

CIVILENGINEERING

S.Y.B.Tech. In Civil Engineering (CBCS)

Sem. III & IV

Academic Evaluation Scheme and Course Content

Year 2017-18

Class:-S.Y.B.Tech. (Civil)	Semester III		
CODE: BTC201	Course:-Engineering Mathematics - III		
Prerequisites	BT101, BT201		
Period per week (each of 60 minutes)	Lecture (hrs)	03	
	Practical (hrs)	-	
	Tutorial (hrs)	01	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In semester Evaluation	---	25
	TOTAL	---	125

*60% Weightage for end semester

Course Objectives:

The main objectives of the course are

1. To learn Laplace & Inverse Laplace transforms and its application to solve differential equations.
2. To understand concept of Fourier series, its complex form and enhance problem solving skills.
3. To understand concept of complex variables and conformal mapping.
4. To learn various matrices, operations and important theorems.

Course Outcomes:

At the end of the course the students shall be able to

1. Solve problems based on Laplace and inverse Laplace transform. Apply theory of Laplace transforms to evaluate real integrals and solve initial & boundary value problems.
2. Solve problem based on Fourier series expansion.
3. Solve complex variable problems.
4. Find rank of matrices, Eigen values and Eigen vectors of matrices

Course Content

Module	Details	Hrs
1	Laplace Transforms Function of bounded variation (Statement only) Laplace Transforms of $1, e^{at}, \sin at, \cos at, \sinh at, \cosh at, t^n, \operatorname{erf}(\sqrt{t}), J_0(t)$, Shifting theorems, change of scale, $L\{t^n f(t)\}, L\left\{\frac{f(t)}{t}\right\}, L\left\{\frac{d^n f(t)}{dt^n}\right\}, L\left\{\int_0^t f(u)du\right\}$ Convolution theorem, Evaluation of real integrals using Laplace transforms.	07
2	Inverse Laplace Transforms Evaluation of Inverse Laplace Transforms using partial fractions, convolution theorem, shifting theorems and other properties. Application of Laplace Transform to solve initial & boundary value problems involving ordinary differential equation with one dependent variables	06
3	Fourier Series & Integrals Orthogonal & Orthonormal set of functions. Fourier series, Determination of	05

	Fourier constants, Dirichlet's conditions Fourier series for $f(x), x \in [c, c+2\pi]$ and $x \in [c, c+2L]$	
4	Fourier Series half range & complex form. Fourier series of Odd and Even functions Half range Fourier Sine & Cosine series, Parseval's Identity Complex form of Fourier series	05
5	Complex Variables & Mapping Functions of complex variable, Analytic functions, Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic functions, Analytic method and Milne Thomsom methods to find $f(z)$, orthogonal trajectories. Conformal mapping, Bilinear transformation, cross ratio, fixed points	07
6	Matrices Orthogonal, Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian & Unitary matrices and their elementary properties. Elementary operations and their use in getting the Rank, Normal form of a matrix, PAQ form, Consistency of system of linear homogeneous and non-homogeneous equations.	06
7	Eigen values & Cayley Hamilton Eigen-values and Eigenvectors of a matrix, Cayley- Hamilton theorem, Function of a matrix, Diagonalization of a matrix	06
<p>Text Books:-</p> <ol style="list-style-type: none"> 1. B S Grewal (2014), "Higher Engineering Mathematics", Khanna Publications, 43rd Edition, ISBN 8174091955, 1315 Pages <p>Reference Books:-</p> <ol style="list-style-type: none"> 1. Erwin Kreyszig (2010), "Advanced Engineering Mathematics" Wiley Eastern Limited, Singapore 10th edition, ISBN 8126554231, 1148 Pages. 2. Text book of Engineering Mathematics , N.P.Bali , Laxmi Publications, 9th edition, ISBN:978-81-318-0832-0 		

Sr. No.	Examination	Module
1	T – I	1 , 2 and part of 3
2	T – II	Remaining part of 3, 4 and part of module 5
3	Final exam	1 to 7

***A total of 10 tutorials to be taken batchwise covering the entire syllabus.**

SEMESTER- III	CLASS: S.Y.B.Tech. (Civil)		
CODE: BTC202	COURSE : Surveying – I		
Prerequisites	BT103, BT203, BT253		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	--	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In Semester Evaluation	--	--
	TOTAL	---	100

* 60% Weightage for end semester

Course Objectives:

Students will learn :

1. Various methods of surveying.
2. To determine the location and reduced level of different points using appropriate instruments
3. To use different methods commonly employed for linear measurement, angular measurement, relative heights, determining areas of irregular bodies
4. Explain the concept of volume measurement and its methods and plane table surveying and its applications.

Course Outcomes:

Students will be able to

1. Apply the knowledge for collection of data required for the linear measurement, angular measurement to determine contour of ground to prepare the map.
2. Demonstrate their capability for preparing ground map at their own which is useful for their future.
3. Apply concept of surveying and its application in different construction work.

Course Content

Module No	Details	Hrs
1	Introduction : Various types of surveying – based on methods and instruments, classifications, uses and necessity of geodetic surveying, photographic, astronomy and hydrographic surveying, Diagonal scale, various types of verniers, micrometers on surveying instruments, principles of surveying. Different types of ranging, tapes, chains, steel band, Linear measurements, approximate, direct, optical and electronic methods, Chain surveying, minor instruments for setting out right angle.	05
2	Compass survey: Bearings – different types, compass – prismatic, surveyor, whole circle, reduced bearings, declination, local attraction, plotting of compass survey by different methods.	05
3	Levelling: Definitions, technical terms, different types of levels such as dumpy,	06

	quickset, precise auto Temporary and permanent adjustments of dumpy and auto level, Difficulties in leveling, reduction of levels, problems, Difficulties in leveling work, corrections and precautions to be taken in leveling work, Running a level line, L section and cross section	
4	Contouring: Definitions, contour interval, equivalent, uses and characteristics of contour lines, direct and indirect methods of contouring, methods of interpolation , Grade contour – definition, use, setting out in field, Computation of volume by trapezoidal and prismoidal formula, volume from spot levels, Volume from contour plan.	04
5	Areas: Area of a irregular figure by Trapezoidal rule, average ordinate rule, Simpson’s 1/3 rule, various coordinate methods, Planimeter: types of planimeter including digital planimeter, area of zero circle, use of planimeter.	03
6	Theodolite traverse: Various parts and axis of transit, technical terms, temporary and permanent adjustments of a transit, horizontal and vertical angles, methods of repetition and reiteration, Different methods of running a theodolite traverse, Gales traverse table, balancing of traverse by Bow-Ditch’s transit and modified transit rules, Problems on one-plane and two-plane methods, omitted measurements, Precautions in using theodolite, errors in theodolite survey, Use of theodolite for various works such as prolongation of a straight line, setting out an angle.	09
7	Plane table surveying: Definitions, uses and advantages, temporary adjustments, Different methods of plane table surveying, Two point problem, Errors in plane table survey, use of telescopic alidade	04

Recommended Books:

1. T.P Kanetkar (2000); “Surveying and Levelling Vol I”, Pune VidyarthiGrihaNew Central Book Agency. ISBN-13 9788185825113.
2. N. N. Basak (2014); “Surveying And Levelling”, Mcgraw Hill Education (India) Private Limited. ISBN-13: 978-9332901537.
3. R Agor(2009); “Surveying and Leveling”, Khanna Publishers. ISBN-13: 978-8174092359.
4. Dr. B.C. Punamia (2005); “Surveying Vol –I”, Laxmi Publications (P) Ltd., New Delhi. ISBN-13: 978-8170088530. 536 p.
5. Dr. B.C. Punamia (2005); “Surveying Vol-Li”. Laxmi Publications (P) Ltd., New Delhi. ISBN-13: 978-8170088837. 658 p.
6. R. Subramanian (2007); “Surveying And Levelling”, Oxford University Press. ISBN-13: 9780195684247. 970p.

Sr. No.	Examination	Module
1	T – I	Module 1 , 2
2	T – II	Module 3, 4
3	Final Examination	Module 1 to 7

Class:-S. Y. B. Tech. (Civil)	Semester III		
CODE: BTC203	Course:-Strength Of Materials		
Prerequisites	BT104, BT154, BT204		
Period per week (each of 60 minutes)	Lecture (hrs)	03	
	Practical (hrs)	-	
	Tutorial (hrs)	-	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In semester Evaluation	---	--
	TOTAL	---	100

*60% Weightage for end semester

Course Objectives:

The main objectives of the course are

1. To introduce the students to the behavior of an elastic member Subjected to various types of forces such as axial force, shear force, bending moment, torsion etc.
2. To prepare the base for the students to study other structural engineering subjects at a later stage.

Course Outcomes:

At the end of the course the students shall be able to

1. Draw axial force, shear force and bending moment diagrams for determinate beams.
2. Analyze members subjected to axial force, shear force, bending moment, torsion in terms of stresses including principal stresses.
3. Find deflection in determinate beams

Course Content

Module No	Details	Hrs
1	<p>Stress & strain: Stress, yield stress, ultimate stress, shear stress, factor of safety, strain, modulus of elasticity (E), modulus of rigidity (G), bulk modulus (K), Poisson's ratio, relationship between elastic constants, bars of varying sections, stresses in composite section, temperature stresses</p> <p>Thin cylindrical and spherical shells: Stresses and strains in thin cylindrical shells subjected to internal pressure.</p> <p>Self Learning: Stresses and strains in thin spherical shells subjected to internal pressure</p>	05
2	<p>Principal stresses: General equations for transformation of stress, principles planes and principal stresses, maximum shear stress, determination using Mohr's circle.</p>	03
3	<p>Axial force, shear force and bending moment in beams: Axial force, shear force & bending moment diagrams for statically determinate beams including beams with internal hinges for different types of loading, relationships between rate of loading, shear force and bending moment.</p>	05
4	<p>Simple theory of bending: Flexure formula for beam, simple problems involving the application of flexure formula, section modulus, moment of resistance of a section, flitched/ composite beams.</p> <p>Unsymmetrical bending:</p>	05
		03

	Moment of inertia about rotated axes, principal axes and principal moment of inertia, flexural stresses due to bending in two planes for symmetrical sections, bending of unsymmetrical sections.	
5	Bending moment combined with axial loads: Application to members subjected to eccentric loads, core of the section. Self Learning: Problems on chimneys, retaining walls.	04
6	Shear stress in beams: Distribution of shear stress across plane sections used commonly for beams, Self Learning: shear connectors. Shear center of thin walled open sections such as angle, tee, channel, I, etc. Simple theory of torsion: Torsion of circular shafts - solid and hollow, stresses and strains in shaft when transmitting power	04 03
7	Deflections of beams: Deflection of cantilever simply supported and overhanging beams for different types of loadings using double integration method and Macaulay's method.	04
<p>Text Books:-</p> <ol style="list-style-type: none"> 1. Popov, Egor P, (1978), "Mechanics of materials", Englewood Cliffs, N.J: Prentice-Hall, ISBN 0135711584 , 864 pages 2. S.B. Junnarkar (2007), "Mechanics of materials Vol-1", Charotar Publications, ISBN 8185594678, 447 pages 3. Dr.R.K.Bansal (2007), "Strength Of Materials", Laxmi Publications, ISBN 81311800008, 1106 pages 4. Bear & Johnson (2007), "Mechanics of materials", Tata McGraw-Hill, ISBN: 0070042845, 780 pages <p>Reference Books:-</p> <ol style="list-style-type: none"> 1. Timoshenko & Gere (2006), "Mechanics of materials", Tata McGraw Hill, CBS Publishers & Distributors, ISBN 8123908946, 762 pages 2. James M. Gere, Books/cole (2012), "Mechanics of materials", Cengage Learning, ISBN 1111577730, 1056 pages 3. G.H. Ryder (2002), "Strength of materials" Macmillan Publishers India Limited, ISBN 0333935365, 352 pages 4. William A. Nash (2005), "Strength of materials", Schaum's outline series, Tata McGraw-Hill Education, ISBN 0070601631, 216 pages 		

Sr. No.	Examination	Module
1	T – I	1 and 2
2	T – II	3 and part 4
3	Final exam	1 to 7

SEMESTER-III	CLASS: S.Y.B.Tech. (Civil)		
CODE: BTC204	COURSE: Engineering Materials		
Prerequisites	BT105, BT106, BT205, BT206		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	--	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In Semester Evaluation	--	--
	TOTAL	---	100

* 60% Weightage for end semester.

Course Objectives:

1. To describe the classification of different construction materials and the requirements of buildings materials from functional, aesthetic and economic point of view.
2. To discuss the properties of materials such as stones, bricks, cement, lime, concrete, timber, glass, metals, alloys, paints varnishes and other miscellaneous materials.
3. To explain different manufacturing processes of stones, bricks, cement, lime, concrete, timber, glass, metals, alloys, paints varnishes and other miscellaneous materials.

Course Outcomes:

The course will enable the students to

1. Select appropriate building materials.
2. Use good quality materials in construction.

Course Content

Module No.	Details	Hrs.
1	Introduction Classification of materials, requirements of building materials and products: functional, aesthetical and economical. Study of properties of materials- physical, mechanical, chemical, biological and other like durability, reliability, compatibility and economic characteristics.	03
2	Stones, Bricks and Concrete blocks i) Stones: Classification of rocks, properties and uses of stones, quarrying, dressing, seasoning, deterioration and preservation of stones, requirements of good building stone, test on stones, common building stones ii) Bricks: Uses, types of bricks, good brick earth, harmful ingredients, manufacture of bricks, properties of good building bricks, factors affecting quality of bricks, test on bricks, and classification of bricks. iii) Concrete Blocks: Raw materials, manufacturing process, advantages, uses	08
3	Binder materials Lime and Cement: Composition, classification, manufacturing process, precautions during handling, physical properties, uses. Mortar: Classification of mortar, properties of good mortar mix, types of mortar – manufacturing process and uses. Cement Concrete: Ingredients, properties, preparation and uses, types of cement concrete	06

4	Tiles and other ceramic products Roofing tiles, ceiling and ridge tiles, clay terracing tiles, burnt clay tiles, flooring and wall tiles, terracotta, earthenware, stoneware pipes, sanitary appliances.	03
5	Timber and its alternative material Timber: Uses, classification, properties, seasoning and conversion of timber, defects in timber, preservation of timber, fire resistance of timber, timber based products, advantages and drawbacks of timber construction Alternative materialsof Timber: Glass: Ingredients, manufacture, treatment, types, properties and uses Plastic: Polymerization, classification, fabrication, fiber reinforced plastic, properties and uses of plastics in building. Metal and alloys: Ferrous and non ferrous metals and alloys, aluminum, tin , zinc, nickel, types and uses and anti-corrosive treatment	07
6	Protective Materials and Bituminous Materials Protective Materials: Paints, varnishes and distemper – characteristics, ingredients, types and uses Bituminous Materials: Bitumen, asphalt and tar – characteristics, types and uses	02
7	Miscellaneous Materials Asbestos, cork, rubber, gypsum and its products, turpentine, waterproofing and damp-proofing materials, linoleum, geosynthetics, geofabrics, siporex/light weight concrete blocks, adhesive, sealant and joint fillers, electric, thermal and sound insulating materials.	03

Recommended Books:

1. S. S. Bhavikatti (2012); “Building Materials”, Vikas Publishing House Pvt Ltd. ISBN-13: 978-9325960442. 488p.
2. Rangwala (2012);"Engineering materials", Charotar Publications. ISBN-13: 978-9380358796.
3. S.K. Duggal (2010); “Building Materials”, New Age International Publishers. ISBN-13: 978-8122433791. 616p.
4. Varghese P. C (2005); “Building Materials” PHI. ISBN-13: 978-8120328488. 180p.
5. M. Gambhir (2011); “Building Materials Products, Properties and Systems” McGraw Hill Education (India) Private Limited. ISBN-13: 978-0071077606.
6. IS codes of different materials, BIS publications.

Sr. No.	Examination	Module
1	T – I	1 , 2 (i, ii)
2	T – II	2(iii), 3, 4
3	Final Examination	1 to 7

SEMESTER-III	CLASS: S.Y.B.Tech. (Civil)		
CODE:BTC205	COURSE: Engineering Geology		
Prerequisites	BT105, BT106, BT205, BT206		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	--	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In Semester Evaluation	--	--
	TOTAL	---	100

*60% Weightage for end semester

Course Objectives:

1. To classify the various branches of geology that are applicable to civil engineering
2. To describe the geological processes of agents modifying the earth's surface, weathering, earthquakes and preventive measures for structures constructed in earthquake prone areas.
3. Explain mineralogy, petrology, geological history and structural geology of India.
4. To discuss the importance and methods of surface and sub-surface investigations and geological considerations while selecting sites for dams, reservoirs, tunnels, etc.
5. Outline Ground water and its implications for foundations in civil engineering, types, causes and preventive measures for landslide prevention.

Course Outcome:

At the end of this course, the students will be able to

1. Relate the processes associated with the origin and formation of various earth surface features, rock types, especially in India
2. Carry out proper geological and geotechnical investigations for major engineering projects.
3. Examine and give opinions regarding the geological hazards, erosion, flooding, dewatering and seismic investigations and its impact on structures etc.

Course Content

Module No.	Details	Hrs.
1	<p>Introduction: Branches of geology useful to civil engineering, importance of geological studies in various civil engineering projects.</p> <p>Physical geology: Internal structure of the earth and use of seismic waves in understanding the interior, Agents modifying the earth surface, study of weathering and its significance in physical and engineering properties of rocks like strength and water tightness, durability etc., Geological action of river, wind and glaciers, erosion; transport and depositional landforms created by them. Earthquakes – earthquake waves, construction and working of seismographs, earthquake zones of India, Geological aspects earthquake resistance structures.</p>	08
2	<p>Mineralogy: Methods of mineral identification, physical properties of minerals, rock forming minerals, ore forming minerals, megascopic identification of</p>	03

	common primary and secondary minerals family.	
3	<p>Petrology: Study of igneous, sedimentary rocks, distinguishing properties between igneous, sedimentary and metamorphic rocks to identify them in field. Igneous petrology – mode of formation, textures, structures etc. Hatch’s scheme of classification, study of common igneous rocks, Sedimentary petrology – mode of formation, textures, characteristics of shallow water types, residual like lamination, bedding, current bedding etc., classification of secondary rocks, types, residual deposits, chemically formed and organically formed deposits, commonly occurring sedimentary rocks, Metamorphic petrology –mode of formation, agents and types of metamorphism, metamorphic minerals, rock cleavage, structures and textures in metamorphic rocks, classification, commonly occurring metamorphic rocks.</p>	08
4	<p>Structural geology: Structural elements of rocks – dip, strike, outcrop patterns, unconformities, outliers and inliers, study of joints, faults and folds, importance of structural elements in engineering operations.</p> <p>Stratigraphy : Principle of stratigraphy and co-relation, geological time scale, physiographic divisions of India – study of formations occurring in peninsular India.</p>	08
5	<p>Geological investigations: Preliminary geological investigations and their importance to achieve safety and economy of the projects, supporting case histories of dams and tunnel projects in Maharashtra State, Methods of surface and sub surface investigations – trial pits, trenches, drill holes, geological logging, inclined drill holes, Resistivity method and seismic methods, Use of aerial photographs and satellite imageries in civil engineering projects.</p> <p>Engineering properties of rock. Requirements of good building stone, geological factors controlling properties of good building stones, consideration of common rocks as building stones, study of different building stone from various formation in Indian peninsula, geological factors controlling location of quarries, quarrying methods and quarrying operations</p>	07
6	<p>Ground water: Sources and zones, water table, unconfined and perched, springs, Factors controlling water bearing capacity of rocks, pervious and impervious rocks, cone of depression and its use in civil engineering, Methods of artificial recharge of ground water, geology of percolation tank.</p>	04
	<p>Role of engineeringgeology of Dam, Tunnel and Reservoir site: Importance of geological conditions while selecting the type of dam, ideal geological conditions for dam and reservoir site, favorable and unfavorable conditions in different types of rocks in presence of various structural features, precautions to be taken to counteract unsuitable conditions, significance of faults, folds, crushed zone, dykes and fractures on the dam site and treatment giving to such structures, tail channel erosion, Improvements of sites.</p>	

7	<p>Tunneling: Importance of geological considerations while choosing sites and alignment of the tunnel, Ideal site conditions for tunneling; geological conditions to be avoided. Tunneling to various types of rocks under various geological and structural condition, difficulties during tunneling and methods to overcome the difficulties.</p> <p>Stability of hill slopes: Landslides, their types, causes and preventive measures for landslides</p>	09
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Recommended Books:

1. Singh Parbin (2012), "Engineering & General Geology", S K Kataria and Sons Ltd. ISBN- 9350142678.
2. Kesavulu Chenna N. (2009), "Textbook of Engineering Geology", 2nd Edition, Trinity Press, ISBN-13: 9789380856278.
3. Winter J.D. (2011), "Principles of Igneous & Metamorphic Petrology", 2nd Edition Phi Learning Pvt. Ltd-New Delhi. ISBN-13: 9788120343979.

Sr. No.	Examination	Module
1	T – I	1,2
2	T – II	3,4
3	Final Examination	1 to 7

SEMESTER-III	CLASS: S.Y.B.Tech. (Civil)		
CODE: BTC206	COURSE: Building Construction		
Prerequisites	BT103, BT203		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	--	
	Tutorial	02	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In Semester Evaluation	--	25
	TOTAL	---	125

*60% Weightage for end semester

Course Objectives:

1. To describe basic components of buildings and to differentiate the types of building as per Codal provisions.
2. To discuss the students to the basic activity of construction from foundation up to finishing, including various building services required at various stages of construction.

Course Outcomes:

The course will enable the students to

1. Utilize basic principles used in building construction.
2. Utilize various building services required during construction such as plumbing, fire fighting, ventilation, acoustical and thermal insulation systems.
3. Identify ways and means to overcome the problems of dampness, thermal and termite resistance.

Course Content

Module No.	Details	Hrs.
1	Introduction Classification of buildings based on occupancy and types of construction, Basic components of building	2
2	Foundations and Masonry Constructions 1. Foundations : Functions, Requirements, Types, Layouts, Excavation, Foundation in special situation, Caissons, Failure of foundation and preventive measures 2. Stone Masonry : Materials and Types of stone masonry, Structural member built of stones, Joints, Lifting appliances, Permissible loads, Supervision during construction, Maintenance 3. Brick Masonry : Materials for brick masonry, Terminology, Art of brick laying, tools for brick works, Bonds, Junctions, Quoins, Typical structural members in brickworks – columns/piers, footings, thresholds, jambs, window sills,	18

	<p>corbels, Defects in brick masonry, Supervision of brick masonry works, Comparison of brick masonry and stone masonry, thickness of brick wall</p> <p>4. Concrete block Masonry and Composite Masonry: Concrete block masonry, Stone composite masonry, Brick-Stone composite masonry, Reinforced brick masonry</p> <p>5. Masonry Finishes : Plastering, Pointing, Painting and Other Decorative finishes</p>	
3	<p>Building Openings and Vertical Circulation</p> <p>6. Building Openings: Doors, Windows - terminology, dimensions, types, fixtures and fastenings, Ventilators</p> <p>7. Vertical Circulation: Staircase – terminology, types, requirements, geometric design, Ramps, Escalators, Lifts</p>	4
4	<p>Floors and Roofs</p> <p>8. Floors : Construction of ground floor, Selection of flooring materials, Types of flooring, Upper floors</p> <p>9. Roofs: Features of good roof, Classification of roofs, wooden and steel trusses, Roof covering, Drainage</p>	4
5	<p>Temporary Works Formworks, Scaffolding, Shoring, Underpinning</p>	4
6	<p>Building services Plumbing Services, Ventilation, air conditioning and thermal insulation, Acoustics of buildings, Fire fighting, Damp-proofing and water proofing, Maintenance of building</p>	7
7	<p>Green Building Energy consumption in building, Concept of green building, Advantages of green building.</p>	1

In Semester Evaluation:

Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

Recommended Books:

1. Dr. B.C. Punamia(2008); "Building Construction" Laxmi Publications (P) Ltd.ISBN-13: 978-8131804285. 666p.
2. S. S. Bhavkatti (2012); "Building Construction" VikasPublishing House Pvt Ltd. ISBN-13: 978-9325960794. 356p.
3. S. P. Arora and S. P. Bindra (2010); "Textbook of Building Construction", Dhanpat Rai & Sons publication, ISBN-13: 978-8189928803. 688p
4. Sushil Kumar (2010); "Building Construction" Standard Publishes-Distributors. ISBN-13: 978-8180141683. 796p.
5. Varghese P. C (2007); "Building Construction" PHI. ISBN-13: 978-8120330832. 472p.

UG Civil, Sardar Patel College of Engineering Andheri (West), Mumbai 400 058

Year: 2017-18

Sr. No.	Examination	Module
1	T – I	1 , 2
2	T – II	3, 4
3	Final Examination	1 to 7

SEMESTER- III	CLASS: S.Y.B.Tech. (Civil)		
CODE: BTC251	COURSE : Surveying – I		
Prerequisites	BTC202		
Period per week (each of 60 minutes)	Lecture	--	
	Laboratory	03	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	--	--
	End Semester*	--	--
	In Semester Evaluation	--	50
	TOTAL	---	50
Course Objectives:			
Students will learn :			
<ol style="list-style-type: none"> 1. Various methods of surveying. 2. To determine the location and reduced level of different points using appropriate instruments 3. To use different methods commonly employed for linear measurement, angular measurement, relative heights, determining areas of irregular bodies 			
Course Outcomes:			
Students will be able to			
<ol style="list-style-type: none"> 1. Apply the knowledge for collection of data required for the linear measurement, angular measurement to determine contour of ground to prepare the map. 2. Demonstrate their capability for preparing ground map at their own which is useful for their future. 3. Apply concept of surveying and its application in different construction work. 			

List of Experiments:

1. Chaining , ranging and offsetting
2. To find internal angles of a polygon with a prismatic and a surveyor compass.
3. Level simple and compound leveling, booking methods, practice on levels Dumpy, Tilting and Auto levels.
4. Measurement of Horizontal angles by Repetition method
5. Measurement of Horizontal angles by Reiteration method
6. Measurement of Bearing of line using theodolite
7. Measurement of vertical angle using theodolite
8. Use of digital planimeter for measuring area of irregular figures
9. Plane table survey by Radiation method.

Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

Recommended Books:

1. T.P Kanetkar (2000); “Surveying and Levelling Vol I”, Pune VidyarthiGrihaNew Central Book Agency. ISBN-13 9788185825113.
2. N. N. Basak (2014); “Surveying And Levelling”, Mcgraw Hill Education (India) Private Limited. ISBN-13: 978-9332901537.

3. R Agor(2009); “Surveying and Leveling”, Khanna Publishers. ISBN-13: 978-8174092359.
 4. Dr. B.C. Punamia (2005); “Surveying Vol –I”, Laxmi Publications (P) Ltd., New Delhi. ISBN-13: 978-8170088530. 536 p.
 5. Dr. B.C. Punamia (2005); “Surveying Vol-Li”. Laxmi Publications (P) Ltd., New Delhi. ISBN-13: 978-8170088837. 658 p.
 6. R. Subramanian (2007); “Surveying And Levelling”, Oxford University Press. ISBN-13: 9780195684247. 970p.
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Class:-S. Y. B. Tech. (Civil)	Semester III		
CODE: BTC252	Course:-Strength Of Materials (Lab)		
Prerequisites	BTC203		
Period per week (each of 60 minutes)	Lecture (hrs)	-	
	Practical (hrs)	02	
	Tutorial (hrs)	-	
Scheme of Evaluation		Hours	Marks
	In Semester	-	-
	End Semester*	-	-
	In semester Evaluation	---	25
	TOTAL	---	25

Course Objectives:

The main objectives of the course are to introduce the students to the experimental methods

1. To investigate the behavior of an elastic member subjected to various types of forces such as axial force, shear force, bending moment, torsion etc. and
2. To test material properties of hardness and toughness

Course Outcomes:

At the end of the course the students shall be able to

1. Experimentally determine the various material properties.

Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

Practicals (At least eight to be performed)

1. Tension test on mild steel / tor steel rod.
2. Transverse test on cast iron specimen.
3. Shear test on metal specimens.
4. Torsion test on mild steel / cast iron specimen.
5. Load deflection test on metal specimens.
6. Charpy impact test on metal specimens
7. Izod impact test on metal specimens
8. Brinell hardness test on metal specimens.
9. Rockwell hardness test on metal specimens.

Report on experiments performed as detailed above shall be submitted as laboratory work.

Text Books

1. Popov, Egor P, (1978), "Mechanics of materials", Englewood Cliffs, N.J: Prentice-Hall, ISBN 0135711584 , 864 pages
2. S.B. Junnarkar (2007), "Mechanics of materials Vol-1", Charotar Publications, ISBN 8185594678, 447 pages
3. Bear & Johnson (2007), "Mechanics of materials", Tata McGraw-Hill, ISBN: 0070042845, 780 pages

Reference Books:

1. Timoshenko & Gere (2006), "Mechanics of materials", Tata McGraw Hill, CBS Publishers & Distributors, ISBN 8123908946, 762 pages
 2. James M. Gere, Books/cole (2012), "Mechanics of materials", Cengage Learning, ISBN 1111577730, 1056 pages
 3. G.H. Ryder (2002), "Strength of materials" Macmillan Publishers India Limited, ISBN 0333935365, 352 pages
 4. William A. Nash (2005), "Strength of materials", Schaum's outline series, Tata McGraw Hill Education, ISBN 0070601631, 216 pages
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Class:-S. Y. B. Tech. (Civil)	Semester III		
CODE: BTC253	Course:- Engineering Materials		
Prerequisites	BTC204		
Period per week (each of 60 minutes)	Lecture (hrs)	-	
	Practical (hrs)	02	
	Tutorial (hrs)	-	
Scheme of Evaluation		Hours	Marks
	In Semester	-	-
	End Semester*	-	-
	In semester Evaluation	---	25
	TOTAL	---	25

Course Objectives:

The main objectives of the course are to introduce the students to the experimental methods

1. To investigate the behavior of an elastic member subjected to compression, flexure, abrasion etc.
2. To investigate various physical properties of cement

Course Outcomes:

At the end of the course the students shall be able to

1. Experimentally determine the various material properties and physical properties of cement.

List of Experiments:

1. Water absorption and compression test of bricks.
2. Water absorption and transverse load test on tiles
3. Moisture content and flexural strength test on timber.
4. Compression test on timber (Parallel / perpendicular to the grains).
5. Physical properties of cement: Fineness, consistency, Setting time, Soundness, Compressive strength.
6. Compression test on Paver blocks
7. Water absorption, density and compression test on masonry blocks
8. Abrasion test on tiles

Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

Recommended Books:

1. Hemant Sood (1996); "Laboratory Manual On Testing Of Engineering Materials", New Age International Publication Pvt.Ltd. ISBN 8122407579 148 pages.
2. S. S. Bhavikatti (2012); "Building Materials", Vikas Publishing House Pvt Ltd. ISBN-13: 978-9325960442. 488 pages
3. Rangwala (2012); "Engineering materials", Charotar Publications. ISBN-13: 978-9380358796. 520 pages
4. S.K. Duggal (2010); "Building Materials", New Age International Publishers. ISBN-13: 978-8122433791. 616 pages

5. Varghese P. C (2005); “Building Materials” PHI. ISBN-13: 978-8120328488. 180 pages
 6. M. Gambhir (2011); “Building Materials Products, Properties and Systems” McGraw Hill Education (India) Private Limited. ISBN-13: 978-0071077606. 658 pages
 7. IS codes of different materials, BIS publications.
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SEMESTER-III	CLASS: S.Y.B.Tech. (Civil)		
CODE: BTC254	COURSE: Engineering Geology		
Prerequisites	BTC205		
Period per week (each of 60 minutes)	Lecture	--	
	Laboratory	02	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	--	--
	End Semester*	--	--
	In Semester Evaluation	--	25
	TOTAL	---	25

Course Objectives:

1. Identification and description of physical properties of rock-forming and ore-forming minerals.
2. Identification and systematic description of megascopic features of Igneous, Sedimentary and Metamorphic rocks.
3. Description and drawing of vertical cross-section of structural geological maps and study of core samples and the engineering problems encountered on site.

Course Outcome:

At the end of this course, students will be able to

1. Identify the different properties of minerals and differentiate and identify the different rock types.
2. Interpret the cross-section of the geological maps and evaluate the suitability of site for different engineering projects from study of core samples.

List of Experiments:

1. Study of physical properties of the minerals.
2. Megascopic identification of rock forming minerals – crystalline, crypto-crystalline and amorphous silica and their varieties, Orthoclase, Microcline, Plagioclase, Muscovite, Biotite, Hornblende, Asbestos, Augite, Olivine, Tourmaline, Garnet, Natrolite, Actinolite, Calcite, Dolomite, Gypsum, Corundum, Talc, Fluorite, Kyanite
3. Megascopic identification of ore forming minerals - Bauxite, Graphite, Galena, Pyrite, Hematite, Magnetite, Chalcopyrite, Chromite, coal
4. Identification of rocks –
 - Megascopic identification of Igneous rocks : Granite and its varieties, Synite, Dionite, Gabbro, Pegmatite, Porphyry, Dolerite, Rhyolite, Pumice, Trachyte, Basalt and its varieties, Volcanic Breccia, Volcanic Tuffs.
 - Megascopic identification of Sedimentary rocks : Conglomerate, Breccia, Sandstone and its varieties, Shales, Limestone, Melliolite, Laterite,
 - Megascopic identification of Metamorphic rocks: Slate, Phyllite, Mica, Schists, Hornblende schists, Granite gneiss and its varieties, Augen gneiss, Marbles and quartzite.
5. Study of Structural geological maps. (at least eight).

6. Study of core samples, percentage recovery, RQD, core logging and engineering problem based on field data collected during site investigation.

Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

Recommended Books:

1. Singh Parbin (2012); "Engineering & General Geology", S K Kataria and Sons Ltd. ISBN- 9350142678.
2. Kesavulu Chenna N. (2009)" Textbook of Engineering Geology" 2nd Edition Trinity Press, ISBN-13: 9789380856278.
3. WINTER (2011); "Principles of Igneous & Metamorphic Petrology", 2nd Edition PHI LEARNING PVT. LTD-NEW DELHI. ISBN-13: 9788120343979.

Audit Courses

SEMESTER-III	CLASS: S.Y.B.Tech. (Civil)		
CODE: HS301 (Audit Course)	COURSE: Economics for Engineers		
Prerequisites	Basic knowledge of Economics		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	--	
	Tutorial	02	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In Semester Evaluation	--	-
	TOTAL	---	100

SEMESTER-III	CLASS: S.Y.B.Tech. (Civil)		
CODE: HS302 (Audit Course)	COURSE: Sociology & Elements of Indian History for Engineers		
Prerequisites	Basic knowledge of Sociology & history		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	--	
	Tutorial	02	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In Semester Evaluation	--	-
	TOTAL	---	100

SEMESTER-III	CLASS: S.Y.B.Tech. (Civil)		
Course: HS303	Business & Professional Communication(Interdisciplinary)		
	Credits: 03		
Prerequisite:	BT 107, BT 306		
Period per week (60 minutes of each lecture)	Lecture: Tutorial:	02 hours 01 Hour	
Evaluation System		Hours	Marks
	Im semester	01	10X02
	End Semester:	02	50
	TW/ Practical/ Presentations / Case Studies		30

Introduction

Employers often identify “good professional skills” as a requirement in job descriptions. In fact, employers consistently list business writing and communication in their most highly desired skill sets in new and existing employees. It’s no secret that the ability to effectively communicate your ideas in public and interpersonal spaces in the professional environment and to negotiate workplace relationships often means the difference between getting that promotion and being passed over for it. Evidence of your ability to communicate well is one of the top skills that interviewers assess when evaluating job candidates. But what does it really mean to have good professional skills? In this course, you will develop and refine your professional skills so that you will be able to apply them in your workplace interactions, both at the interpersonal level and in a more public space. But achieving “good communication” in organizational contexts depends upon far more than organizational members’ possession and execution of these often taken for granted and under-developed skills. Therefore, as you develop your oral communication skills set in the previous courses, here you will examine communication issues that are important to contemporary organizations, as well as the communication-based problems with which they grapple.

Course Objectives:

1. Use theories and concepts to analyse communication in the workplace
2. Plan and productively participate in effective team meetings
3. Develop teamwork skills and specific strategies to work effectively in teams
4. Plan and conduct information-gathering interviews
5. Research, organize, and deliver professional oral presentations

Course Outcomes:

1. To develop interpersonal skills, understand the modern business environment, the importance of business communication, facing the challenges in business communication.
2. To develop professionals with idealistic, practical and moral values.

3. To re-engineer attitude and understand its influence on behaviour of individuals in the society.
4. Attend more closely to your own verbal messages (both formal and informal), and make conscientious efforts to improve your oral communication skills
5. Understand and intelligently discuss communication issues and problems that affect contemporary organizations.
6. To enhance holistic development of students and improve their employability skills

Module No.	Course Content	Hours of Teaching
1.	Introduction to Business Environment and Communication: Employers of today, Communication in an organization, Flow of information within an organization, challenges in organizational communication, Improving communication challenges, Entrepreneurship and communication.	04
2.	Corporate Communication: Introduction, why corporate communication? Focus areas of corporate communication, Ethical and legal issues in communication.	05
3.	Business Etiquettes: Introduction, what is etiquette? What can good etiquette give you? constituents of etiquette, Business etiquette and modern technology, Business Etiquettes in India.	03
4.	Communicating across Cultures: Introduction, what is Culture, Cultural Parameters, Cultural aspects, Workplace Culture, communicating across different cultures, Culture and Writing Skills, Culture and Non-verbal communication.	06
5.	Business Writing: Improving writing skills, Planning and execution of messages Writing different messages. Writing proposals.	06

Assignments:

1. All assignments based on case studies from organization
2. Case analysis and self-study assignments are compulsory
3. You will research, organize, and deliver 2 professional oral presentation that focuses on business-related issues.
4. you will be taking graded quizzes for all the module

Recommended Books:

1. English Language Lab, NiraKanor, PHI
2. Guide to Managerial Communication, Mary Munter, Pearson
3. Cengage Learning India, English Language Communication Skill – Lab Manual
4. Soft Skills for Everyone, Butterfield, Cengage
5. Campus to Corporates, Sage Publication
6. Business Communication- concepts, cases & applications, Chaturvedi&Chaturvedi,
7. Business Communication, Meenakshi Raman & Prakash Singh,

Year: 2017-18

8. Oxford Communication for Management, Urmila Rai and S M Rai, HPH
 9. Business and Managerial Communication, Sengupta, PHI
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-

UG Civil, Sardar Patel College of Engineering Andheri (West), Mumbai 400 058

Year: 2017-18

S.Y. B.Tech. In Civil Engineering (CBCS)

Sem. IV

Academic Evaluation Scheme and Course Content

Year 2017-18

SEMESTER-IV	CLASS: S.Y.B.Tech. (Civil)		
CODE:BTC226	COURSE: Probability and Statistics		
Prerequisites	Std. XII Maths		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	---	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In Semester Evaluation	--	--
	TOTAL	---	100

* 60% Weightage for end semester

Course Objectives:

1. Introduce Statistical methods, probability distributions and testing of hypothesis.
2. Introduce complex integration (Cauchy's theorems).
3. Introduce simplex and allied simplex methods to solve LPP.

Course Outcomes:

Upon successful completion of the course, students should be able to

1. Solve problem in basic statistics, probability, probability distributions, testing of hypothesis.
2. Solve integration of complex valued functions.
3. Solve linear programming problems using various simplex methods.

Course Content

Module No.	Details	Hrs.
1	Statistics Measures of central tendency (mean, median, mode, quartiles, deciles, percentiles, only introduction no questions to be asked) Measures of dispersion(mean deviation, quartile deviation, standard deviation), coefficient of variation Covariance & correlation .Karl Pearson's coefficient & Spearman's rank coefficient (with proofs) (repeated and non-repeated ranks) Regression analysis(Linear and multiple)	07
2	Probability Introduction to probability and conditional probability, Baye's theorem Discrete and continuous random variable, Probability mass function & probability density function. Probability distribution for random variables. Expected value. Variance, Moments and Moment generating function. Binomial, Poisson and Normal distribution for detailed study. Central limit theorem (only statement) & problems based on this theorem.	07
3	Sampling Theory & Testing of Hypothesis Population and sample. Sampling with & without replacement. Random samples. Population parameters, Sample statistics Sampling distributions. Sample mean Sampling distribution of means. Sampling distribution of proportions. The sample variance. Sampling distribution of variances. Cases where population variance is unknown. Sampling distribution of	

	ratios of variances. Other statistics Statistical decisions. Statistical hypothesis. Null hypothesis and alternate hypothesis. Test of hypothesis and significance. Type I & Type II errors. Level of significance. One-tailed and two-tailed tests. Tests of significance for large samples (between sample & population mean, difference between the means of two samples) Tests of significance for small samples (t-test, paired t-test, F-test). The χ^2 test for goodness of fit and contingency tables.	
4	Estimation Theory Unbiased estimates and efficient estimates. Point and interval estimates Confidence interval estimates of population parameters. Confidence interval for means, proportions, variance ratios. Maximum likelihood estimates.	04
5	Complex analysis Line integrals for complex valued functions, Cauchy's integral theorem and formula with proof, Problems based on above, Taylor and Laurent series expansion, Cauchy residue theorem (proof & problems), Application to real integrals	10
6	Linear Programming Problem Solving LPP using graphical method and Simplex method. Solving LPP using big M method, Solving LPP using duality, Solving LPP using dual simplex method.	08
7	Linear Programming Problem Non linear programming problem using Hessian matrix. Lagrangian method KUNH TUCKER conditions (problems based on above)	06

Text Books

1. G.V kumbhojkar "Applied Mathematics-III", C.Jamanadas 1st Edition.

Reference Books

1. Vector Calculus by Shanti Narayan & J.N.Kapur (S.Chand & company Limited)
2. Probability & Statistics for engineers by Richard Johnson & Gupta (Pearson Education)
3. Probability & Statistics by Murray Spiegel (Schaum series)
4. Operations research by Hamady Taha.
5. Complex analysis by Shanti Narayan.

Sr. No.	Examination	Module
1	T-1	Module 1 and 2
2	T-2	Module 3 and 4
3	Final Examination	Module 1 to 7

SEMESTER-IV	CLASS: S.Y.B.Tech. (Civil)		
CODE: BTC227	COURSE: Surveying – II		
Prerequisites	BTC202, BTC251		
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	--	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In Semester Evaluation	--	--
	TOTAL	---	100

* 60% Weightage for end semester

Course Objectives:

1. Acquire knowledge of curves, types and its application to civil engineering projects.
2. Acquire the knowledge of modern surveying instruments
3. Discuss electronic distance measurements and precision levelling
4. Use of computers for level computation and plotting contour plan using software.

Course Outcomes:

Students will be able to

1. Use the knowledge for collection of data required for the linear measurement, angular measurement to determine contour of ground to prepare the map.
2. Demonstrate their capability for preparing longitudinal section, cross section, contour plan
3. Apply the actual concept of surveying and its application by performing project work.
4. Perform setting out foundation plan for load bearing and framed structure with surveying instruments.

Course Content

Module No.	Details	Hrs.
1	Curves-I : Definitions of different terms, necessity of curves and types of curves, Simple circular curves and compound curves, office and field work, linear methods of setting out of curves, Angular methods for setting out of curves, two theodolite and Rankine's deflection angle methods, difficulties in setting out curves and their solutions.	06
2	Curves-II : Reverse and transition curves, their properties and their advantages, design of transition curves, shift, spiral angle, Composite curves – office and field work, setting out of curve by angular method, composite curve problems, Vertical curves– definitions, geometry and types, tangent correction and chord gradient methods, sight distance on a vertical curve	10
3	Modern Surveying instruments: Electronics in surveying, general principles used in the instruments. Auto levels, self compensating instrument, Electronic distance Measurements – types, principles, applications in surveying, corrections for field observations, Electronic digital theodolite – types, uses and application, concept of total station. Use of computer	04

	in survey work for level computation and plotting contour plan, Introduction of GPS	
4	Precision Leveling: Precise level and leveling staff, field procedure for precise leveling, field notes.	02
5	Tacheometric surveying: Principles and uses, advantages, stadia formula, different methods of tacheometer, subtense bar method, location details by tacheometer, stadia diagram and tables, error and accuracy in tacheometry survey work, Application in plane table and curve setting	06
6	Setting out works: General horizontal and vertical control, setting out of foundation plan for load bearing and framed structure, batter board, slope and grade stakes, setting out with theodolite, Setting out of sewer line, culvert, use of laser for works, Setting out centre line for tunnel, transfer of levels of underground work, Project / route survey for bridge, dam and canal. Checking vertically of high rise structures.	04
7.	Geodetic surveying: Basic concept of triangulation, order of triangulation, size & shape of triangles, strength of figure, triangulation field work, base line measurement, problems on base line measurement, measurement of angles.	04

In Semester Evaluation

Report on experiments conducted, the term work shall comprise of:

Three A1 size drawing sheets comprising practical work on: L section and cross section block contouring, tacheometric survey. Office and field work for minimum two types of curves by angular method, plotting of a contour plan on computer using suitable software,

Recommended Books:

1. T.P Kanetkar (2000); “Surveying and Levelling Vol I”, Pune VidyarthiGrihaPrakashan. ISBN-13 9788185825113.
2. T.P Kanetkar (2000); “Surveying and Levelling Vol II”, Pune VidyarthiGrihaNew Central Book Agency. ISBN-13 9788185825007.
3. N. N. Basak (2014); “Surveying And Levelling”, Mcgraw Hill Education (India) Private Limited. ISBN-13: 978-9332901537.
4. R Agor(2009); “Surveying and Leveling”, Khanna Publishers. ISBN-13: 978-8174092359.
5. Dr. B.C. Punamia (2005); “Surveying Vol –I”, Laxmi Publications (P) Ltd., New Delhi. ISBN-13: 978-8170088530. 536 p.
6. Dr. B.C. Punamia (2005); “Surveying Vol-II”. Laxmi Publications (P) Ltd., New Delhi. ISBN-13: 978-8170088837. 658 p.
7. Dr. B.C. Punamia (2006); “Surveying Vol-III”. Laxmi Publications (P) Ltd., New Delhi. ISBN-13: 978-8170088257. 280p.
8. R. Subramanian (2007); “Surveying And Levelling “, Oxford University Press. ISBN-13: 9780195684247. 970p

Sr. No.	Examination	Module
1	T – I	1 , 2
2	T – II	3, 4
3	End sem.	1 to 7

Class:-S. Y. B. Tech. (Civil)	Semester IV		
CODE: BTC228	Course:-Structural Analysis - I		
Prerequisites	BT104, BT204, BTC203, BTC252		
Period per week (each of 60 minutes)	Lecture (hrs)	03	
	Practical (hrs)	-	
	Tutorial (hrs)	02	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In semester Evaluation	---	25
	TOTAL	---	125

*60% Weightage for end semester

Course Objectives:

The main objectives of the course are

- To introduce the students to the behavior and analysis of determinate structures.
- To prepare the base for the students to study other structural engineering subjects at a later stage.

Course Outcomes:

At the end of the course the students shall be able to

- Draw axial force, shear force and bending moment diagrams for rigid jointed frames.
- Find deflection in beams, rigid jointed and pin jointed frames using different methods.
- Draw influence line diagrams for determinate beams and pin jointed frames.
- Analyse three hinged arches and cables and suspension bridges.
- Find buckling load of columns.

Course Content

Module No	Details	Hrs
1	Axial force, shear force and bending moment in frames: Axial force, shear force and bending moment diagrams for statically determinate frames with and without internal hinges.	05
2	General theorems: Theorems relating to elastic structures, principle of virtual work. Strain energy in elastic structures, stresses due to axial load & impact load. Complementary energy, Castigliano's theorem, Betti's and Maxwell's reciprocal theorems, principle of superposition	03
3	Deflection of statically determinate structures: Deflection of cantilevers, simply supported and overhanging beams for different types of loadings using following methods; Moment area method, Conjugate beam, Principle of virtual work (unit load method) and Castigliano's theorem. Deflection of determinate pin jointed and rigid jointed frames by principle of virtual work (unit load method). Self study: Deflection of determinate pin jointed and rigid jointed frames by Castigliano's theorem.	09
4	Influence lines for statically determinate structures: Influence lines for cantilever, simply supported, overhanging beams and pin	07

	jointed truss. Criteria for maximum shear force and bending moment at a section, absolute maximum shear force and bending moment under moving loads (udl and series of point loads) for simply supported beams.	
5	Three hinged arch: Determination of normal thrust, radial shear force and bending moment for three hinged parabolic arches. Self study: Determination of normal thrust, radial shear force and bending moment for segmental arches.	03
6	Cables and suspension bridges: Simple suspension cable, minimum and maximum tensions in the cable supported at same and at different levels, anchor cable, cable supports, suspension cable with three hinged stiffening girder, shear force and bending moment at any section of the three hinged stiffening girder.	05
7	Columns and Struts: Short and long/slender columns, Concept of buckling in slender columns subjected to axial loads, Euler's and Rankine's design formulae for columns with different support conditions.	04

Term work:-

At least 20 (twenty) solved problems based on the above syllabus as per the module weightage shall be submitted as term work.

Text Books:-

1. Reddy C.S.(1999), "Basic Structural Analysis", Tata McGraw hill, ISBN 0070702764, 540 pages.
2. Junnarkar S.B. (2013), "Structural Analysis, Vol. II" Charotar Publishers ISBN 9380358703, 986 pages.
3. S S Bhavikatti (2011), "Structural Analysis ", Vikas Publishing House PVT. Ltd.-Noida, ISBN 8125942696, 436 pages.
5. Devdas Menon (2009), "Structural Analysis", Narosa Book Distributors Pvt Ltd-New Delhi, ISBN 8173197504, 685 pages.

Reference Books:-

1. Stephen P. Timoshenko, Donovan H. Young (1965), "Theory of Structures", Tata McGraw Hill Higher Education, ISBN 0070648689, 629 pages.
2. Charles H. Norris , John Benson Wilbur (1990),"Elementary Structural Analysis", Tata McGraw Hill Higher Education, ISBN 0070659338.
3. Harold I. Laursen (2007), "Structural Analysis", Tata McGraw Hill Higher Education, ISBN 0070366438, 468 pages.
4. B.G. Neal (1963), "Structural Theorems and Their Applications", Pergamon Press ISBN 0080108717, 208 pages.
5. Russell C. Hibbeler (2011), "Structural Analysis", Prentice Hall, IBN 0132570534
6. Alexander Chajes (1982), "Structural Analysis", Longman Higher Education, ISBN 0138534080, 352 pages.
7. Aslam Kassimali (2014), "Structural Analysis", Cengage Learning, ISBN 1133943896, 613 pages.
8. Dr. Ramachandran Vaidyanathan, Dr. P. Perumal (2006), "Comprehensive Structural Analysis", Laxmi Publications, ISBN 8170088917, 466 pages.

Sr. No.	Examination	Module
1	T – I	Modules 1 , 2 and part of 3
2	T – II	Remaining part of Module 3, and Module 4
3	Final exam	Modules 1 to 7

SEMESTER-IV		CLASS: S.Y.B.Tech. (Civil)	
CODE: BTC229		COURSE: Fluid Mechanics	
Prerequisites		Std. XII Physics	
Period per week (each of 60 minutes)	Lecture	03	
	Laboratory	--	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In Semester Evaluation	--	--
	TOTAL	---	100

* 60% Weightage for end semester

Course Content

Module No.	Details	Hrs.
1	Properties of Fluids Mass density, weight density, specific gravity, specific volume, viscosity, compressibility, bulk modulus, surface tension, capillary action, vapour pressure, types of fluids, basic concepts.	06
2	Fluid Statics Pascal's Law, Pressure variation in fluid at rest, absolute, atmospheric, gauge pressure, measurement of pressure, hydrostatic forces on plane and curved surfaces. Buoyancy and flotation: Archimede's principle, Met center, meta centric height, equilibrium of floating and submerged bodies.	06
3	Fluid Kinematics and Dynamics Description of fluid flow: Lagrangian method, Eulerian method, Streamlines, pathlines, streaklines, classification of fluid flows, continuity equation, rotational flow, rotation and vorticity, velocity and stream function. Circulation, flow net. Euler's equation, Bernoulli's theorem, its application to real fluid, flow measuring devices, Venturimeter, nozzle meter, pitot tube, rotameter.	10
4	Flow measurement Orifices: Hydraulic coefficients, small and large orifices, time of emptying of tank through orifices. Mouthpieces: External, convergent, Borda's mouthpiece. Notches and weirs: rectangular, triangular, Cipolletti weirs, velocity of approach, end contraction.	08
5	Ideal Fluid flow Uniform flow, source and sink, free vortex flow, superimposed flow, doublet, flow past half bodies, Rankine's body and cylinder only.	06

6	Compressible flow Basic equation of flow, velocity of sound or pressure wave in fluid, Mach number, Mach cone, area velocity relationship, stagnation properties.	06
7	Liquids in relative equilibrium Uniform linear acceleration, liquid container subjected to constant horizontal and vertical acceleration, constant rotation with vertical axis.	06

Recommended Books

1. Dr. R.K. Bansal (2005); "A Textbook of Fluid Mechanics", Laxmi publication. ISBN-13: 978-8131802946. 501p.
2. Dr. P.N. Nodi (2009); "Hydraulics and Fluid Mechanics" Standard Book House ISBN-13: 978-8189401269. 250p.
3. Dr. Jain A.K (2010); "Fluid Mechanics" Khanna Publishers. ISBN-13: 978-8174091949.
4. K Subramanya (2008); "Flow in Open Channels" 978-0070086951. 576p.
5. Subramanaya K (2010); "Fluid mechanics & hydraulic Machines". McGraw Hill Education (India) Private Limited. ISBN-13: 978-0070699809.

Sr. No.	Examination	Module
1	T – I	1, 2
2	T – II	3, 4
3	Final Examination	1 to 7

Class:-S. Y. B. Tech. (Civil)		Semester V	
CODE: BTC230		Course:-Concrete Technology	
Prerequisites		BTC106, BTC206	
Period per week (each of 60 minutes)	Lecture (hrs)	03	
	Practical (hrs)	--	
	Tutorial (hrs)	--	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In semester Evaluation	---	--
	TOTAL	---	100

*60% Weightage for end semester

Course Objectives:

- To introduce the ingredients of concrete and types of admixtures.
- To understand the behavior of concrete and its types
- To introduce laboratory and non-destructive testing methods for concrete

Course Outcomes:

At the end of the course the students shall be able to

- Test properties of fresh and hardened concrete.
- Design concrete mix.
- Analyze a situation and recommend the suitable type of concrete and admixtures.

Course Content

Module No	Details	Hrs
1	Ingredients of Concrete: Cement: Types of cement and their use, physical properties of 33 Grade, 43 Grade, 53 Grade ordinary Portland cement, Portland pozzolana cement, rapid hardening Portland cement, hydrophobic cement, low heat Portland cement and sulphate resisting Portland cement as per relevant I.S. codes Aggregates: Properties of coarse and fine aggregates and their influence on concrete. Admixtures: Plasticizers, retarders, accelerators and other admixtures, test on admixtures, chemistry and compatibility with concrete.	09
2	Grades of concrete: Concrete for ordinary work, light weight concrete, high density concrete, workability, durability and strength requirements, effect of w/c ratio, acceptability criteria, laboratory testing of fresh and hardened concrete, concreting under special conditions, work in extreme weather conditions, under-water concreting.	06
3	Concrete mix design: Mix design for compressive strength by I.S. methods, road note method and British method, mix design for flexural strength. Self Learning: Mix Design by road note method and British method.	04

4	High performance concrete: Constituents of high grade concrete, various tests and application of high performance concrete.	03
5	Ready mix concrete: Requirements of RMC, transit mixer details, mix design of RMC.	03
6	Concrete for repairs and rehabilitation of structures: Polymer concrete, fiber reinforced concrete, polymer impregnated concrete, polymer modified cement concrete/mortar and ferro cement, different tests.	06
7	Non-Destructive testing of concrete: Hammer test, ultrasonic pulse velocity test, load test, carbonation test, ½ cell potentiometer test, and corrosion of steel test, core test and relevant provision of I.S. codes.	05

Text Books:

1. R. Santhakumar (2006), "Concrete Technology", Oxford University Press (Rs), Isbn 0195671537, 771 pages.
2. Shetty M. S. (30 November 2000), "Concrete Technology - Theory And Practice", S Chand & Co Ltd, ISBN 8121903483, 658 pages.

Reference Books:

1. O.P. Jain & Jaikrishna (2007), "Plain & Reinforced Concrete -Vol. I", Nem Chand & Brothers ISBN 8185240086.
2. A. M. Neville (2012), "Properties Of Concrete", Trans-Atlantic Publications, Inc., ISBN 0273755803, 846 pages.
3. I.S. 10262 code & Relevant I.S. Codes.
4. Special Publication Of ACI On Polymer Concrete And FRC:
5. Proceedings Of International Conferences On
6. Polymer Concrete And FRC

Sr. No.	Examination	Module
1	T – I	1 and 2
2	T – II	3, 4 and 5
3	Final exam	1 to 7

SEMESTER-IV	CLASS:S.Y.B.Tech. (Civil)		
CODE: BTC231	COURSE: Building Design and Drawing		
Prerequisites	BT103, BT203, BT253, BTC206		
Period per week (each of 60 minutes)	Lecture	02	
	Laboratory	--	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	04	100
	In Semester Evaluation	--	--
	TOTAL	---	100

* 60% Weightage for end semester

Course Objectives:

Students will learn to:

1. Interpret various types of building drawings.
2. Comprehend building rules, regulation, byelaws and building codes.
3. Acquire the knowledge of the principles of planning of residential and public (non-residential) buildings.
4. Design and draw complete floor plans, foundation plan, and basic roof plan.
5. Generate cross sections, elevations and detailed sections.

Course Outcomes:

At the end of this course, the students will be able to

1. Understand building rules, regulation and bylaws, Building codes.
2. Interpret various types of drawings.
3. Transform their ideas to create plans and designs for various types of building.
4. Convert design parameters, process details into 2D and 3D views.
5. Make use of the acquired knowledge to prepare layout on the filed as per the plan.

Course Content

Module No.	Details	Hrs.
1	Introduction: Introduction: Various types of drawings, Importance of above drawings, Situations where above drawings are prepared/required, Symbols, Conventions and Abbreviations, Commonly used symbols and conventions for Electric fittings, Water supply, Sanitary, Furniture, Material of construction etc., Abbreviations used for the above, Actual use of symbols, conventions and abbreviations. Scales: Definition, Scales used for various types of drawings, Title, Margins and size of letters as per IS: Sizes of various standard papers, Layout of various views on drawing paper	02
2	Building Regulations, Bye-laws and Codes Principle of architectural composition, Principles of Planning, Recommendations of CBRI, Roorkee, Importance of Building byelaws - following important bye-laws – (plot area, built-up area, minimum size of rooms, margins, setbacks, heights, passages and corridors, ventilation,	05

	circulation, open space, water supply & sanitary, electrification, fire safety, other safety, lifts), Environment Approval procedure with respect to bye-laws, Sustainable design principles - provisions of National Building Code, ANSI, ASTM, ASHRAE, approval process, Green building principles-green building techniques- energy solutions, site solutions, exterior and interior solutions, Certification –BREEAM, GRIHA, NAHB, LEED, IGBC	
3	<p>Building Planning Planning of Residential Buildings:Residential building forms, Basic areas in residential buildings, Process of planning-family requirement & analysis, conceptual plan outlines, Principles and techniques for functional planning, Climate and design considerations – orientation, Planning for service, Landscaping-concept of art, Structural system and functional classification of buildings, Creativity-role of architect and engineer. Planning of Public Buildings:Approach for activity analysis for public buildings such as educational institutes (schools, colleges, and institutional campus), health care centers, hospitals, office buildings or business parks, entertainment buildings – Space norms, basic areas, and functional setting areas. Planning of Building Services- Introduction to building services like water supply, drainage, electrification, ventilation, lightening, staircases and lifts, fire safety, acoustics and thermal insulation,</p>	10
4	<p>Method of Drawing Selection of Scales, Developing working and submission drawings – Plans (layout plan, floor line plan, detailed plan, foundation plan, roof or terrace plan, plan showing drainage, water supply and electricity lines), Elevations,Cross sections, Importance and purpose of preparing above drawings, Details to be shown and location of the details.</p>	12
5	<p>Perspective Drawing Elements of Perspective drawing, one point and two point perspective.</p>	03

Recommended Books:

1. M.G. Shah, C.M. Kale, S.Y. Patil (2011);“Building Drawing with an Integrated Approach to Built Environment” McGraw Hill Education (India) Private Limited; ISBN-13: 978-0071077873. 408p.
2. V.B. Sikka (2013); “A Course in Civil Engineering Drawing” S.K. Kataria& Sons; ISBN-13: 978-9350142721. 550 p.
3. Dr.N.KumaraSwamy&A.Kameshwara Rao (2012); “Building Planning & Drawing” Charotar Publishing House. ISBN-13: 978-9380358581. 434 p
4. Rangwala(2013); “Town Planning” Charotar Publishing House Pvt. Ltd. ISBN-13: 978-9380358680. 344p.

Sr. No.	Examination	Module
1	T – I	1 , 2
2	T – II	3, 4
3	Final Examination	1 to 5

SEMESTER-IV	CLASS:S.Y.B.Tech. (Civil)		
CODE: BTC276	COURSE: Surveying – II		
Prerequisites	BTC202, BTC251, BTC227		
Period per week (each of 60 minutes)	Lecture	--	
	Laboratory	03	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	--	--
	End Semester*	--	--
	In Semester Evaluation	--	50
	TOTAL	---	50

Course Objectives:

1. Acquire knowledge of curves, types and its application to civil engineering projects.
2. Acquire the knowledge of modern surveying instruments
3. Discuss electronic distance measurements and precision levelling
4. Use of computers for level computation and plotting contour plan using software.

Course Outcomes:

Students will be able to

1. Use the knowledge for collection of data required for the linear measurement, angular measurement to determine contour of ground to prepare the map.
2. Demonstrate their capability for preparing longitudinal section, cross section, contour plan
3. Apply the actual concept of surveying and its application by performing project work.
4. Perform setting out foundation plan for load bearing and framed structure with surveying instruments.

List of Experiments:

1. Determination of Tacheometric constants.
2. Height and distance calculation using tacheometric formulae.
3. To set out circular curves by linear method (offset from tangent and from long chord)
4. To set out circular curve by angular method (Rankine’s and two theodolite method)
5. Determination of RL and horizontal distance of object by one plane method.
6. Determination of RL and horizontal distance by of object by two plane method.
7. Setting out a simple foundation plan in the field
8. Study of modern surveying instruments

In Semester Evaluation

Report on experiments conducted, the term work shall comprise of:

Three A1 size drawing sheets comprising practical work on: L section and cross section block contouring, tacheometric survey. Office and field work for minimum two types of curves by angular method, plotting of a contour plan on computer using suitable software,

Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

Recommended Books:

1. T.P Kanetkar (2000); “Surveying and Levelling Vol I”, Pune VidyarthiGrihaPrakashan. ISBN-13 9788185825113.
 2. T.P Kanetkar (2000); “Surveying and Levelling Vol II”, Pune VidyarthiGrihaNew Central Book Agency. ISBN-13 9788185825007.
 3. N. N. Basak (2014); “Surveying And Levelling”, Mcgraw Hill Education (India) Private Limited. ISBN-13: 978-9332901537.
 4. R Agor(2009); “Surveying and Leveling”, Khanna Publishers. ISBN-13: 978-8174092359.
 5. Dr. B.C. Punamia (2005); “Surveying Vol –I”, Laxmi Publications (P) Ltd., New Delhi. ISBN-13: 978-8170088530. 536 p.
 6. Dr. B.C. Punamia (2005); “Surveying Vol-II”. Laxmi Publications (P) Ltd., New Delhi. ISBN-13: 978-8170088837. 658 p.
 7. Dr. B.C. Punamia (2006); “Surveying Vol-III”. Laxmi Publications (P) Ltd., New Delhi. ISBN-13: 978-8170088257. 280p.
 8. R. Subramanian (2007); “Surveying And Levelling “, Oxford University Press. ISBN-13: 9780195684247. 970p
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SEMESTER-IV	CLASS: S.Y.B.Tech. (Civil)		
CODE: BTC277	COURSE: Fluid Mechanics		
Prerequisites	BTC229		
Period per week (each of 60 minutes)	Lecture	--	
	Laboratory	02	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	--	--
	End Semester*	--	--
	In Semester Evaluation	--	25
	TOTAL	---	100

Course Objectives:

- To summarize various principles and fluid properties.
- To explain calibrations of various flow flow measuring devices.

Course Outcomes:

- To utilize various properties of fluids.
- To carry out calibrations of various flow flow measuring devices.

List of experiments: (preferably eight to be performed)

1. Determination of Specific Weight of Fluid by using Buoyancy/Archimedes principle.
2. Determination of Specific Gravity of Fluid by using U-Tube Manometer.
3. Verification of Bernoulli's theorem
4. Determination of metacentric height
5. Calibration of Orifice
6. Calibration of notches
7. Calibration of venturimeter
8. Calibration of mouthpieces
9. Calibration of weirs
10. Calibration of nozzlemeter

Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

Recommended Books

1. Dr. R.K. Bansal (2005); "A Textbook of Fluid Mechanics", Laxmi publication. ISBN-13: 978-8131802946. 501p.
2. Dr. P.N. Nodi (2009); "Hydraulics and Fluid Mechanics" Standard Book House ISBN-13: 978-8189401269. 250p.
3. Dr. Jain A.K (2010); "Fluid Mechanics" Khanna Publishers. ISBN-13: 978-8174091949.
4. K Subramanya (2008); "Flow in Open Channels" 978-0070086951. 576p.
5. Subramanaya K (2010); "Fluid mechanics & hydraulic Machines". McGraw Hill Education (India) Private Limited. ISBN-13: 978-0070699809.

Class:-S. Y. B. Tech. (Civil)	Semester IV		
CODE: BTC278	Course:- Concrete Technology (Lab)		
Prerequisites	BTC230		
Period per week (each of 60 minutes)	Lecture (hrs)	-	
	Practical (hrs)	02	
	Tutorial (hrs)	-	
Scheme of Evaluation		Hours	Marks
	In Semester	-	-
	End Semester*	-	-
	In semester Evaluation	---	25
	TOTAL	---	25

Course Objectives:

The main objectives of the course is to introduce the students to the experimental methods

1. To determine properties of cement, aggregates and concrete.

Course Outcomes:

At the end of the course students will be able to

1. Test physical properties of cement, aggregates and concrete.
2. Evaluate the effects of admixtures on physical properties of concrete.
3. Design the concrete mix.

Practicals: (At least eight to be performed)

1. Study of properties of fine and coarse aggregates.
2. Physical properties of cement.
3. Effect of w/c ratio on workability (slump cone, compaction factor, V-B test, flow table)
4. Effect of w/c ratio on strength of concrete,
5. Mix design in laboratory
6. Non destructive testing of concrete – some applications (hammer, ultrasonic)
7. Secant modulus of elasticity of concrete & indirect tensile test on concrete.
8. Study of admixtures & their effect on workability and strength of concrete.
9. Modulus of rupture of concrete.
10. Permeability test on concrete.
11. Tests on polymer modified concrete/mortar.
12. Setting time of concrete

Report on experiments performed as detailed above shall be submitted as laboratory work.

Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

- (i) Attendance in Laboratory/Tutorial = 20%,

Year: 2017-18

- (ii) Journal/Drawing sheet/Sketch book = 40%,
- (iii) MCQ/Oral/Test = 40%.

Text Books:

1. R. Santhakumar (2006), “Concrete Technology”, Oxford University Press (Rs), ISBN 0195671537, 771 pages
2. Shetty M. S. (30 November 2000), “Concrete Technology - Theory And Practice”, S Chand & Co Ltd, ISBN 8121903483, 658 pages

Reference Books:

1. O.P. Jain & Jaikrishna (2007), “Plain & Reinforced Concrete -Vol. I”, Nem Chand & Brothers ISBN 8185240086.592 pages
 2. A. M. Neville (2012), “Properties Of Concrete”, Trans-Atlantic Publications, Inc., ISBN 0273755803, 846 pages
 3. Relevant I.S. Codes.
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SEMESTER-IV	CLASS:S.Y.B.Tech. (Civil)		
CODE: BTC279	COURSE: Building Design and Drawing		
Prerequisites	BTC231		
Period per week (each of 60 minutes)	Lecture	--	
	Laboratory	03	
	Tutorial	---	
Scheme of Evaluation		Hours	Marks
	In Semester	--	--
	End Semester*	--	--
	In Semester Evaluation	--	50
	TOTAL	---	50

Course Objectives:

Students will learn to:

1. Interpret various types of building drawings.
2. Prepare and analyze plans of various types of buildings considering the functional requirements with respect to building rules, regulation and bylaws, Building codes

Course Outcomes:

At the end of this course, the students will be able to

1. Understand & interpret the drawings.
2. Transform their ideas to create plans and designs for various types of building.
3. Convert design parameters into 2D and 3D views.

Term Work:

The term work shall comprise of:

1. One A₃ size practice sheet which includes, lines, their thicknesses and application in building drawing, Symbols, Commonly used symbols and conventions for Electric fittings, Water supply, Sanitary, Furniture, Material of construction etc and line plan for any type of building.
2. Line plan of various types of buildings such as residential, educational, industrial, health, entertainment, service, community buildings on graph sheets.
3. Planning and design of two buildings: (1) Residential building and (2) Public building
 - a. One A1 size drawing sheets- Working Drawing, drawn (in autocad) independently for the two structures designed as mentioned above, showing following details drawn to scale as per standard practice: site plan, ground floor plan, first floor plan, elevation, section, door and window schedule
 - b. One A1 size drawing sheet – Detailed Drawing, drawn (in auto cad) for the two structures designed as mentioned above, showing following details drawn to scale as per standard practice: roof plan and its section, foundation plan and its section, stair and its section, typical door and window details including section, and any other specific detail
4. Tow point perspective of any one building designed (residential or public) neglecting small building elements
- 5.

Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows:

Year: 2017-18

- (i) Attendance in Laboratory/Tutorial = 20%,
- (ii) Graph sheets/Drawing sheets = 60%,
- (iii) MCQ/Oral/Test = 20%.

Recommended Books:

1. M.G. Shah, C.M. Kale, S.Y. Patil (2011);“Building Drawing with an Integrated Approach to Built Environment” McGraw Hill Education (India) Private Limited; ISBN-13: 978-0071077873. 408p.
 2. V.B. Sikka (2013); “A Course in Civil Engineering Drawing” S.K. Kataria& Sons; ISBN-13: 978-9350142721. 550 p.
 3. Dr.N.KumaraSwamy&A.Kameshwara Rao (2012); “Building Planning & Drawing” Charotar Publishing House. ISBN-13: 978-9380358581. 434 p
 4. Rangwala(2013); “Town Planning” Charotar Publishing House Pvt. Ltd. ISBN-13: 978-9380358680. 344 p.
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MC102	Course:- Environmental Studies		
Period per week (each of 60 minutes)	Lectures	02/week	
Evaluation system	Examination	Test 1 and Test 2	01 Hr each Marks 20
		End Semester	02 Hrs Marks = 75
	Credit Course : 2 credits		

Course Objective:

1. Creating the awareness about environmental problems
2. Imparting basic knowledge about the environment and its allied problems.
3. Developing an attitude of concern for the environment.
4. Creating awareness about environment protection and environment improvement.
5. Acquiring skills to help the concerned individuals in identifying and solving environmental problems

Course Outcome:**The student will be able to**

Illustrate Depleting Nature of Environmental Resources, Global Environmental Crisis, Ecosystem concept.

Adapt to 3R (Reuse, Recovery, Recycle).

Study different control measures related to Environmental Pollution.

Illustrate and analyse various Case Studies related to Environmental Legislation.

Demonstrate the working of Renewable energy sources & Equipments.

Illustrate the Techniques of Disaster Management and Green Building

Course Content

Module No	Details	Hrs
01	Introduction to Environmental Studies and sustainability: History of Environmental Studies: Aqueducts of Greece; Harappa Civilization Air Pollution Episodes: Meuse Valley; Donora Pennsylvania; London smog; Bhopal Gas Tragedy.	02
02	Ecology and Sustainability: i. Ecology: Definitions: Ecosystem; Ecology; Biome; Biodiversity; Productivity; Respiration, Concept of primary and secondary productivity ii. Concept and Definition of Sustainable Development. iii. Social, Economic and Environmental aspects of sustainable development. iv. Control measures: 3R (Reuse, Recovery, Recycle), v. Sustainable Structures (Green building)	04
03	Environmental Pollution: i. Air: Definition, Sources, classification, Effects: global, On human, plants and materials, Mitigation Measures for particulate and gaseous pollutants ii. Soil: Definition, Sources, Effect: Global, on human, plants and	06

	materials, Mitigation measures: Remediation measures iii. Noise: Definition; Classification of air pollutants; Effect, Mitigation iv. Water: Definition; Classification of pollutants, Surface water quality, water quality in lakes, rivers and ground water, Effects of water pollution, Remediation of water pollution v. Thermal: Definition, Sources, Effect on receiving Bodies, Mitigation Measures: Cooling ponds	
04	Treatment of Water and Wastewater Classification of Water; Flowsheet to treat Surface and Ground Water treatment; Function of units. Quantities of wastewater; Flowsheet of wastewater treatment; function of units	03
05	Solid Waste Management Definition; Types of solid waste: Domestic, Hazardous, Construction and demolition waste and Biomedical waste; Functional Units of solid waste management; Recovery and Reuse; Disposal	03
06	Climate Change i. History of climate change ii. Chemistry of climate change iii. Greenhouse effect and greenhouse gases iv. Impact of climate change	03
07	Acts and Laws related to environment i. Water Act, 1974 ii. Air Act 1981 iii. EPA, 1986 iv. Hazardous Wastes (Management and Handling) Rules, 1989	02

Text Books

- 1 Gilbert Masters and Wendell Ella, Introduction to Environmental Engineering and Science, Pearson Edition:2013

Reference Books

Raman Siva Kumar Introduction to Environmental Science and Engineering Mc Graw Hill Second Edition:2015

1.1 Mackenzie Davis and David Cornwell Introduction to Environmental Engineering, 5e publishing, Indian Edition: 2014

1.2 V.M. Domkundwar, Environmental Engineering; Dhanpat Rai and Co. Publishing Edition:2014

Benny Joseph, Environmental Studies by Benny Joseph, TataMcGraw Hill.

R. Rajagopalan, Environmental Studies by R.Rajagopalan, Oxford University Press.

Anandita Basak Environmental Studies by. Anandita Basak, Pearson Education.

SEMESTER-IV	CLASS: S.Y.B.Tech. (Civil)		
CODE: OE401 (Audit Course)/SWAYAM	COURSE: Rural Technology & Community Development		
Prerequisites	Social Science		
Period per week (each of 60 minutes)	Lecture	03/AU	
	Laboratory	--	
	Tutorial	02	
Scheme of Evaluation		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	03	100
	In Semester Evaluation	--	-
	TOTAL	---	100

CLASS : T.Y. B.Tech	SEMESTER – V		
CODE: HS401/SWAYAM	Course: Developing soft skills and personality		
Prerequisites	BTC107		
Period per week (each of 60 minutes)	Lecture	02	
	Tutorial	02 hours per batch	
Evaluation system		Hours	Marks
	In Semester	01	20 X 02
	End Semester*	02	50
	TW/Practical	---	50
	TOTAL		100