

BACHELOR OF TECHNOLOGY

Civil Engineering Department

Semester - III

Course Scheme

Course Code	Course Name	Lecture hours	Tutorial hours	Practical hours	Credit
HS 192001	Introduction to Sociology	3	0	0	3
MA 192001	Mathematics III (Complex Analysis and Differential Equations II)	4	2	0	6
CE 192001	Engineering Mechanics	3	2	0	5
CE 192002	Surveying And Geoinformatics	3	0	2	4
CE 192003	Construction Materials	3	0	2	4
CE 192004	Building Planning And Drawing	2	0	3	3.5
	Total	18	4	7	25.5

Civil Engineering Department

Semester: III

I	Course Code	HS 192001			
II	Course Title	Introduction to Sociology			
III	Credit Structure	L	T	P	C
		3	0	0	3
IV	Prerequisite(If any for the student)	Nil			
V	Course Coordinators	Dr. Shukkoor. T			
VI	Course Content	<p>Unit- 1 Sociology: Origin and Development; Nature, Scope and Significance; Founders of Sociol-ogy; Sociological Perspectives</p> <p>Unit-2 Basic Concepts: Society, Community, Social Structure, Status and Role; Culture, Norms and Values, Socialization; social stratification, Groups- Types of group, Social organisations; Social control; Deviance, Social change, Social protests, Social movements</p> <p>Unit-3 Social Institutions- Features and Functions: Family, Education, Economy, Religion, State</p> <p>Unit-4 Social Problems- definition and characteristics: Corruption, Unemployment, Poverty</p> <p>Unit- 5 Sociology of Science and Technology: Society and Technology: Technol- ogy and Development, The Social Construction of Technology, Technology and Social Relations, Social responsibilities of scientists and technocrats, Gender and Technology</p>			

VII	Text/References	<ol style="list-style-type: none"> 1. Giddens, Anthony (2013): Sociology (seventh edition), Cambridge, Polity Press 2. Das, Veena (2005): Handbook of Indian Sociology, New Delhi: Oxford University Press 3. Harlambos, M. (2014): Sociology: Themes and Perspectives, London: Harper Collins 4. MacIver and Page (1974): Society: An Introductory Analysis, New Delhi: Macmillan & Macmillan 5. Inkeles, Alex (1987): What is Sociology? New Delhi: Prentice-Hall of India 6. Johnson, Harry M. (1995): Sociology: A Systematic Introduction, New Delhi: Allied Publishers 7. Ahuja, Ram (2001): Indian Social System, New Delhi: Rawat Publication. 8. Ahuja, Ram (2003): Society in India, New Delhi: Rawat Publication. 9. Abercrombie, N., Hill, S., Turner, B.S: Dictionary of Sociology (2005): Penguin Reference
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Civil Engineering Department

Semester : III

I	Course Code	MA 192001			
II	Course Title	Mathematics III (Complex Analysis and Differential Equations II)			
III	Credit Structure	L	T	P	C
		4	2	0	6
IV	Prerequisite(If any for the student)	Nil			
V	Course Content	<p>Complex Analysis: Definition and properties of analytic functions; Cauchy-Riemann equations, Harmonic functions; Power series and their properties; Elementary functions; Cauchy's theorem and its applications; Taylor series and Laurent expansions; Residues and the Cauchy residue formula; Evaluation of improper integrals; Conformal mappings.</p> <p>Differential Equations: Laplace transforms, Shifting theorems, Convolution theorem, Review of power series and series solutions of ODEs; Legendre's equation and Legendre polynomials; Regular and irregular singular points, method of Frobenius; Bessel's equation and Bessel's functions; Sturm-Liouville problems; Fourier series; D'Alembert solution to the Wave equation; Classification of linear second order PDE in two variables; Vibration of a circular membrane; Fourier Integrals, Heat equation in the half space</p>			
VI	Text/References	<ol style="list-style-type: none"> 1. Kreyszig, E., Advanced Engineering Mathematics, 8th Edition, John Wiley & Sons, 1999. 2. Boyce, W.E., and DiPrima, R., Elementary Differential Equations, 8th Edition, John Wiley & Sons, 2005. 3. Churchill, R.V., and Brown, J.W., Complex variables and applications, 7th edition, McGraw-Hill, 2003. 4. Churchill, R.V., and Brown, J.W., Fourier series and boundary value Problems, 7th Edition, McGraw-Hill, 2006. 5. Howie, J.M., Complex Analysis, Springer-Verlag, 2004. 6. Ablowitz, M.J., and Fokas, A.S., Complex variables: Introduction and Applications, Cambridge University Press, 1998 (Indian Edition). 			

Civil Engineering Department

Semester : III

I	Course Code	CE 192001			
II	Course Title	Engineering Mechanics			
III	Credit Structure	L	T	P	C
		3	2	0	5
IV	Prerequisite(If any for the student)				
V	Course Content	<p>Course contents:</p> <p>Unit-I: Introduction Introduction to engineering mechanics, assumptions, methods of analysis- scalars and vectors, Force system-coplanar and non-coplanar forces, colinear- non-colinear forces, concurrent forces, nonconcurrent forces, moment of force and couple, free body diagram.</p> <p>Unit-II: Forces in Engineering Systems Forces in beams: Types of loading-Concentrated load, Uniformly distributed load, Uniformly varying load, Random loads, Types of Support: Free, Fixed, Hinged, Truss Analysis: Assumptions, analysis of forces in truss- method of joints, method of sections, conditions of equilibrium, nature of force system. Friction: Introduction, laws of friction, angle of repose, cone of friction, friction on plane and inclined surfaces, wedge, belt friction, application of friction to engineering problem.</p> <p>Unit-III: Centroid, Center of gravity and Moment of Inertia Definitions: Center of gravity, centroid, center of mass, Centroid of standard sections, centroid of composite sections, centroid of wires, moments of inertia, parallel axis theorem, perpendicular axis theorem, radius of gyration, moment of inertia for standard and composite sections.</p> <p>Unit-IV: Motion Introduction to dynamics-kinematics and kinetics, Rectilinear motion: Determination of position, distance travelled, uniform motion, effect of increasing/decreasing velocity/acceleration, motion under gravity, relative motion, Curvilinear motion: Resolution of velocity and acceleration, tangential and normal components, radius of curvature, radial and transverse components of acceleration, Projectile Motion: Independence of horizontal and vertical motion, properties of projectile motion, projectile on inclined surfaces.</p> <p>Unit-V: Kinetics of Particles D'Alemberts Principle: D'Alemberts principle, D'Alemberts principle in normal and tangential components, motion of connected bodies, simple machines, circular motion, centripetal force, motion of vehicle on a level circular track, motion of vehicle on a banked circular track. Work and Energy: work of force, energy, work of constant force in</p>			

		rectilinear motion, work of force exerted by spring, mechanical efficiency.
VI	Text/References	<p>Textbooks:</p> <ol style="list-style-type: none"> 1. Engineering Mechanics-Statics and Dynamics, S Rajasekaran and G Sankara Subramanian, 3rd Edition, Vikas Publishing House Pvt. Ltd. 2. A Textbook of Engineering Mechanics, R K Bansal, Laxmi Publications <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Engineering Mechanics-Statics and Dynamics, Irving Shames and G.Krishna Rao, 4thEdition, Pearson. 2. Fundamentals of Engineering Mechanics, Vikas Publishing House PvtLimited, 2009

Civil Engineering Department

Semester : III

I	Course Code	CE 192002			
II	Course Title	Surveying and Geoinformatics			
III	Credit Structure	L	T	P	C
		3	0	2	4
IV	Prerequisite(If any for the student)				
V	Course Content	<p>Introduction to Geoinformatics: Various sub-fields- Surveying, Geodesy, Global Navigation Satellite System (GNSS), Photogrammetry, Remote Sensing, Laser Scanning, Geographical Information System (GIS), Cartography. Three stages: Geospatial Data Collection, Processing, and Analysis/Interpretation.</p> <p>Basic concepts of surveying: Objectives; Basic measurements, control networks, locating topographic details; Units of measurement; Error in measurement and their types, indices of precision, weight, outliers; Error sources, types; accuracy and precision.</p> <p>Chain surveying- linear measurements, tape corrections, obstacles to chaining, Compass surveying basics of compass surveying, local attraction.</p> <p>Levelling-types of levelling operations, methods of calculation of reduced level, contouring, computation of area and volume.</p> <p>Theodolite- Basics, temporary and permanent adjustments, methods of traversing, closing error, computation of latitude and departure.</p> <p>Coordinate systems: Important surfaces in geodesy: earth surface, geoid, MSL, reference ellipsoid; Reference systems: 2D and 3D coordinate systems; map projection, UTM projection</p> <p>Total station surveys: Principles, classification, salient features of total station</p> <p>GPS survey: Principles, errors, DGPS, DOP, GPS survey Methods and plans</p>			

		<p>Practical:</p> <ol style="list-style-type: none"> 1. To understand map numbering system and to study various details on topographic map(s). 2. Study of various instrument used in chain and tape surveying and their uses. 3. To measure the distance between two points on a level ground using chain and tape. 4. To find the bearings of various station points and to calculate the included angles. 5. To prepare a map using chain and compass survey. 6. Taking the levels of various points with Single setup, booking in a level field book. 7. Establish a close traverse using theodolite and adjust closing error. 8. Mapping using Total Station. (will span multiple labs) 9. Use of GPS in field for mapping. (will span multiple labs) 10. Introduction to GIS software.
VI	Text/References	<ol style="list-style-type: none"> 1. Surveying and Levelling, NN Basak, Mc Graw Hill. 2. Surveying Vol. 1, S.K. Duggal, Mc. Graw Hill 3. Schofield, W., Engineering Surveying, 6e, Butterworth Heinemann, Oxford. 4. Anderson, J.M. and Mikhail, E.M., Surveying theory and practice.
VI I	Any other Remarks:	

Civil Engineering Department

Semester : III

I	Course Code	CE 192003			
II	Course Title	Construction Materials			
III	Credit Structure	L	T	P	C
		3	0	2	4
IV	Prerequisite(If any for the student)				
V	Course Content	<p>Construction Materials:</p> <p>Bricks: Classification, Requirement of good bricks, Manufacturing of clay bricks, Sustainable bricks, Tests on bricks: Dimension, Compressive strength, Water absorption, Efflorescence and Warpage</p> <p>Cement: Introduction, Portland cement, raw materials, clinker composition, hydration reactions and products, water requirement, types of cement, testing of cement</p> <p>Aggregates: Natural stone aggregates, Industrial by products, Properties of aggregates: Particle size distribution, Specific gravity, Crushing strength, Impact strength, Water absorption, Flakiness Index and Elongation Index, Abrasion Resistance, Bulking of sand, Codal guidelines</p> <p>Concrete: Introduction, materials of concrete, grades of concrete, water cement ratio, fresh properties of concrete, strength: compressive, flexure and split tension strength, durability, defects in concrete, non-destructive testing, admixtures. Mix design of concrete</p> <p>Steel: Types of steel: Reinforcement steel and rolled steel sections, Stress-strain behaviour, Properties of steel: Unit weight, Tensile strength, Modulus of elasticity, Shear modulus, Poisson's ratio, Coefficient of linear thermal expansion; Different shapes and arrangement</p> <p>Bitumen: Types, Uses of bituminous material, Properties of bitumen: Penetration test, Ductility test, Softening point test, Viscosity test, Flash point and fire point test, Rheological Properties, Aging of Bitumen</p> <p>Other construction materials: Stone, Timber, Fly ash, Stabilized Mud, Glass, Geosynthetics etc.</p>			

Laboratory Experiments (As per Indian Standard codes):

1. Bricks:
 - a. Compressive strength of bricks
 - b. Water absorption of bricks
 - c. Dimensions and efflorescence of bricks
2. Cement:
 - a. Consistency of cement
 - b. Setting times of cement
 - c. Surface area of cement (Blaine's)
 - d. Sieve Analysis
 - e. Strength test on cement
3. Aggregates
 - a. Particle Size Distribution of Coarse and Fine Aggregates
 - b. Water absorption of coarse and fine aggregates
 - c. Elongation and Flakiness index
 - d. Specific gravity of coarse and fine aggregates
 - e. Impact test on aggregates
 - f. Abrasion test on aggregates
2. Concrete
 - a. Slump Cone Test
 - b. Compaction Factor Test
 - c. Flow Test
 - d. Compressive strength
 - e. Split tension strength
 - f. Flexure strength test
3. Steel
 - a. Tensile strength of steel
 - b. Dimension, cross sectional area and unit weight of steel
4. Bitumen
 - a. Penetration test on bitumen
 - b. Ductility test on bitumen
 - c. Softening point test on bitumen
 - d. Viscosity test on bitumen
 - e. Flash point and fire point test on bitumen

VI	Text/References	<ol style="list-style-type: none"> 1. Peter A. Claisse, Civil Engineering Materials, Butterworth-Heinemann Publications, Elsevier 2. Marios Soutsos and Peter Domone, Construction Materials: Their Nature and Behaviour, CRC Press, Taylor and Francis Group 3. Haimei Zhang, Building Materials in Civil Engineering, Woodhead Publishing 4. William P. Spence and Eva Kultermann; Construction Materials, Methods and Techniques: Building for a Sustainable Future, Cengage Learning 5. S. K Duggal, Building Materials, Taylor and Francis Publishing 6. G. C. Sahu and Jena Joypal, Building Materials and Construction, McGraw Hill Publication 7. Recent technical literature on related topics
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Civil Engineering Department

Semester : III

I	Course Code	CE 192004			
II	Course Title	Building Planning and Drawing			
III	Credit Structure	L	T	P	C
		2	0	3	3.5
IV	Prerequisite(If any for the student)				
V	Course Content	<p>Principles and Codes of Practices for Planning and Designing of Buildings (Residential and Public buildings) - Study of IS-Code of Practice for Architectural and Building Drawings, Principles of planning for residential buildings, Classification of buildings: Residential-Bungalows, Apartments/Flats etc. Public-Education, Health, Offices/Commercial, Hotels, Hostels, Study of building Bye-laws and documents / permissions required from commencement to completion of the building according to National Building Code (N.B.C.) of India and local Development Control (D.C.) rules, Study of sun path diagram, wind rose diagram and sun shading devices, Calculation of setback distances, carpet area, built-up area and floor space index (FSI), Principles of planning for public buildings: i) Building for education: schools, colleges, institutions, libraries etc. ii) Buildings for health: hospitals, primary health centres etc. iii) Office buildings: banks, post offices, commercial complexes etc. iv) Building for public residence: hostels, boarding houses, etc.</p> <p>Components and Services of a Building: Staircase (dog legged & open newel in details), Foundations: stepped footing, isolated sloped footing and combined footing, Openings: doors and windows, Types of pitched roof and their suitability (plan and section), Building services: Water supply, sanitary and electrical layouts.</p> <p>Perspective Drawing: One-point perspective, Two-point perspective</p> <p>Town Planning, Architectural Planning & Built Environment: Objectives and principles (road systems, zoning, green belt etc.), Master plan and slum rehabilitation, Architectural Planning: introduction and principles, Built Environment: introduction and principles.</p> <p>Green Buildings: Introduction and overview, Certification methods (LEED and TERI)</p> <p>Computer Aided Drawing (CAD): Advantages of CAD, Overview of any one of the CAD software's prevailing in the market (AutoCAD, Revit, 3D Max etc.)</p>			

VI	Text/References	<ol style="list-style-type: none"> 1. Building Drawing with an Integrated Approach to Build Environment by M. G. Shah, C. M. Kale, S. Y. Patki (Tata McGraw-Hill Education) 2. Civil Engineering Drawing (including Architectural aspect) by M.Chakraborti (Monojit Chakraborti Publications, Kolkata) 3. Planning and Designing Buildings by Y.S. Sane (Modern PublicationHouse, Pune) 4. Building Drawing and Detailing by B.T.S. Prabhu, K.V. Paul and C.V.Vijayan (SPADES Publication, Calicut) 5. Building Planning by Gurucharan Singh (Standard Publishers &Distributors, New Delhi) 6. IS 962: 1989 –Code of Practice for Architectural and Building Drawings. 7. National Building Code of India –2005 (NBC 2005)
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