT BOOKS:

TB 1:	
TB 2:	
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 67

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 7	COURSE TITLE	Detailing & Quantity Estimation lab				COURSE ID			
COURSE COMPONENT	CREDITS					PCE 701			
Surveying (CC)	2	CONTACT HOURS				L	P	T	
						1	2	0	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	0	3				25	25	50	100

COURSE OUTCOMES:

CO 1:	prepare detail estimates of given residential building
CO 2:	plan and prepare water proofing estimate and guide lines for selected project
CO 3:	prepare detailed estimate for various service oriented project
CO 4:	prepare detailed bar bending schedule and drawing for rcc works
CO 5:	
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	List of experiments (any five) 1. Prepare a detailed estimate of the framed structure of building 2. Prepare a detailed estimate of the sub structure of the building 3. Prepare a detailed estimate for the brick work and plastering of a building 4. Prepare a detailed estimate for the flooring and painting of a building	9
2.	5. Prepare a detailed estimate for waterproofing of sub structures 6. Prepare a detailed estimate for waterproofing of terrace, tanks and toilets 7. Prepare a detailed estimate of the culvert 8. Prepare a detailed estimate of a small commercial building	9
3.	9. Prepare a detailed estimate for the water supply of a building 10. Prepare a detailed estimate of a road 11. Prepare a detailed estimate of a septic tank 12. Prepare a detailed estimate of the manhole	9
4.	Preparation of working drawings for any FIVE of the following: 1. RC Beams- Simply supported, Continuous, Cantilever 2. T – beam / L-beam floor 3. Slabs – Simply supported, Continuous, One way and two way slabs. 4. Columns – Tied Columns and Spirally reinforced columns . 5. Isolated footings for RC Columns.	9
5.	6. Combined rectangular and trapezoidal footings. 7. Rolled sections and connections (welded and riveted). 8. Built-up columns and beams. 9. Gusset bases 10. Roof trusses	9

TEXT BOOKS:

TB 1:	Dutta, B.N., "Estimating and Costing in Civil Engineering", UBS Publishers & Distributors Pvt. Ltd., 2003
TB 2:	Kohli, D.D and Kohli, R.C., "A Text Book of Estimating and Costing (Civil)", S.Chand & Company Ltd., 2004
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	PWD Data Book.
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7	COURSE TITLE	Seminar (Industry Based)				COURSE ID	
COURSE COMPONENT	CREDITS					PCE 703	
Seminar (SM)	2	CONTACT HOURS				L	P
						2	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				100	0
						ESE	Total
						0	100

COURSE OUTCOMES:

CO 1:	Appreciate the practical implementation of concepts in industry
CO 2:	Participate and Contribute hands on to a project/process.
CO 3:	Develop ideas for future academic and career project selection.
CO 4:	Improve the chances of employment through developed contacts and skill set.
CO 5:	Get a Professional attitude and career ideas.
CO 6:	Consolidate and present self contribution in a practical work involved in.

SYLLABUS

UNIT	CONTENT	Hrs
1.	The Student has to submit a report on the Industrial Based Internship. And present a seminar to the panel of faculty.	9
2.		9
3.		9
4.		9
5.		9

TEXT BOOKS:

TB 1:	
TB 2:	
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7	COURSE TITLE	Project (Phase - I)				COURSE ID	
COURSE COMPONENT	CREDITS					CEP 701	
Project (PJ)	2	CONTACT HOURS				L	P
						0	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				50	50
						ESE	Total
						0	100

COURSE OUTCOMES:

CO 1:	Retrospect and set to direction of the project progress
CO 2:	identify and search for Innovative solutions
CO 3:	Presentation and Documentation tools usage
CO 4:	Raise and identify the flaws in planning and execution of a project.
CO 5:	Summarise the then stage of the project.
CO 6:	projection of the future plans and execution methods.

SYLLABUS

UNIT	CONTENT	Hrs
1.	The objective of the project work is to enable the students to work in convenient groups of not more than five/six members in a group on a project involving theoretical and experimental studies related to Civil Engineering. Every Project Work shall have a Guide who is a member of the faculty of Civil Engineering of the university where the student is registered. The hours allotted for this course shall be utilized by the students to receive directions from the Guide, on library reading, laboratory work, computer analysis or field work and also to present in periodical seminars the progress made in the project. Each student shall finally produce a comprehensive report covering background information, literature Survey, problem statement, Project work details and conclusions. This experience of project work shall help the student in expanding his / her knowledge base and also provide opportunity to utilize the creative ability and inference capability.	9
2.		9
3.		9
4.		9
5.		9

TEXT BOOKS:

TB 1:	
TB 2:	
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 70

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7	COURSE TITLE	General Proficiency				COURSE ID	
COURSE COMPONENT	CREDITS					GP 701	
Communication Skills (GP)	1	CONTACT HOURS				L	P
						0	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				0	0
						ESE	Total
						0	100
COURSE OUTCOMES:							
CO 1:	Develop reading and comprehensive skills						
CO 2:	Get advanced general aptitude skills.						
CO 3:	Get advanced mathematical aptitude skills						
CO 4:	Develop Critical Reasoning skills						
CO 5:							
CO 6:							
SYLLABUS							
UNIT	CONTENT						Hrs
1.	Effective Reading Skills: Reading Comprehension Purpose of reading, skimming and scanning. Tips for improving comprehension skills. (For effective reading skills practice papers on Reading Comprehension will be provided to students)						9
2.	Aptitude section: Clocks, Calendar, Profit/loss, Percentage, Average						9
3.	Aptitude Section: Ages, Trains & Boats, Simplification, Ratio & proportion, Partnership						9
4.	Critical Reasoning: Analyze logical arguments.						9
5.							9
TEXT BOOKS:							
TB 1:	For Verbal Section: Spoken English for India by R.K.Bansal and J.B. Harrison- Orient Longman						
TB 2:	A practical English Grammar by Thomson and Martinet-Oxford University Press						
TB 3:	Professional Communication by Malti Aggarwal						
TB 4:	English grammar, composition and correspondence by M.A.Pink and A.E.Thomas –S.Chand and Sons.						
TB 5:	Word Power by Blum Rosen-Cambridge University Press						
REFERENCES:							
Ref 1:	A Dictionary of Modern Usage-Oxford University Press						
Ref 2:	For Aptitude Section: Quantitative aptitude by R.S Agarwal						
Ref 3:	Verbal and Non Verbal Reasoning by R.S Agarwal						
Ref 4:	All books of puzzles to puzzle to puzzle you by Shakuntala Devi.						
Ref 5:	Question Bank on the practice exercise (Created for internal use)						

CIVIL ENGINEERING DEPARTMENT 71

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8	COURSE TITLE	Earthquake Resistant Design of Buildings				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 801	
Structures(CC)	4	CONTACT HOURS				L	P
						3	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	3	0				25	25
						ESE	Total
						50	100

COURSE OUTCOMES:

CO 1:	Articulate and determine SDOF systems and their equations of motion
CO 2:	Articulate and determine SDOF systems and their equations of motion
CO 3:	Understand the basics of seismology
CO 4:	Estimate the response and design spectra for various RC and steel structures
CO 5:	Adapting the IS code for design of Earthquake resistant RC structures
CO 6:	Apply and develop an engineering solution for earthquake resistant design

SYLLABUS

UNIT	CONTENT	Hrs
1.	THEORY OF VIBRATIONS: Concept of inertia and damping – Types of Damping – Difference between static forces and dynamic excitation – Degrees of freedom – SDOF idealization – Equations of motion of SDOF system for mass as well as base excitation – Free vibration of SDOF system – Response to harmonic excitation – impulse response	9
2.	MULTIPLE DEGREE OF FREEDOM SYSTEM: Introduction to MDOF systems, Two degree of freedom system – Normal modes of vibration – Natural frequencies – Mode shapes – Decoupling of equations of motion – Concept of mode superposition (No derivations).	9
3.	ELEMENTS OF SEISMOLOGY: Causes of Earthquake – Geological faults – Tectonic plate theory – Elastic rebound – Epicentre – Hypocentre – Primary, shear and Raleigh waves – Seismogram – Magnitude and intensity of earthquakes – Magnitude and Intensity scales – Spectral Acceleration	9
4.	RESPONSE OF STRUCTURES TO EARTHQUAKE: Response and design spectra – Design earthquake – concept of peak acceleration – Effect of soil properties and damping –Importance of ductility – Methods of introducing ductility into RC structures..	9
5.	DESIGN METHODOLOGY: IS 1893, IS 13920 and IS 4326 – Code provisions – Design as per the codes – Calculation of base shear distribution to various floors - Base isolation techniques – Vibration control measures – Important points in mitigating effects of earthquake on structures.	9

TEXT BOOKS:

TB 1:	1. Chopra, A.K., "Dynamics of Structures – Theory and Applications to Earthquake Engineering", Second Edition, Pearson Education, 2003.
TB 2:	2. Agarwal Pankaj, "Earthquake resistance design", PHI.
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	1. Biggs, J.M., "Introduction to Structural Dynamics", McGraw–Hill Book Co., N.Y., 1964
Ref 2:	2. Dowrick, D.J., "Earthquake Resistant Design", John Wiley & Sons, London, 1977
Ref 3:	3. Paz, M., "Structural Dynamics – Theory & Computation", CSB Publishers & Distributors, Shahdara, Delhi, 1985
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 72

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 8	COURSE TITLE	Elective II*				COURSE ID			
						TCE 811-818			
COURSE COMPONENT	CREDITS					L	P	T	
Elective (DE)	3					3	0	0	
						CONTACT HOURS			
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	3	0				25	25	50	100
COURSE OUTCOMES:									
CO 1:									
CO 2:									
CO 3:									
CO 4:									
CO 5:									
CO 6:									
SYLLABUS									
UNIT	CONTENT							Hrs	
1.								9	
2.								9	
3.								9	
4.								9	
5.								9	
TEXT BOOKS:									
TB 1:									
TB 2:									
TB 3:									
TB 4:									
TB 5:									
REFERENCES:									
Ref 1:									
Ref 2:									
Ref 3:									
Ref 4:									
Ref 5:									

CIVIL ENGINEERING DEPARTMENT 73

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 8	COURSE TITLE	Elective III*				COURSE ID			
						TCE 851-858			
COURSE COMPONENT	CREDITS					L	P	T	
Elective (IE)	3					3	0	0	
						CONTACT HOURS			
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	3	0				25	25	50	100
COURSE OUTCOMES:									
CO 1:									
CO 2:									
CO 3:									
CO 4:									
CO 5:									
CO 6:									
SYLLABUS									
UNIT	CONTENT							Hrs	
1.								9	
2.								9	
3.								9	
4.								9	
5.								9	
TEXT BOOKS:									
TB 1:									
TB 2:									
TB 3:									
TB 4:									
TB 5:									
REFERENCES:									
Ref 1:									
Ref 2:									
Ref 3:									
Ref 4:									
Ref 5:									

CIVIL ENGINEERING DEPARTMENT 74

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 8	COURSE TITLE	Project**			COURSE ID				
COURSE COMPONENT	CREDITS				CEP 801				
Project (PJ)	6	CONTACT HOURS			L	P			
					6	0			
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
	0	3				0	100	100	200

COURSE OUTCOMES:

CO 1:	Application of fundamental knowledge of civil engineering in solving engineering problems
CO 2:	Use conventional as well as advanced tool application
CO 3:	Design and draw the necessary drawings as per the detailing's.
CO 4:	Planning and execution skills as an individual and team member.
CO 5:	Get the presentation skills of the work done and submission of a Technical Report.
CO 6:	Become confident in planning, partitioning and solving a simple project through team work.

SYLLABUS

UNIT	CONTENT	Hrs
1.	The objective of the project work is to enable the students to work in convenient groups of not more than five/six members in a group on a project involving theoretical and experimental studies related to Civil Engineering. Every Project Work shall have a Guide who is a member of the faculty of Civil Engineering of the university where the student is registered. The hours allotted for this course shall be utilized by the students to receive directions from the Guide, on library reading, laboratory work, computer analysis or field work and also to present in periodical seminars the progress made in the project. Each student shall finally produce a comprehensive report covering background information, literature Survey, problem statement, Project work details and conclusions. This experience of project work shall help the student in expanding his / her knowledge base and also provide opportunity to utilize the creative ability and inference capability.	9
2.		9
3.		9
4.		9
5.		9

TEXT BOOKS:

TB 1:	
TB 2:	
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 75

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8	COURSE TITLE	General Proficiency				COURSE ID	
COURSE COMPONENT	CREDITS					GP 801	
Communication Skills (GP)	1	CONTACT HOURS				L	P
						0	0
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
	0	3				0	0
						ESE	Total
						0	100
COURSE OUTCOMES:							
CO 1:	Develop reading and comprehensive skills						
CO 2:	Get advanced general aptitude skills.						
CO 3:	Get advanced mathematical aptitude skills						
CO 4:	Develop Critical Reasoning skills						
CO 5:							
CO 6:							
SYLLABUS							
UNIT	CONTENT						Hrs
1.	Effective Reading Skills: Reading Comprehension Purpose of reading, skimming and scanning. Tips for improving comprehension skills. (For effective reading skills practice papers on Reading Comprehension will be provided to students)						9
2.	Aptitude section: Clocks, Calendar, Profit/loss, Percentage, Average						9
3.	Aptitude Section: Ages, Trains & Boats, Simplification, Ratio & proportion, Partnership						9
4.	Critical Reasoning: Analyze logical arguments.						9
5.							9
TEXT BOOKS:							
TB 1:	For Verbal Section: Spoken English for India by R.K.Bansal and J.B. Harrison- Orient Longman						
TB 2:	A practical English Grammar by Thomson and Martinet-Oxford University Press						
TB 3:	Professional Communication by Malti Aggarwal						
TB 4:	English grammar, composition and correspondence by M.A.Pink and A.E.Thomas –S.Chand and Sons.						
TB 5:	Word Power by Blum Rosen-Cambridge University Press						
REFERENCES:							
Ref 1:	A Dictionary of Modern Usage-Oxford University Press						
Ref 2:	For Aptitude Section: Quantitative aptitude by R.S Agarwal						
Ref 3:	Verbal and Non Verbal Reasoning by R.S Agarwal						
Ref 4:	All books of puzzles to puzzle to puzzle you by Shakuntala Devi.						
Ref 5:	Question Bank on the practice exercise (Created for internal use)						

CIVIL ENGINEERING DEPARTMENT 76

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7E-I	COURSE TITLE	Design of Pre-Stressed Concrete Structures				COURSE ID	
						TCE 711	
COURSE COMPONENT	CREDITS					L	P
Structures (DE)							
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
							ESE
							Total

COURSE OUTCOMES:

CO 1:	Understand various concepts of prestressing
CO 2:	Determine the resultant stresses in beams at various sections
CO 3:	Understand and determine deflections in short term and long term
CO 4:	Check the member for important Limit states
CO 5:	Design a typical Flexural prestressed and post tensioned members.
CO 6:	Appreciate the Prestressing Concepts with advantages as well as sensitivity of the same

SYLLABUS

UNIT	CONTENT	Hrs
1.	Materials: High strength concrete and steel, Stress- Strain characteristics and properties. Basic Principles of Prestressing: Fundamentals, Load balancing concept, Stress concept, centre of Thrust, Pretensioning and post tensioning systems, tensioning methods and end anchorages.	9
2.	Analysis of Sections for Flexure and Losses of Prestress: Various losses encountered in pre-tensioning and post tensioning methods. Stresses in concrete due to pre-stress and loads, stresses in steel due to loads, Cable profiles.	9
3.	Deflections: Deflection of a pre-stressed member – short term and long term deflections.	9
4.	Limit State of Collapse: Flexure – IS Code recommendations Ultimate flexural Strength of sections, Shear –IS Code recommendations, shear reinforcement. Limit state of serviceability – control of deflections and cracking	9
5.	Design of Beams: Design of pre tensioned and post tensioned symmetrical and unsymmetrical sections. Permissible stresses, design of prestressing force and eccentricity, limiting zone of pre-stressing cable profile.	9

TEXT BOOKS:

TB 1:	1. Pre-stressed Concrete –N. Krishna Raju– Tata mc. Graw Publishers.- 2010
TB 2:	2. Pre-stressed Concrete – P. Dayarathnam : Oxford and IBH Publishing Co. - 1996
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	1. Design of pre-stressed concrete structures – T.Y.Lin and Ned H. Burns – John Wiley & Sons, New York. - 2004
Ref 2:	2. Fundamental of pre-stressed concrete- N.C. Sinha & S.K.Roy - 1994
Ref 3:	3. IS:1343:1980
Ref 4:	Pre-stressed Concrete – N.Rajgopalan, Narosa Publishing House - 2008
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 77

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7E-I	COURSE TITLE	Geographic Information System				COURSE ID	
						TCE 712	
COURSE COMPONENT	CREDITS					L	P
Surveying (DE)		CONTACT HOURS					
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total
COURSE OUTCOMES:							
CO 1:	Understand the concept of GIS.						
CO 2:	Differentiate and adopt the right data type for a better data model.						
CO 3:	Understand DBMS and create the database structure.						
CO 4:	Do manipulation and analyse surface modelling networks.						
CO 5:	Adopt GIS for general implementation in different fields						
CO 6:	Appreciate use of GIS for bettering the society.						
SYLLABUS							
UNIT	CONTENT						Hrs
1.	Introduction: Geographic Information System (GIS) Concepts and Terminology, Utility of GIS, Essential components of a GIS, Hardware and Software requirements for GIS, Conceptual models in GIS. Data Acquisition: Scanners and Digitizers, Method of Digitization, Data Storage, Verification and Editing, Remote Sensing data as input to GIS.						9
2.	Data Types: Spatial data and Non-spatial data, Spatial Data Models: Raster data model and Vector data model, Data Formats, Raster Vector Data Conversion, Data Compression, Run Length Coding, Quadtree Tessellation, Point Line and Area features, Topology, Data Reduction and Generalization, Map Projection and transformation, Geo-referencing, Edge Matching, Rectification and Registration Data quality and sources of errors.						9
3.	Non Spatial Data, Database Structure: Hierarchical Database Structure, Network Data Structure, Relational Database Structure, Data storage and retrieval in GIS, Object Oriented Database, Database Management System.						9
4.	Spatial Data Manipulation and Analysis: Reclassification and Aggregation, Geometric and Spatial Operations on Data, Layers, coverage, Overlays, Buffers, Measurement and Statistical Modeling, Raster based analysis, Vector based analysis, Network Analysis, Data Output: Types of Output.						9
5.	Applications of GIS in Administration, Planning, Management, Monitoring, Engineering, Digital Elevation Model (DEM) and other areas, Various GIS packages and their salient features, Modern trends: Web GIS, Open GIS, Data Mining, GIS Customization, Automated Mapping/Facilities Management(AM/FM).						9
TEXT BOOKS:							
TB 1:	1. Burrough, P.A. and McDonnell, R.A., "Principles of Geographic Information System", Oxford University Press.						
TB 2:	2. Chandra, A.M. and Ghosh, S.K., "Remote Sensing and Geographical Information Systems", Narosa Publishing House, New Delhi.						
TB 3:	3. "Manual of Remote Sensing", Vol.2, "American Society of Photogrammetry & Remote Sensing".						
TB 4:	4. Geographic Information Systems: A Management Perspective, Stan Aromoff WDL Publications.						
TB 5:							
REFERENCES:							
Ref 1:							
Ref 2:							
Ref 3:							
Ref 4:							
Ref 5:							

CIVIL ENGINEERING DEPARTMENT 78

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7E-I	COURSE TITLE	Ground Improvement Techniques				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 713	
Geo Technical Engineering (DE)		CONTACT HOURS				L	P
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE	ESE
							Total
COURSE OUTCOMES:							
CO 1:	Learn different methods of soil improvement by dewatering the area.						
CO 2:	Learn various techniques of strengthening the soil by compaction.						
CO 3:	Understand the mechanism and application of various chemical stabilization of soils.						
CO 4:	Identify the expansive soils and will learn the application of geosynthetics in various field of civil engineering.						
CO 5:	Learn the concepts of soil reinforcement and various factors affecting the reinforced soil.						
CO 6:	Summarize and differentiate various ground improvement techniques and their applications in the field of civil engineering						
SYLLABUS							
UNIT	CONTENT						Hrs
1.	Ground Improvement: Role of ground improvement in foundation engineering, methods of ground improvement, Geotechnical problems in alluvial, laterite and black cotton soils. Selection of suitable ground improvement techniques based on soil condition. Hydraulic Modification: Dewatering: methods of dewatering- sumps and interceptor ditches, single, multi stage well points, vacuum well points, Horizontal wells, foundation drains, blanket drains, criteria for selection of fill material around drains, Electro-osmosis						9
2.	Compaction: In situ densification methods in granular Soils– Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth. Compaction equipments, specifications and control. In situ densification methods in Cohesive soils– preloading or dewatering, Vertical drains – Sand Drains, Sand wick geo-drains, Stone and lime columns, thermal methods.						9
3.	Grouting: Grouting: Objectives of grouting, grouts and their properties, grouting methods- ascending, descending and stage grouting, hydraulic fracturing in soils and rocks- post grout test Stabilisation: Cement stabilization, bituminous stabilization, Lime stabilization, Chemical stabilisation with calcium chloride, sodium silicate and gypsum- Methods, Principles, Applications and Field Control.						9
4.	Expansive soils: Problems of expansive soils , tests for identification , methods of determination of swell pressure. Improvement of expansive soils, Foundation techniques in expansive soils - under reamed piles. Geo-synthetics: Geo-textiles- Types, Functions and applications , geo-grids and geo-membranes – functions and applications.						9
5.	Reinforced Earth: Principles, Components of reinforced earth, factors governing design of reinforced earth walls, design principles of reinforced earth walls.						9
TEXT BOOKS:							
TB 1:	Ground Improvement Techniques- Purushothama Raj P. (1999) Laxmi Publications, New Delhi.						
TB 2:	Construction and Geotechnical Method in Foundation Engineering- Koerner R.M. (1985) - Mc Graw Hill Pub. Co., New York.						
TB 3:							
TB 4:							
TB 5:							
REFERENCES:							
Ref 1:	Engineering principles of ground modification- Manfred Hausmann (1990) - Mc Graw Hill Pub. Co., New York.						
Ref 2:	Methods of treatment of unstable ground- Bell, F.G. (1975) Butterworths, London.						
Ref 3:	Expansive soils- Nelson J.D. and Miller D.J. (1992) -, John Wiley and Sons.						
Ref 4:	Soil Stabilization; Principles and Practice- Ingles. C.G. and Metcalf J.B. (1972) - Butterworths, London.						
Ref 5:	Jones J.E.P., Earth Reinforcement and Soil Structure, Butterworths, 1995.						

CIVIL ENGINEERING DEPARTMENT 79

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7E-I	COURSE TITLE	Environmental Impact Assessment of Civil Engg. Projects				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 714	
Environmental Engineering (DE)		CONTACT HOURS				L	P
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total
COURSE OUTCOMES:							
CO 1:	Understand the effects of various Civil Engg. Projects on environment						
CO 2:	Understand the general laws and regulations pertaining to impact of Civil Engg. projects on environment						
CO 3:	Ability for Assessing and planning the details of environmental impact						
CO 4:	Understand case studies and mitigation of environmental impacts						
CO 5:	Awareness of various case studies of environmental impacts						
CO 6:	Able to Understand the laws, regulations, planning and mitigation of various environmental projects						
SYLLABUS							
UNIT	CONTENT						Hrs
1.	INTRODUCTION: Impact of development projects under Civil Engineering on environment - Environmental Impact Assessment (EIA) - Environmental Impact Statement (EIS) – EIA capability and limitations – Legal provisions on EIA						9
2.	METHODOLOGIES: Methods of EIA –Check lists – Matrices – Networks – Cost-benefit analysis – Analysis of alternatives						9
3.	PREDICTION AND ASSESSMENT Assessment of Impact on land, water and air, noise, social, cultural flora and fauna; Mathematical models; public participation – Rapid EIA						9
4.	ENVIRONMENTAL MANAGEMENT PLAN: Plan for mitigation of adverse impact on environment – options for mitigation of impact on water, air and land, flora and fauna; Addressing the issues related to the Project Affected People – ISO 14000.						9
5.	CASE STUDIES: EIA for infrastructure projects – Bridges – Stadium – Highways –Dams – Multi-storey Buildings – Water Supply and Drainage Projects – Waste water treatment plants.						9
TEXT BOOKS:							
TB 1:	1. Canter, R.L., “Environmental Impact Assessment”, McGraw-Hill Inc., New Delhi, 1996.						
TB 2:	2. Shukla, S.K. and Srivastava, P.R., “Concepts in Environmental Impact Analysis”, Common Wealth Publishers, New Delhi, 1992.						
TB 3:							
TB 4:							
TB 5:							
REFERENCES:							
Ref 1:	1. John G. Rau and David C Hooten (Ed)., “Environmental Impact Analysis Handbook”, McGraw-Hill Book Company, 1990.						
Ref 2:	2. “Environmental Assessment Source book”, Vol. I, II & III. The World Bank, Washington, D.C., 1991.						
Ref 3:	Judith Petts, “Handbook of Environmental Impact Assessment Vol. I & II”, Blackwell Science, 1999.						
Ref 4:							
Ref 5:							

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7E-I	COURSE TITLE	Bridge engineering				COURSE ID	
						TCE 715	
COURSE COMPONENT	CREDITS					L	P
Structures (DE)							
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
							ESE
							Total

COURSE OUTCOMES:

CO 1:	Classify a given type of bridge, understand the factors governing its selection and evaluate the loads for which it needs to be designed for
CO 2:	Design the main components of slab bridges and multi-beam bridges
CO 3:	Design the main components of balanced cantilever bridge, arch bridge, prestressed concrete bridge and lattice girder railway bridges
CO 4:	Understand the terminology of cable bridges and construction methods
CO 5:	Design the bridge bearings and bridge substructures
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	General Considerations: Types of Bridges, Economic Spans, Aesthetics, Selection of suitable type of bridge. Design Loads and their Distribution: Design loads for highway and railway bridges.	9
2.	Slab Bridges: Analysis of deck slabs using effective width method and Pigeaud's method, T-Beam Bridges Live Load distribution in multi-beam bridges by courbons method, henry jaega, morice – little method	9
3.	Design of Superstructure: Design of balanced cantilever concrete bridge, Design of lattice girder railway bridges. Design principles of arch bridge, prestressed concrete bridge, and box girder bridge.	9
4.	Introduction to cable bridges. Various types of bridge bearings and their design. & Terminology	9
5.	Introduction to Design of Substructure. Introduction to Construction/Erection Methods.	9

TEXT BOOKS:

TB 1:	Victor, D.J, "Essential of Bridges", Oxford and IBH Publishing Co. Pvt. Ltd.
TB 2:	Krishna Raju, N., "Design of Bridges", Oxford and IBH Publishing Co. Pvt. Ltd
TB 3:	Ponnuswamy, S, "Bridge Engineering", Tata McGraw Hill Book Co. Ltd., New Delhi
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	Raina, V.K, "Concrete Bridge Practice", Tata McGraw Hill Book Co. Ltd., New Delhi
Ref 2:	Pama, R.P and Cusens, A.R, "Bridge Deck Analysis," John Wiley & Sons.
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 81

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7E-I	COURSE TITLE	Advanced Highway Engineering				COURSE ID	
						TCE 716	
COURSE COMPONENT	CREDITS					L	P
Transportation Engineering (DE)		CONTACT HOURS					
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total
COURSE OUTCOMES:							
CO 1:	Contribute in preparation of highway planning and evaluate materials						
CO 2:	Appreciate various design methods of flexible and rigid pavements						
CO 3:	Apply different construction techniques and quality control tests in road construction						
CO 4:	Select the appropriate soil stabilization methods for road						
CO 5:	Evaluate and suggest maintenance and rehabilitation for the pavements						
CO 6:	Interpret and apply engineering knowledge to solve problems related to pavements						
SYLLABUS							
UNIT	CONTENT						Hrs
1.	Highway planning: Preparation of master plans, Saturation system, Critical Study of National Road Development Plans, Feasibility study for National Highways and Expressways, Highway Economics and Financing Highway Materials; Evaluation of subgrade soil and road aggregates, Types of bituminous binders and their Suitability, Adhesion and Rheology of bituminous binders, New road materials, additives, Bituminous mix design						9
2.	Design Considerations: Equivalent single wheel load, Repetition of loads, pavement Structure-Soil interaction, Strength of pavement component materials, Design factors Flexible payment: Empirical, semi-empirical and analytical design methods, IRC Method of Design, Benkelman beam method, Determination of road roughness. Rigid Pavements: Load and temperature stresses, Requirements of fillers and sealers, Design of joints and load transfer devices, IRC methods of design, Design of SFRC pavements.						9
3.	Construction Techniques and Specifications: Quality control tests, Equipment and Specifications for water bound macadam, Wet mix macadam and bituminous roads construction, bituminous surface treatment, Penetration macadam, Bituminous bound macadam, Dense bituminous macadam, Semi-Dense bituminous concrete, Bituminous concrete, Sheet asphalt and Mastic asphalt. Equipment and Specifications for cement concrete roads. Reinforced Concrete Pavements						9
4.	Soil Stabilised Road: Aggregate mixtures, proportioning, Soil stabilized mixes Special problems related to Drainage						9
5.	Pavement Evaluation, Maintenance and Rehabilitation: Techniques for Functional and Structural Evaluation, Causes of failures, Routine and periodic maintenance, Special repairs, Types and design of overlays, Maintenance management system.						9
TEXT BOOKS:							
TB 1:	Yoder, E.J., and Witzek, M.W., "Principles of pavement Design", John Wiley & Sons, Inc., New York.						
TB 2:	Flaherty CAO, "Highway Engg.", vol. 2, Edward Arnol, London.						
TB 3:	Khanna, S.K. and Justo, C.E.G., "Highway Engg.", Nem Chand & Bros, Roorkee.						
TB 4:	Bituminous Road construction, HMSO, UK.						
TB 5:							
REFERENCES:							
Ref 1:	Kadiyali, L.R., "Principles and Practices of Highway Engg."						
Ref 2:	Concrete Roads, HMSO, U.K.						
Ref 3:							
Ref 4:							
Ref 5:							

CIVIL ENGINEERING DEPARTMENT 82

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7E-I	COURSE TITLE	Tender procedure and contract management				COURSE ID	
						TCE 717	
COURSE COMPONENT	CREDITS					L	P
Materials (DE)							
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
							ESE
							Total

COURSE OUTCOMES:

CO 1:	understand the documentation work for national and international contracts
CO 2:	study the procedure and guidelines for tenders
CO 3:	get exposure for arbitration ,rules and regulation of agreement
CO 4:	become familiar to legal aspects of revenue codes and property law
CO 5:	get knowledge on various labour laws ,safety regulation and Indian acts
CO 6:	appreciate the legal and documentary procedure of tendering and contract management

SYLLABUS

UNIT	CONTENT	Hrs
1.	CONSTRUCTION CONTRACTS: Indian Contracts Act – Elements of Contracts – Types of Contracts – Features – Suitability –Design of Contract Documents – International Contract Document – Standard Contract Document – Law of Torts	9
2.	TENDERS: Prequalification – Bidding – Accepting – Evaluation of Tender from Technical, Contractual and Commercial Points of View – Contract Formation and Interpretation – Potential Contractual Problems – World Bank Procedures and Guidelines – Transparency in Tenders Act, e -tendering.	9
3.	ARBITRATION: Comparison of Actions and Laws – Agreements – Subject Matter – Violations – Appointment of Arbitrators – Conditions of Arbitration – Powers and Duties of Arbitrator – Rules of Evidence – Enforcement of Award – Costs	9
4.	LEGAL REQUIREMENTS: Insurance and Bonding – Laws Governing Sale, Purchase and Use of Urban and Rural Land – Land Revenue Codes – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties and their Influence on Construction Costs – Legal Requirements for Planning – Property Law – Agency Law – Local Government Laws for Approval – Statutory Regulations	9
5.	LABOUR REGULATIONS: Social Security – Welfare Legislation – Laws relating to Wages, Bonus and Industrial Disputes, Labour Administration– Insurance and Safety Regulations – Workmen’s Compensation Act – Indian Factory Act – Tamil Nadu Factory Act – Child Labour Act - Other Labour Laws	9

TEXT BOOKS:

TB 1:	1. Gajaria G.T., Laws Relating to Building and Engineering Contracts in India, M.M.Tripathi Private Ltd., Bombay, 1982
TB 2:	2. Tamilnadu PWD Code, 1986
TB 3:	3. Jimmie Hinze, Construction Contracts, Second Edition, McGraw Hill, 2001
TB 4:	Joseph T. Bockrath, Contracts and the Legal Environment for Engineers and Architects, Sixth Edition, McGraw Hill, 2000.
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7E-I	COURSE TITLE	Design of Hydraulic Structures				COURSE ID	
						TCE 718	
COURSE COMPONENT	CREDITS					L	P
Water Resources (DE)		CONTACT HOURS					
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Design of canal regulation works.
CO 2:	Design of a stable spillway and energy dissipation work.
CO 3:	Design of Diversion Head Works for flow conditions based on Fraud's no
CO 4:	Design the head regulation measures
CO 5:	design the hydraulic structure over/under the flow passage.
CO 6:	Perform the basic hydraulic design of water storage and diversion works.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Introduction: Types of hydraulic structures and their functions, Consideration for their selection. Dams: Design principles of gravity and earth dams	9
2.	Spillways: Types of spillways, design of Ogee and Siphon spillways, spillway aerators, spillway gates, energy dissipation downstream of spillways	9
3.	Diversion Headworks: Components of diversion head works and their design Channel transitions: Design of channel transitions for sub critical and super critical flows	9
4.	Canals Falls and Regulators: Types and design of Sarda type and sloping glacis falls, design of cross and distributory head regulators, energy dissipation downstream of falls	9
5.	Cross Drainage Structures: Necessity and types of cross drainage structures, design of Siphon aqueduct.	9

TEXT BOOKS:

TB 1:	1. Bharat Singh, "Fundamentals of Irrigation Engineering", Nem Chand and Bros. Roorkee.
TB 2:	2. G.L Asawa, "Irrigation Engineering", New Age International Publishers, New Delhi.
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7E-I	COURSE TITLE	Ground Water Development and Management				COURSE ID	
						TCE 719	
COURSE COMPONENT	CREDITS					L	P
Water Resources (DE)							
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
							ESE
							Total

COURSE OUTCOMES:

CO 1:	Understand the various components of ground water hydrological cycle.
CO 2:	Understand the movement of water beneath earth
CO 3:	Understand the Hydraulics of different kinds of wells
CO 4:	Judge the right method of surface and sub surface water exploration.
CO 5:	Apply the methods for recharging the ground water.
CO 6:	Appreciate the Consumptive use of ground water along with other fresh water sources

SYLLABUS

UNIT	CONTENT	Hrs
1.	Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention	9
2.	Ground Water Movement: Permeability, Darcy's law, storage coefficient. Transmissibility, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system. Ground water flow contours their applications.	9
3.	Analysis of Pumping Test Data – I: Steady flow groundwater flow towards a well in confined and unconfined aquifers – Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests. Analysis of Pumping Test Data – II: Unsteady flow towards a well – Non equilibrium equations – Thesis solution – Jacob and Chow's simplifications, Leak aquifers.	9
4.	Surface and Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic refraction methods. Subsurface methods – Geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.	9
5.	Artificial Recharge of Ground Water: Concept of artificial recharge – recharge methods, relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies. Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg relation, Shape of interface, control of seawater intrusion. Groundwater Basin Management: Concepts of conjunction use, Case studies.	9

TEXT BOOKS:

TB 1:	1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
TB 2:	2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.
TB 3:	3. Groundwater by Beaver, John Wiley & sons.
TB 4:	4. Groundwater System Planning & Managemnet – R.Willes & W.W.G.Yeh, Printice Hall.
TB 5:	Applied Hydrogeology by C.W.Fetta, CBS Publishers & Distributers.

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 7E-I	COURSE TITLE	Airfield and Harbour Engineering				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 720	
Transportation Engineering (DE)		CONTACT HOURS				L	P
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE	ESE
							Total

COURSE OUTCOMES:

CO 1:	Understand and plan the various elements of typical harbour
CO 2:	Understand the planning and design of various marine structures and maintenance techniques at Harbour
CO 3:	Understand the fundamental of aircraft characteristics and airport planning
CO 4:	Design of runway and taxiways at Airport
CO 5:	Obtain Knowledge on terminal area design and air traffic control & visual aids
CO 6:	Interpret and apply engineering knowledge to solve problems related to Airfield and Harbour Engineering.

SYLLABUS

UNIT	CONTENT	Hrs
1.	General: History of water transportation at world level and at national level development and policy, classification of harbours, natural and artificial. Major ports in India. Harbour Planning: Harbour components, ship characteristics, characteristics of good harbour and principles of harbour planning, size of harbour, site selection criteria and layout of harbours. Surveys to be carried out for harbor planning. Natural Phenomena: Wind, waves, tides formation and currents phenomena, their generation characteristics and effects on marine structures, silting, erosion and littoral drift.	9
2.	Marine Structures: General design aspects, breakwaters - function, types general design principles, wharves, quays, jetties, piers, pier heads, dolphin, fenders, mooring accessories – function, types, suitability, design and construction features. Docks and Locks: Tidal basin, wet docks-purpose, design consideration, operation of lock gates and passage, repair docks - graving docks, floating docks. Port Amenities and Navigational Aids: Ferry, transfer bridges, floating landing stages, transit sheds, warehouses, cold storage, aprons, cargo handling equipments, purpose and general description, Channel and entrance demarcation, buoys, beacons, light house electronic communication devices. Harbour Maintenance: Costal protection-purpose and devices, dredging, purpose, methods, dredgers-types, suitability, disposal of dredged materials .mechanical and hydraulic dredgers.	9
3.	AIRPORT ENGINEERING General: History, development, policy of air transport, aircrafts, aerodromes, airtransport authorities, air transport activities, air crafts and its characteristics, airport classifications as per ICAO. Airport Planning : Regional planning-concepts and advantages, location and planning of airport as per ICAO and F.A.A.recommendations, airport Elements -airfield, terminal area, obstructions, approach zone,zoning laws, airport capacity, airport size and site selection, estimation of future air traffic, development of new airport, requirements of an ideal airport layout.	9
4.	Run Way Design: Wind rose and orientation of runway ,wind coverage and crosswind component, factors affecting runway length, basic runway length, and corrections to runway length, runway geometrics and runway patterns (configurations).Runway marking, threshold limits cross section of runway Taxiway Design: Controlling factors, taxiway geometric elements, layout, exittaxiway, location and geometrics, holding apron, turnaround facility. Aprons -locations, size, gate positions, aircraft parking configurations and parking systems ,hanger-site selection, planning and design considerations, Fuel storage area, blast pads . wind direction indicator	9
5.	Terminal Area Design: Terminal area elements and requirements, terminal building functions, space requirements, location planning concepts, vehicular parking area and Circulation network. passenger requirements at terminal building Grading and Drainage : Airport grading-importance - operations, airport drainage aims, functions, special characteristics, basic requirements, surface and subsurface drainage systems. Air Traffic Control and Visual Aids: Air traffic control objectives, control system, control network-visual aids-landing information system, airport markings and lighting.	9

TEXT BOOKS:

TB 1:	R. Srinivasan and S. C. Rangwala, Harbour, Dock and Tunnel Engineering, 1995, Charotar Pub.House, Anand
TB 2:	Dr. S. K. Khanna, M.G.Arora and S.S.Jain, Airport Planning & Design, Nem Chand & Bros.,Roorkee
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	G.V. Rao Airport Engineering, Tata McGraw Hill Pub. Co., New Delhi
Ref 2:	S. P. Bindra, A Course in Docks and Harbour Engineering, 1992, DhanpatRai& Sons, NewDelhi
Ref 3:	Airport Engineering, Charotar Publishing House Pvt. Ltd, Anand
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-II	COURSE TITLE	Matrix methods of structural analysis				COURSE ID	
						TCE 811	
COURSE COMPONENT	CREDITS					L	P
Structures (DE)		CONTACT HOURS					
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Develop efficient algorithms for finding solution using matrix algebra
CO 2:	Determine solutions for simple indeterminate structures using flexibility matrix method
CO 3:	Determine solutions for simple indeterminate structures using stiffness matrix method
CO 4:	Apply the concept of stiffness matrix method for orthogonal grid structures
CO 5:	Apply the concept of stiffness matrix method for space truss and develop software solution
CO 6:	Develop software solutions for large structural problems

SYLLABUS

UNIT	CONTENT	Hrs
1.	Review of Matrix Algebra, Numerical methods for inversion of matrix such as Gauss Elimination, Solution of simultaneous equations, Gauss Jordan & Gauss Seidel iteration methods. Computer Algorithm & Programming aspects	9
2.	Flexibility Method, Selection of Redundant, Flexibility Matrix, Analysis of pin jointed indeterminate trusses, Continuous beams & Simple Portal Frames involving not more than three unknowns.	9
3.	Stiffness method, member stiffness matrix, effective node numbering, assembly, banded matrix, Analysis of determinate / indeterminate structures such as pin jointed trusses & beams, Member and Structure approach. Stiffness matrix for portal frame member, Transformation matrix, Member and Structure approach, Problems involving not more than three unknowns	9
4.	Stiffness method for analysis of orthogonal grid structure, member stiffness matrix, transformation matrix, member & structure approach	9
5.	a) Stiffness method for analysis of Space truss. Problems involving not more than three unknowns, Space frame, Formulation of member stiffness matrix for space frame member, Substructure Technique. b) Software applications for analysis of skeletal structures, input data, Generation of geometry of structure, software solution & Presentation of output.	9

TEXT BOOKS:

TB 1:	1. Numerical Methods for Engineering – S.C. Chapra & R.P. Canale Tata Mc Graw Hill Publication
TB 2:	2. Matrix & Finite Element analysis of structures – Madhujit Mukhopadhyay – Ane Books Pvt. Ltd.
TB 3:	3. Problems in structural Analysis by Matrix Methods – P Bhatt, Wheeler Publication
TB 4:	4. Advanced Structural Analysis – Devdas Menon – Narosa Publishing House
TB 5:	5. Matrix Analysis of Structures – Aslam Kassimalli Books / Cole Publishing company.

REFERENCES:

Ref 1:	6. Structural Analysis – A Matrix Approach - Pandit & Gupta - Tata Mc Graw Hill Publication
Ref 2:	Matrix Analysis of Framed Structures – Gere & Weaver- CBS Publications, Delhi
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 87

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-II	COURSE TITLE	Advanced concrete technology				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 812	
Materials (DE)		CONTACT HOURS				L	P
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Attain the knowledge of cement, hydration process, aggregate grading curve, maturity concept.
CO 2:	Comprehend between various types of special concrete and new technologies.
CO 3:	Determine the different mix design of advanced concrete and non-destructive methods.
CO 4:	Propose different types concrete technique for different requirement.
CO 5:	Apprehension of different concrete testing methods used in construction work.
CO 6:	Expertise on various concrete technologies and their requirement as per the demand.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Cement and its types: general, hydration of cement, water requirement for hydration, alkali aggregate reaction. Aggregate: grading curves of aggregates. Concrete: properties of concrete, w/c ratio, w/b ratio, gel space ratio, maturity concept, aggregate cement bond strength.	9
2.	Light weight concrete, ultra light weight concrete, vacuum concrete, mass concrete, waste material based concrete, shotcreting, guniting, sulphur concrete and sulphur infiltrated concrete, jet cement concrete (ultra rapid hardening), gap graded concrete, no fines concrete, high strength concrete, high performance concrete and under water concreting.	9
3.	Design of high strength concrete mixes, design of light weight aggregate concrete mixes, design of flyash cement concrete mixes, design of high density concrete mixes Advanced non-destructive testing methods: ground penetration radar, probe penetration, pull out test, break off maturity method, stress wave propagation method, electrical/ magnetic methods, nuclear methods and infrared thermography, core test.	9
4.	Historical development of fibre reinforced concrete, properties of metallic fibre, polymeric fibres, carbon fibres, glass fibres and naturally occurring fibres. Interaction between fibres and matrix (uncracked and cracked matrix), basic concepts and mechanical properties: tension and bending. Properties of hardened frc, behaviour under compression, tension and flexure of steel fibres and polymeric fibres. GFRC, SFRC, SIFCON-development, constituent materials, casting, quality control tests and physical properties	9
5.	Ferrocement, analysis and design of prefabricated concrete structural elements, manufacturing process of industrial concrete elements, precast construction, erection and assembly techniques.	9

TEXT BOOKS:

TB 1:	Santha Kumar, "Concrete technology", Oxford University Press.
TB 2:	A.M.Neville and Brooks, "Concrete technology"
TB 3:	Murdock – "Properties of Concrete"
TB 4:	P. K.Mehta, "Properties of Concrete"
TB 5:	M. S. Shetty, "Concrete Technology"

REFERENCES:

Ref 1:	P.N. Balguru & P.N. Shah, "Fiber Reinforced Cement Composite"
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-II	COURSE TITTLE	Hydro power engineering				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 813	
Water Resources (DE)						L	P
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Understand the need and requirement of energy.
CO 2:	Classify the hydro power plants.
CO 3:	Understand the typical structural component Power house
CO 4:	Design the penstock and surge tank.
CO 5:	Select right type and featured turbine for effective power production
CO 6:	Appreciate the need for conservation and production of power with the typical Indian resource.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Introduction: Power resources, Need & advantages, Estimation of Hydropower potential. Calculations for estimation of electrical load on turbines. Load factor, peak demand and utilization factor load duration curve Prediction of load.	9
2.	Classification of Hydropower Plant: General Management of running of river plants. Storage, pondage, diversion, canal plants, valley dam plants. Pumped storage plants, advantages & disadvantages, types. Tidal power plants.	9
3.	Powerhouse: Components, Structural details of powerhouse.	9
4.	Penstocks: Classification, design criteria, water hammer phenomenon, surge tanks, design procedures & details classification, canal surges.	9
5.	Turbines: Selection, classification, Arrangements in powerhouse. Draft tubes, cavitation, governing of turbines. Design principles of impulse & reaction turbines. Design of micro hydel power plants	9

TEXT BOOKS:

TB 1:	Dandekar, "Water Power Resources Engineering"
TB 2:	R.S.Varshney "Hydro Power Structures" Nem Chnad and Brothers, Roorkee.
TB 3:	R.K.Sharma "Water power engineering".
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-II	COURSE TITTLE	Finite element technique				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 814	
Structures (DE)		CONTACT HOURS				L	P
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE	ESE
							Total

COURSE OUTCOMES:

CO 1:	Formulate the functionals for generating weak form of differential equations governing structural behaviours
CO 2:	Formulate shape functions for one, two and three dimensional elements
CO 3:	Derive the discretized forms of strain displacement relationships
CO 4:	Mathematically assemble the elements based on displacement compatibility
CO 5:	Solve the mathematical system of equations representing the structure under the given loadings and boundary conditions
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	INTRODUCTION – VARIATIONAL FORMULATION: General field problems in Engineering – Modelling – Discrete and Continuous models – Characteristics – Difficulties involved in solution – The relevance and place of the finite element method – Historical comments – Basic concept of FEM, Boundary and initial value problems – Gradient and divergence theorems – Functionals – Variational calculus Variational formulation of VBPS. The method of weighted residuals – The Ritz method.	9
2.	FINITE ELEMENT ANALYSIS OF ONE DIMENSIONAL PROBLEMS: One dimensional second order equations – discretisation of domain into elements – Generalised coordinates approach – derivation of elements equations – assembly of elements equations – imposition of boundary conditions – solution of equations – Cholesky method – Post processing – Extension of the method to fourth order equations and their solutions – time dependant problems and their solutions – example from fluid flow and solid mechanics.	9
3.	FINITE ELEMENT ANALYSIS OF TWO DIMENSIONAL PROBLEMS: Second order equation involving a scalar-valued function – model equation – Variational formulation – Finite element formulation through generalised coordinates approach – Triangular elements and quadrilateral elements – convergence criteria for chosen models – Interpolation functions – Elements matrices and vectors – Assembly of element matrices – boundary conditions – solution techniques.	9
4.	ISOPARAMETRIC ELEMENTS AND FORMULATION: Natural coordinates in 1, 2 and 3 dimensions – use of area coordinates for triangular elements in - 2 dimensional problems – Isoparametric elements in 1,2 and 3 dimensional Lagrangean and serendipity elements – Formulations of elements equations in one and two dimensions - Numerical integration.	9
5.	APPLICATIONS TO FIELD PROBLEMS IN TWO DIMENSIONALS: Equations of elasticity – plane elasticity problems – axisymmetric problems in elasticity, Time dependent problems in elasticity.	9

TEXT BOOKS:

TB 1:	Chandrupatla, T.R., and Belegundu, A.D., "Introduction to Finite Element in Engineering", Third Edition, Prentice Hall, India, 2003.
TB 2:	Bhavikati, S.S., "Finite Element Analysis", New Age International Publishers, 2005.
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	J.N.Reddy, "An Introduction to Finite Element Method", McGraw-Hill, Intl. Student Edition, 1985.
Ref 2:	Zienkiewics, "The finite element method, Basic formulation and linear problems", Vol.1, 4/e, McGraw-Hill, Book Co.
Ref 3:	S.S.Rao, "The Finite Element Method in Engineering", Pergaman Press, 2003.
Ref 4:	C.S.Desai and J.F.Abel, "Introduction to the Finite Element Method", Affiliated East West Press, 1972.
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 90

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-II	COURSE TITLE	Systems approach in civil engineering				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 815	
Structures (DE)		CONTACT HOURS				L	P
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Identify goals, objectives, constraints, solution methods for a given system
CO 2:	Formulate the linear programming and nonlinear programming problems and solve the same
CO 3:	Solve transportation and assignment problems using distribution models
CO 4:	Apply dynamic programming to assist decision making
CO 5:	Model and solve sequencing and scheduling problems
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	Use of systems approach in Civil Engineering and managerial decision making process. Concept of systems approach: system, boundaries of system, goals and objectives, optimality, mathematical models, objective function and constraints, problem solving mechanism, types of problems, modeling / problem formulation, sub-optimization, solution techniques, sensitivity analysis.	9
2.	Linear programming: general nature of problem, formulation of problems, graphical method of solution, simplex method, dual. Method of Big M, Two phase method, duality. Non-Linear programming: Single variable unconstrained optimization – Local & Global optima, unimodal function	9
3.	Distribution models: Transportation and assignment problems and their solutions. Hungarian method for solving an assignment problem.	9
4.	Dynamic programming: Decision theory- classification of decision situations, decision tables and decision tree, criteria for decision making under certain, uncertain and risk conditions, utility theory. Multi stage decision processes, Principle of optimality, recursive equation, Applications, various models of D.P. Games theory: Theory of Games, Game models, rules of Game theory	9
5.	Sequencing and scheduling problems: Queuing models- various situations, queue discipline and customer behaviour, single server model. Basic functions of inventory and inventory decisions, Inventory models – Various costs, deterministic inventory models, classical EOQ model.	9

TEXT BOOKS:

TB 1:	“Operations Research-An Introduction” by Hamdy A. Taha, macmillian publication.
TB 2:	“Operation Research Techniques and Methods”, by V.K. Kapoor, Sultan Chand and Sons, Educational Publisher, New Delhi.
TB 3:	Quantitative Techniques in Management by N.D. Vohra (Mc Graw Hill)
TB 4:	Topics in Management Science by Robert E. Markland (Wiley Publication)
TB 5:	An Approach to Teaching Civil Engineering System by Paul J.Ossenbruggen

REFERENCES:

Ref 1:	A System Approach to Civil Engineering Planning & Design by Thomas K. Jewell (Harper Row Publishers)
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 91

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-II	COURSE TITLE	Engineering economics				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 816	
Materials (DE)		CONTACT HOURS				L	P
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	understand various project related economic terminology from engineering prospective
CO 2:	understand demand and supply rule
CO 3:	study the time value of money
CO 4:	determine various cost and do cost benefit analysis
CO 5:	understand the inflation effects on national income
CO 6:	understand and predict the effect economical aspects

SYLLABUS

UNIT	CONTENT	Hrs
1.	Introduction : Definitions - Goods, Utility, Value ,Assets, Liabilities, Revenue, Income, Wealth and welfare, Meaning, Nature and Scope of Economics, Meaning of Science, Engineering and Technology. Engineering Economics and its scope in engineering perspective.	9
2.	Concepts of Demand and Supply: Demand Analysis, Law of Demand, Determinates of Demand, Elasticity of Demand-Price, Income and cross Elasticity. Uses of concept of elasticity of demand in managerial decision, Law of supply.	9
3.	Time Value of Money: Nominal an effective value of interest, simple and compound interest, present worth comparison, present worth equivalence, annual rate analysis, rate of return analysis, Depreciation, Lease Vs Hire purchase.	9
4.	Cost Estimation: Types of costs Fixed cost, variable cost, average cost, marginal cost, money cost, real cost opportunity cost. Total cost, cost output relationship, cost benefit analysis, Break even analysis	9
5.	National Income, Inflation and Business Cycles: Concept of national Income Gross Income and Net Income, Meaning of Inflation, Types, causes & prevention of Inflation. Phases of business cycle	9

TEXT BOOKS:

TB 1:	
TB 2:	
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	Engineering Economics-James L.Riggs, David D. Bedworth, Sabah U.Randhawa, Tata Mc Graw -Hill
Ref 2:	Managerial Economics for Engineering : Prof. D.N. Kakkar
Ref 3:	Managerial Economics : D.N. Dwivedi
Ref 4:	Managerial Economics : Maheshwari.
Ref 5:	Industrial Organisation and Engineering Economics-Banga &Sharma, Khanna Publishers

CIVIL ENGINEERING DEPARTMENT 92

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-II	COURSE TITLE	Design of Tall Buildings				COURSE ID	
						TCE 817	
COURSE COMPONENT	CREDITS					L	P
Structures (DE)							
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
							ESE
							Total

COURSE OUTCOMES:

CO 1:	Critically examine current trends in growth of tall buildings and future urban habitats including the principles of green buildings.
CO 2:	Explain hybrid structural systems widely used in tall buildings and conduct conceptual design.
CO 3:	Model tall buildings for analysis.
CO 4:	Evaluate wind sensitivity, user comfort and dynamic response.
CO 5:	Complete a conceptual design of lateral and gravity load resisting system
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	INTRODUCTION: The Tall Building in the Urban Context - The Tall Building and its Support Structure - Development of High Rise Building Structures - General Planning Considerations. Dead Loads -Live Loads- Construction Loads -Snow, Rain, and Ice Loads - Wind Loads-Seismic Loading – Water and Earth Pressure Loads - Loads - Loads Due to Restrained Volume Changes of Material - Impact and Dynamic Loads - Blast Loads -Combination of Loads.	9
2.	THE VERTICAL STRUCTURE PLANE: Dispersion of Vertical Forces- Dispersion of Lateral Forces - Optimum Ground Level Space - Shear Wall Arrangement - Behaviour of Shear Walls under Lateral Loading. The Floor Structure or Horizontal Building Plane Floor Framing Systems-Horizontal Bracing- Composite Floor Systems The High - Rise Building as related to assemblage Kits Skeleton Frame Systems - Load Bearing Wall Panel Systems - Panel – Frame Systems - Multistory Box Systems.	9
3.	COMMON HIGH-RISE BUILDING STRUCTURES AND THEIR BEHAVIOUR UNDER LOAD: The Bearing Wall Structure- The Shear Core Structure - Rigid Frame Systems- The Wall -Beam Structure: Interspatial and Staggered Truss Systems - Frame - Shear Wall Building Systems - Flat Slab Building Structures - Shear Truss - Frame Interaction System with Rigid - Belt Trusses - Tubular Systems-Composite Buildings - Comparison of High - Rise Structural Systems Other Design Approaches Controlling Building Drift Efficient Building Forms - The Counteracting Force or Dynamic Response.	9
4.	APPROXIMATE STRUCTURAL ANALYSIS AND DESIGN OF BUILDINGS: Approximate Analysis of Bearing Wall Buildings The Cross Wall Structure - The Long Wall Structure The Rigid Frame Structure Approximate Analysis for Vertical Loading - Approximate Analysis for Lateral Loading - Approximate Design of Rigid Frame Buildings-Lateral Deformation of Rigid Frame Buildings The Rigid Frame - Shear Wall Structure - The Vierendeel Structure - The Hollow Tube Structure.	9
5.	OTHER HIGH-RISE BUILDING STRUCTURE: Deep - Beam Systems -High-Rise Suspension Systems - Pneumatic High -Rise Buildings - Space Frame Applied to High - Rise Buildings - Capsule Architecture.	9

TEXT BOOKS:

TB 1:	WOLFGANG SCHUELLER " High - rise building Structures", John Wiley and Sons, New York 1976.
TB 2:	Bryan Stafford Smith and Alex Coull, " Tall Building Structures ", Analysis and Design, John Wiley and Sons, Inc., 1991.
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	COULL, A. and SMITH, STAFFORD, B. " Tall Buildings ", Pergamon Press, London,1997.
Ref 2:	LinT.Y. and Burry D.Stotes, " Structural Concepts and Systems for Architects and Engineers ", John Wiley, 1994.
Ref 3:	Lynn S.Beedle, Advances in Tall Buildings, CBS Publishers and Distributors, Delhi,1996.
Ref 4:	Taranath.B.S., Structural Analysis and Design of Tall Buildings, Mc Graw Hill,1998.
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING					
SEMESTER: 8E-II	COURSE TITLE	Advanced Foundation Engineering,			COURSE ID	
					TCE 818	
COURSE COMPONENT	CREDITS				L	P
Structures (DE)						
					T	
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE
						ESE
						Total

COURSE OUTCOMES:

CO 1:	Understand the fundamental concepts, advanced principles and application of foundation analysis and
CO 2:	Understand Subsurface Exploration, Shallow Foundations - Ultimate bearing capacity, Safe bearing pressure, settlement analysis.
CO 3:	Design of Combined and Raft foundations,
CO 4:	Sheet pile walls, Braced cuts, Pile foundations, Drilled piers and Caissons.
CO 5:	Design Machine Foundations, understand the concept of reinforced earth.
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	Subsurface Exploration: Boring, Sampling, SPT, CPT, Geophysical methods, Bore log and soil report. Shallow Foundations: Terzaghi's, Meyerhoff, Hansens bearing capacity theories, based on SPT, layered soils, eccentric and inclined loads. Bearing capacity on slopes, Foundation settlements.	9
2.	Design of Combined and Raft Foundations : Design of combined footings by Conventional and elastic line methods.	9
3.	Sheet Pile Walls: Cantilever and Anchored sheet pile walls. Braced Cuts: Pressure envelopes and design of various components.	9
4.	Pile Foundations: Load transfer mechanism, Pile capacity in various soil types, negative skin friction, group action, settlements, laterally loaded vertical piles. Drilled Piers and Caissons : Design considerations, bearing capacity equations, Settlements, Lateral loads, Types of caissons, stability analysis.	9
5.	Machine Foundations: Free and forced vibration with and without damping, Elastic half space for rigid footings. Vibration analysis of foundations subjected to vertical, sliding and rocking modes, Design criteria for m/c foundations. Reinforced Earth : Materials and general considerations, Design and Stability	9

TEXT BOOKS:

TB 1:	Joseph Bowles, "Foundation Analysis and Design", McGraw-Hill Book Company.
TB 2:	Braja M. Das, "Principles of Foundation engineering", PWS Publishing Company.
TB 3:	V.N.S. Murthy, "Advanced Foundation Engineering", CBS Publishers and Distributors.
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	
Ref 2:	
Ref 3:	
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-III	COURSE TITLE	Disaster Management				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 851	
Environmental Engineering (IE)		CONTACT HOURS				L	P
EXAMINATION DURATION	THEORY	PRACTICAL			CWA	MSE	ESE
							Total

COURSE OUTCOMES:

CO 1:	General information and concepts of various Natural Hazards
CO 2:	Gets knowledge about the roles of communities and different governing bodies
CO 3:	Understand the different approaches to manage pre-post disaster durations
CO 4:	Exposure to Laws and policies framed by government
CO 5:	Knowledge of Various case studies to know the cause of failures from past failures
CO 6:	Able to prepare a plan of action to reduce the consequential effects of a disaster from being magnified

SYLLABUS

UNIT	CONTENT	Hrs
1.	Concepts and definition –Disaster, Hazard, Vulnerability, Resilience, Risks. Natural disasters; Cloud bursts, earth quakes, Tsunami, snow, avalanches, landslides, forest fires, diversion of river routes (ex. Kosi river), Floods, Drought, Cyclones, volcanic hazards/ disasters (Mud volcanoes): causes and distribution, hazardous effects and environmental impacts of natural disasters, mitigation measures, natural disaster prone areas in India, major natural disasters in India with special reference to Uttarakhand. Man-induced disasters: water logging, subsidence, ground water depletion, Soil Erosion, release of toxic gases and hazardous chemicals into environment, nuclear explosions.	9
2.	Factors affecting vulnerabilities, differential impacts, impacts of development projects such as dams, embankments, changes in land use etc., climate change adaption, relevance of indigenous knowledge, appropriate technology and local resources, sustainable development and its role in disaster mitigation, roles and responsibilities of – community, panchayat raj institutions/urban local bodies, state, centre and other stake holders in disaster mitigation.	9
3.	1.Pre- disaster stage (preparedness): Preparing hazard zonation maps, Predictability/ forecasting & warning, Preparing disaster preparedness plan, Land use zoning, Preparedness through (IEC) Information, education & Communication; Pre-disaster stage (mitigation), Disaster resistant house construction, Population reduction in vulnerable areas, Awareness. 2. Emergency Stage: Rescue training for search & operation at national & regional level, immediate relief, assessment surveys 3. Post Disaster stage-Rehabilitation and reconstruction of disaster affected areas; urban disaster mitigation: Political and administrative aspects, social aspects, economic aspects, environmental aspects.	9
4.	Environmental legislations related to disaster management in India: Disaster Management Act, 2005; Environmental policies & programmes in India- Institutions & national centres for natural disaster mitigation: National Disaster Management Authority (NDMA): structure and functional responsibilities, National Disaster Response Force (NDRF): Role and responsibilities, National Institute of Disaster Management (NIDM): Role and responsibilities	9
5.	Natural disasters in India with special reference to Uttarakhand:Earth quakes: Uttarkashi earth quake, 20th October,1991; Kutch earth quake, 2001; Sikkim earth quake, 18th September, 2011;Cloud Bursts : Uttarkashi cloud bursts, August, 2012;Landslides along Himalayan and other regions: Malpa (Pithoragarh) landslide, 11th & 17th August, 1998; Varunavrat hill landslide at Uttarkashi, 24th September, 2003Floods : Orissa floods, September, 2011Tsunami : Indian Ocean earth quake and Tsunami, 26th December, 2004Cyclones: Thane Cyclone, 30th December, 2011Droughts: Karnataka droughts, October, 2011Snow Avalanche.Man-induced disasters in India:Forest fires: Forest fires in Uttarakhand, 2004 & 2012Industrial disasters: Bhopal gas tragedy, 3rd December, 1984Mining: Chasnala (Bihar) mining disaster, 27th December, 1975Oil spills: Mumbai oil spill, 7th August, 2010.Nuclear disaster accidents: Narora atomic power station, Blandshahar (31st March, 1993); Kalpakkam atomic power station (22nd October, 2002); Kota Atomic power station, Rajasthan (2nd Feb, 1995)Disaster relevant to the area specific to the discipline of the students.Mock shows: Mock shows will be organized and conducted by expert agencies for understanding the vulnerability of areas in and around campus along with adopting the preventive measures.	9

TEXT BOOKS:

TB 1:	K.J. Anandha Kumar, Ajinder Walia, Shekher Chaturvedi, India Disaster Report, 2011, National Institute of Disaster Management, June, 2012
TB 2:	R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997
TB 3:	Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
TB 4:	R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
TB 5:	H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003

REFERENCES:

Ref 1:	R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo,1994
Ref 2:	Dr. Satender , Disaster Management in Hills, Concept Publishing Co., New Delhi, 2000
Ref 3:	AS Arya VK Sharma
Ref 4:	R.K Bhandani
Ref 5:	M.C Gupta

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-III	COURSE TITLE	Rock engineering				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 852	
Structures (IE)						L	P
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Classify different rock types and determine index properties.
CO 2:	Understand the lab and field methods of estimating rock strength.
CO 3:	Learn the methodology of determining initial insitu stresses in rocks
CO 4:	Understand the applications of rock engineering in the field of civil engineering
CO 5:	Learn rock bolting techniques and testing of rock bolts
CO 6:	Apply the basic concepts of rock engineering for relevant higher studies.

SYLLABUS

UNIT	CONTENT	Hrs
1.	CLASSIFICATION AND INDEX PROPERTIES OF ROCKS: Geological classification – Index properties of rock systems – Classification of rock masses for engineering purpose.	9
2.	ROCK STRENGTH AND FAILURE CRITERIA Modes of rock failure – Strength of rock – Laboratory and field measurement of shear, tensile and compressive strength – Stress strain behaviour in compression – Mohr-coulomb failure criteria and empirical criteria for failure – Deformability of rock.	9
3.	INITIAL STRESSES AND THEIR MEASUREMENTS Estimation of initial stresses in rocks – influence of joints and their orientation in distribution of stresses – technique for measurements of insitu stresses.	9
4.	APPLICATION OF ROCK MECHANICS IN ENGINEERING Simple engineering application – Underground openings – Rock slopes – Foundations and mining subsidence.	9
5.	ROCK BOLTING Introduction – Rock bolt systems – rock bolt installation techniques – Testing of rock bolts – Choice of rock bolt based on rock mass condition.	9

TEXT BOOKS:

TB 1:	Goodman P.E., "Introduction to Rock Mechanics", John Wiley and Sons, 1999.
TB 2:	Stillborg B., "Professional User Handbook for rock Bolting", Tran Tech Publications, 1996
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	row E.T., "Rock Characterisation Testing and Monitoring", Pergaman Press, 1991.
Ref 2:	Arogyaswamy R.N.P., "Geotechnical Application in Civil Engineering", Oxford and IBH, 1991.
Ref 3:	Hock E. and Bray J., "Rock Slope Engineering, Institute of Mining and Metallurgy", 1991.
Ref 4:	
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-III	COURSE TITLE	Air Water and noise pollution and control				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 853	
Environmental Engineering (IE)		CONTACT HOURS				L	P
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Gets general information about various air pollutants and their effect on living matter
CO 2:	Knowledge about different layers of atmosphere and their role in dispersion of pollutants
CO 3:	Understand the devices for control of air pollutants
CO 4:	Able to understand the concept of Monitoring of air quality standards and preventive measures using laws against pollution
CO 5:	Understand the principles of prevention and control of water & noise pollution by some case studies
CO 6:	Get an insight of air, water and noise pollution as well as their prevention and control using legislation and enforcement

SYLLABUS

UNIT	CONTENT	Hrs
1.	SOURCES AND EFFECTS OF AIR POLLUTANTS Classification of air pollutants – Particulates and gaseous pollutants – Sources of air pollution – Source inventory – Effects of air pollution on human beings, materials, vegetation, animals - global warming-ozone layer depletion, Sampling and Analysis – Basic Principles of Sampling – Source and ambient sampling – Analysis of pollutants – Principles.	9
2.	DISPERSION OF POLLUTANTS Elements of atmosphere – Meteorological factors – Wind roses – Lapse rate – Atmospheric stability and turbulence – Plume rise – Dispersion of pollutants – Dispersion models – Applications.	9
3.	AIR POLLUTION CONTROL Concepts of control – Principles and design of control measures – Particulates control by gravitational, centrifugal, filtration, scrubbing, electrostatic precipitation – Selection criteria for equipment - gaseous pollutant control by adsorption, absorption, condensation, combustion – Pollution control for specific major industries.	9
4.	AIR QUALITY MANAGEMENT Air quality standards – Air quality monitoring – Preventive measures - Air pollution control efforts – Zoning – Town planning regulation of new industries – Legislation and enforcement– Environmental Impact Assessment and Air quality	9
5.	WATER POLLUTION: Sources of water pollution – Effects of water pollution on ground water– Assessment - Standards – Control methods – Prevention, Case study. NOISE POLLUTION Sources of noise pollution – Effects – Assessment - Standards – Control methods – Prevention, Case study.	9

TEXT BOOKS:

TB 1:	Anjaneyulu, D., "Air Pollution and Control Technologies", Allied Publishers, Mumbai, 2002.
TB 2:	Rao, C.S. Environmental Pollution Control Engineering, Wiley Eastern Ltd., New Delhi, 1996.
TB 3:	Rao M.N., and Rao H. V. N., Air Pollution Control, Tata-McGraw-Hill, New Delhi, 1996.
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	W.L.Heumann, Industrial Air Pollution Control Systems, McGraw-Hill, New York, 1997.
Ref 2:	Mahajan S.P., Pollution Control in Process Industries, Tata McGraw-Hill Publishing Company, New Delhi, 1991.
Ref 3:	Peavy S.W., Rowe D.R. and Tchobanoglous G. Environmental Engineering, McGraw Hill, New Delhi, 1985.
Ref 4:	Garg, S.K., "Environmental Engineering Vol. II", Khanna Publishers, New Delhi
Ref 5:	Mahajan, S.P., "Pollution Control in Process Industries", Tata McGraw-Hill, New Delhi, 1991.

CIVIL ENGINEERING DEPARTMENT 97

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-III	COURSE TITTLE	Seismic Engineering				COURSE ID	
						TCE 854	
COURSE COMPONENT	CREDITS					L	P
Structures (IE)							
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Formulate and solve the equation of motion for SDOF system
CO 2:	Extract the natural frequencies of MDOF systems and obtain their mode shapes
CO 3:	Understand the seismological processes required for estimating the ground motion
CO 4:	apply the modal superposition method for deterministic earthquake response of buildings
CO 5:	apply the codal recommendations for seismic design of buildings, towers and tanks
CO 6:	

SYLLABUS

UNIT	CONTENT	Hrs
1.	Introduction: Definitions of basic problems in dynamics, static v/s dynamic loads, different types of dynamic loads, undamped vibration of SDOF system, natural frequency and periods of vibration, damping in structure. Response to periodic loads, response to general dynamic load, response of structure subject to round motion, use of Fourier series for periodic forces.	9
2.	MDOF systems: Direct determination of frequencies and mode shapes, orthogonality principle, approximate methods for determination of frequencies and mode shapes. Forced vibration of MDOF system, modal analysis, applications to multistoried rigid frames subject to lateral dynamic loads including ground motion	9
3.	Seismological Background: Seismicity of a region, earthquake faults and waves, structure of earth, plate tectonics, elastic-rebound theory of earthquake, intensity and magnitude of earthquake, measurement of ground motion, seismogram, earthquake frequency, local site effects, seismo tectonics and Seismicity of India. Characterization of Ground Motion: Earthquake response spectra, factors influencing response spectra, design response spectra for elastic systems, peak ground acceleration, response spectrum shapes, deformation, pseudo-velocity, pseudo acceleration response spectra. Peak structural response from the response spectrum, response spectrum characteristics, construction site specific response spectra	9
4.	Deterministic Earthquake Response: Types of earthquake excitation, lumped SDOF elastic systems. translational excitation, lumped MDOF elastic systems, translational excitation, time history analysis, multistoried buildings with symmetric plans, multi storied buildings with un symmetric plans, torsional response of symmetric plan building, distributed - parameter elastic systems, translational excitation, combining maximum nodal responses using mean square response of a sin le mode, SRSS and CQC combination of nodal responses.	9
5.	I. S. Code Method of Seismic Analysis: Seismic co-efficient method and its limitation, response spectrum method, IS 1893-2002 provisions for seismic analysis of buildings and water towers, seismic evaluation and retrofitting, types of structural system used in building to resist earthquake loads.	9

TEXT BOOKS:

TB 1:	Structural Dynamics-An Introduction to Computer Methods: Roy R. Craig.
TB 2:	Dynamics of Structures: Anil K. Chopra, Prentice Hall, India.
TB 3:	Dynamics of Structures: Cloguh and Penzien, Tata McGraw Hill
TB 4:	Structural Dynamics: John M, Biggs, Tata McGraw Hill
TB 5:	Fundamentals of Earthquake Engineering: N. M. Newmarks and E. Rosenblueth, Prentice Hall.

REFERENCES:

Ref 1:	Earthquake Design Practice for Building: D. Key, Thomas Telford, London, 1988. • Earthquake Engineering: R. L. Wiegel, 2nd Edition, Prentice Hall, London, 1989.
Ref 2:	Design of Multistoried Buildings for Earthquake Ground Motions: J. A. Blume, Portland Cement Association, Chicago, 1961.
Ref 3:	Proceedings on World Conference on Earthquake Engineering: 1956-2000.
Ref 4:	Earthquake Resistant Design of Structures: Pankaj Agarwal, Manish Shrikhande, Prentice Hall, India, 2006.
Ref 5:	I. S. codes No. 1893, 4326, 13920. (All latest codes)

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-III	COURSE TITLE	Repair & Rehabilitation of Structures				COURSE ID	
						TCE 855	
COURSE COMPONENT	CREDITS					L	P
Structures (IE)		CONTACT HOURS					
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Expertise on different inspection techniques , analysis of damaged structures and need of maintainance.
CO 2:	perceive the knowledge of weathering agents and properties of concrete.
CO 3:	Estimation of distressed structures their causes and procedure for repairing and demolition of structures.
CO 4:	Comprehend between different types of special concrete their application and interpret the causes of deterioration.
CO 5:	Explain the various equipment of retrofitting and case studies of demolition methods.
CO 6:	Expertise on various techniques and concrete for better and effective construction.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Maintenance and Repair Strategies Maintenance, Repair and Rehabilitation, Facets of Maintenance, importance of Maintenance, Various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration;	9
2.	Strength and Durability Of Concrete- Quality assurance for concrete – Strength, Durability and Thermal properties, of concrete – Cracks, different types, causes – Effects due to climate, temperature, Sustained elevated temperature, Corrosion – Effects of cover thickness;	9
3.	Special Concretes- Polymer concrete, Sulphur infiltrated concrete, Fibre reinforced concrete, High strength concrete, High performance concrete, Vacuum concrete, Self-compacting concrete, Geopolymer concrete, Reactive powder concrete, Concrete made with industrial wastes;	9
4.	Techniques for Repair and Protection Methods- Non-destructive Testing Techniques, Epoxy injection, Shoring, Underpinning, Corrosion protection techniques – Corrosion inhibitors, Corrosion resistant steels, Coatings to reinforcement, cathodic protection; Repair, Rehabilitation and Retrofitting of Structures- Evaluation of root causes; Underpinning & shoring; some simple systems of rehabilitation of structures; Guniting, shotcreting;	9
5.	Non-Destructive testing systems; Use of external plates, carbon fibre wrapping and carbon composites in repairs.Strengthening of Structural elements, Repair of structures distressed due to corrosion, fire, Leakage, earthquake – Demolition Techniques – Engineered demolition methods – Case studies.	9

TEXT BOOKS:

TB 1:	Denison Campbell, Allen and Harold Roper, Concrete Structures, Materials, Maintenance and Repair, Longman Scientific and Technical UK, 1991.
TB 2:	R.T.Allen and S.C.Edwards, Repair of Concrete Structures, Blakie and Sons, UK, 1987
TB 3:	M.S.Shetty, Concrete Technology - Theory and Practice, S.Chand and Company, New Delhi, 1992.
TB 4:	Santhakumar, A.R., Training Course notes on Damage Assessment and repair in Low Cost Housing , "RHDC-NBO" Anna University, July 1992.
TB 5:	

REFERENCES:

Ref 1:	Raikar, R.N., Learning from failures - Deficiencies in Design, Construction and Service -
Ref 2:	R&D Centre (SDCPL), Raikar Bhavan, Bombay, 1987.
Ref 3:	N.Palaniappan, Estate Management, Anna Institute of Management, Chennai, 1992.
Ref 4:	Lakshmiathy, M. etal. Lecture notes of Workshop on "Repairs and Rehabilitation of Structures", 29 - 30th October 1999.
Ref 5:	

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-III	COURSE TITLE	Construction Equipment & Automation				COURSE ID	
						TCE 856	
COURSE COMPONENT	CREDITS					L	P
Materials (IE)							
						T	
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Comprehend between conventional and mechanical method of construction.
CO 2:	Asses the appropriate knowledge about equipment for different nature of work.
CO 3:	Summarizes the concept of prestressing and other equipment.
CO 4:	Arrange and estimate the equipment on the basis of requirement.
CO 5:	Utilization of modern equipment on susceptible areas.
CO 6:	Estimation, utilization and judge the need of different equipment as per requirement.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Conventional construction methods Vs Mechanized methods and advantages of latter;	9
2.	Equipment for Earthmoving, Dewatering; Concrete mixing, transporting & placing; plastering machines;	9
3.	Prestressing jacks and grouting equipment; Cranes, Hoists and other equipment for lifting;	9
4.	Equipment for transportation of materials. Equipment Productivities;	9
5.	Use of Drones for spread out sites; Use of robots for repetitive activities.	9

TEXT BOOKS:

TB 1:	Modern Construction and Ground Engineering Equipment and Methods (Prentice Hall 2nd Edition) by F. Harris
TB 2:	Construction Methods and Management: Pearson New International Edition 8 th Edition Stephens Nunnally
TB 3:	Deodhar, S.V. Construction Equipment and Job Planning, Khanna Publishers, New Delhi, 1988.
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	Dr. MaheshVarma, Construction Equipment and its planning and Application, Metropolitan Book Company, New Delhi. 1983.
Ref 2:	Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., Construction Planning, Equipment and Methods, McGraw Hill, Singapore, 2006.
Ref 3:	Sharma S.C. Construction Equipment and Management, Khanna Publishers, New Delhi, 1988
Ref 4:	
Ref 5:	

CIVIL ENGINEERING DEPARTMENT 100

PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING						
SEMESTER: 8E-III	COURSE TITLE	Green Building,				COURSE ID	
COURSE COMPONENT	CREDITS					TCE 857	
Environmental Engineering (IE)		CONTACT HOURS				L	P
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE
						ESE	Total

COURSE OUTCOMES:

CO 1:	Characterize the idea of sustainable development and strategize the design of building.
CO 2:	Administer the green building technique for energy management.
CO 3:	Apprehend the air condition systems and energy efficient motors.
CO 4:	Enforce the green building concepts and rating tools.
CO 5:	Recognize and acknowledge the green practices.
CO 6:	Application of various techniques on green building for the effective development.

SYLLABUS

UNIT	CONTENT	Hrs
1.	Introduction: Life Cycle Impacts Of Materials And Products – Sustainable Design Concepts – Strategies Of Design For The Environment -The Sun-Earth Relationship And The Energy Balance On The Earth’s Surface, Climate, Wind – Solar Radiation And Solar Temperature – Sun Shading And Solar Radiation On Surfaces – Energy Impact On The Shape And Orientation Of Buildings – Thermal Properties Of Building Materials.	9
2.	ENERGY EFFICIENT BUILDINGS Passive Cooling And Day Lighting – Active Solar And Photovoltaic- Building Energy Analysis Methods- Building Energy Simulation- Building Energy Efficiency Standards- Lighting System Design- Lighting Economics And Aesthetics- Impacts Of Lighting Efficiency – Energy Audit And Energy Targeting- Technological Options For Energy Management.	9
3.	INDOOR ENVIRONMENTAL QUALITY MANAGEMENT: Psychometric- Comfort Conditions- Thermal Comfort- Ventilation And Air Quality-Air Conditioning Requirement- Visual Perception- Illumination Requirement- Auditory Requirement- Energy Management Options- -Air Conditioning Systems- Energy Conservation In Pumps- Fans And Blowers- Refrigerating Machines- Heat Rejection Equipment- Energy Efficient Motors- Insulation.	9
4.	Green Building Concepts- Green Building Rating Tools- Leeds And IGBC Codes. – Material Selection Embodied Energy- Operating Energy- Façade Systems- Ventilation Systems- Transportation- Water Treatment Systems- Water Efficiency- Building Economics	9
5.	GREEN BUILDING DESIGN CASE STUDY Include Building Form, Orientation And Site Considerations; Conservation Measures; Energy Modeling; Heating System And Fuel Choices; Renewable Energy Systems; Material Choices; And Construction Budget-	9

TEXT BOOKS:

TB 1:	Kibert, C. “Sustainable Construction: Green Building Design And Delivery”, John Wiley & Sons, 2005
TB 2:	Edward G Pita, “An Energy Approach- Air-Conditioning Principles And Systems”, Pearson Education, 2003
TB 3:	
TB 4:	
TB 5:	

REFERENCES:

Ref 1:	Complete Guide to Green Buildings by Trish riley
Ref 2:	Standard for the design for High Performance Green Buildings by Kent Peterson, 2009
Ref 3:	Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air conditioning Engineers, 2009.
Ref 4:	Green Building Hand Book by Tomwoolley and Samkimings, 2009.
Ref 5:	Colin Porteous, “The New Eco-Architecture”, Spon Press, 2002.

CIVIL ENGINEERING DEPARTMENT 101									
PROGRAM:	BACHELOR OF TECHNOLOGY in CIVIL ENGINEERING								
SEMESTER: 8E-III	COURSE TITLE	Urban Planning					COURSE ID		
							TCE 858		
COURSE COMPONENT	CREDITS						L	P	T
Surveying (IE)		CONTACT HOURS							
EXAMINATION DURATION	THEORY	PRACTICAL				CWA	MSE	ESE	Total
COURSE OUTCOMES:									
CO 1:	Study the objectives of urban planning								
CO 2:	understand the fundamental philosophy of sustainable planning								
CO 3:	implement the rule and regulation and guidelines while planning an urban area								
CO 4:	appreciate and implement the principles of urbanisation as per level of planning area								
CO 5:	understand the various classic theory of urbanisation								
CO 6:	could able to suggest a sustainable solution for urban development and program								
SYLLABUS									
UNIT	CONTENT							Hrs	
1.	Definitions and Rationales of Planning Various definitions of town and country planning; Goals and objectives of planning; Components of planning; Benefits of planning; Arguments for and against planning							9	
2.	Foundations of Planning Orthodoxies of planning including the Lamps of Planning; Sustainability and rationality in planning; Components of sustainable urban and regional development; Defining what counts as planning knowledge: various sources of planning knowledge, various forms of planning knowledge; Reasoning and its various forms in planning; Space, place and location							9	
3.	Development Plans and Development Regulations Definition of development plan; Types of development plans: master plan, city development plan, structure plan, district plan, action area plan, subject plan, town planning scheme, regional plan, sub-regional plan; Planning Advisory Group report and the UDPFI Guidelines; Sector plans and spatial plans; Defining development and development control regulations, types of development control; Implications of violations of development control regulations; Conforming and Nonconforming land uses; Compatible and non-compatible land uses, LULU and NIMBY							9	
4.	Governance of Planning Local government in India; District Planning Committees and Metropolitan Planning Committees; Introduction to Internationalization and globalization of planning: meanings and forms of globalization; Characteristics of a global city; Principles for planning for a global city;							9	
5.	Unit 5: Theories of Urbanization Theories of urbanization including Concentric Zone Theory; Sector Theory; Multiple Nuclei Theory and other latest theories; Land Use and Land Value Theory of William Alonso; City as an organism: a physical entity, social entity and political entity							9	
TEXT BOOKS:									
TB 1:	Financing of Housing and community Improvement Programmers / United Nation Housing Act / H.M.O.S								
TB 2:	Housing and town and country planning: Urban land Problems and Policies / ABRAMS, C.								
TB 3:	Town and Country Planning and Housing / MODAK, N.V.								
TB 4:									
TB 5:									
REFERENCES:									
Ref 1:	Low Cost housing in development countries / MATHUR, G C								
Ref 2:	Sustainable housing: Principles and Practice / EDWARDS, BRIAN								
Ref 3:	The Economics of Housing Policy / STAFFORD, D.C. 8. Urban Housing in Third World / Payne, G K.								
Ref 4:									
Ref 5:									