SYLLABUS II YEAR B.TECH. (CIVIL ENGINEERING)

AUTONOMOUS REGULATIONS 2015

(Effective for the batches admitted in 2015-16 onwards)

DEPARTMENT OF CIVIL ENGINEERING

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES (A)

(Affiliated to AU, Approved by AICTE & Accredited by NBA)

SANGIVALASA, Bheemunipatnam Mandal, Visakhapatnam District-531162

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

B.TECH. 4 YEAR DEGREE COURSE STRUCTURE

(Effective for the B.Tech. students admitted into first year from the academic year 2015-16)

B.TECH. I Year - I Semester

Code	*Subject*	*Cat.*	*Periods*				*Sessional Marks*	*End Exam Marks*	*Total Marks*	*Credits*
			L	*T*	*P*	**Total**				
CIV111	English	HS	3	1	-	4	40	60	100	3
CIV112	Engineering Mathematics – I	BS	3	1	-	4	40	60	100	3
CIV113	Engineering Physics	BS	3	1	-	4	40	60	100	3
CIV114	Engineering Drawing	ES	1	-	3	4	40	60	100	3
CIV115	Environmental Sciences	HS	3	1	-	4	40	60	100	3
CIV116	Engineering Physics Lab	BS	-	-	3	3	50	50	100	2
CIV117	Programming with C Lab	ES	-	1	3	4	50	50	100	3
CIV118	Workshop	ES	-	-	3	3	50	50	100	2
CIV AC1	NSS/NCC/Sports	MC	-	-	3	3	-	-	-	-
Total			13	5	15	33	350	450	800	**22**

B.TECH. I Year – II Semester

Code	*Subject*	*Cat.*	*Periods*				*Sessional Marks*	*End Exam Marks*	*Total Marks*	*Credits*
			L	*T*	*P*	**Total**				
CIV121	Engineering Mathematics - II	BS	3	1	-	4	40	60	100	3
CIV122	Engineering Chemistry	BS	3	1	-	4	40	60	100	3
CIV123	Professional Ethics & Human Values	HS	2	1	-	3	100	-	100	2
CIV124	Mathematics for Civil Engineers	BS	3	1	-	4	40	60	100	3
CIV125	Civil Engineering Materials	PC	3	1	-	4	40	60	100	3
CIV126	Engineering Chemistry Lab	BS	-	-	3	3	50	50	100	2
CIV127	Language Lab	HS	-	-	3	3	50	50	100	2
CIV AC2	NSS/NCC/Sports	MC	-	-	3	3	-	-	-	-
Total			14	5	9	28	360	340	700	**18**

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

B.TECH. 4 YEAR DEGREE COURSE STRUCTURE

B.TECH. II Year – I Semester

Code	*Subject*	*Cat.*	*Periods*				*Sessional Marks*	*End Exam Marks*	*Total Marks*	*Credits*
			L	*T*	*P*	**Total**				
CIV211	Engineering Mathematics-III	BS	3	1	-	4	40	60	100	3
CIV212	Building Technology	PC	4	-	-	4	40	60	100	3
CIV213	Engineering Geology	PC	3	-	1	4	40	60	100	2
CIV214	Engineering Mechanics	ES	3	1	-	4	40	60	100	3
CIV215	Surveying– I	PC	3	1	-	4	40	60	100	3
CIV216	Strength of Materials	PC	3	1	-	4	40	60	100	3
CIV217	Surveying Field Work-I	PC	-	-	3	3	50	50	100	2
CIV218	Strength of Materials Lab	PC	-	-	3	3	50	50	100	2
Total			19	4	7	30	340	460	800	**21**

B.TECH. II Year - II Semester

Code	*Subject*	*Cat.*	*Periods*				*Sessional Marks*	*End Exam Marks*	*Total Marks*	*Credits*
			L	*T*	*P*	**Total**				
CIV221	Concrete Technology	PC	3	-	-	3	40	60	100	3
CIV222	Environmental Engineering-I	PC	3	1	-	4	40	60	100	3
CIV223	Fluid Mechanics-I	PC	4	1	-	5	40	60	100	3
CIV224	Surveying – II	PC	3	1	-	4	40	60	100	3
CIV225	Structural Analysis – I	PC	4	1	-	5	40	60	100	4
CIV226	Building Planning & Drawing	PC	1	-	3	4	40	60	100	3
CIV227	Concrete Technology Lab	PC	-	-	3	3	50	50	100	2
CIV228	Fluid Mechanics Lab-I	PC	-	-	3	3	50	50	100	2
CIV229	Surveying Field Work -II	PC	-	-	3	3	50	50	100	2
CIV2210	Technical Seminar *	PC	-	-	2	2	-	-	-	-
Total			18	4	14	36	390	510	900	**25**

**To be evaluated continuously through II year -II semester and III year –I semester and results reported with III year –I semester*

SYLLABUS II YEAR B.TECH. (CIVIL ENGINEERING)

AUTONOMOUS REGULATIONS 2015

(Effective for the batches admitted in 2015-16 onwards)

II YEAR I SEMESTER

DEPARTMENT OF CIVIL ENGINEERING

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES (A)

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SANGIVALASA, Bheemunipatnam Mandal, Visakhapatnam District-531162

ENGINEERING MATHEMATICS - III

CIV 211 **Credits : 4**
Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Outcomes:

At the end of the course the student will be able to

1. Understand the concepts of Gradient, Divergence and Curl and finding scalar potential function of irrotational vector fields.
2. Understand the concepts of Green's Theorem, Stokes' Theorem and the Divergence Theorem and to evaluate line integrals, surface, integrals and flux integrals.
3. Understand some basic techniques for solving linear partial differential equations and how to identify a partial differential equation in order to determine which technique(s) can best be applied to solve it.
4. Understand the methods to solve the Laplace, heat, and wave equations.
5. Gain good knowledge in the application of Fourier Transforms.

SYLLABUS

UNIT I 12 Periods

Vector Differentiation: Differentiation of Vectors – Scalar and Vector point function – Del applied to Scalar point functions - Gradient geometrical interpretations – Directional Derivative - Del applied to vector point function – divergence - Curl – Physical interpretation of Divergence and Curl - Del applied twice to point functions- Del applied to product of point functions.

UNIT II 12 Periods

Vector Integration: Integration of vectors – Line integral – Surface – Green's theorem in the plane – Stokes theorem – Volume integral – Gauss Divergence theorem (all theorems without proofs) – Irrotational fields.

UNIT III 12 Periods

Partial Differential Equations: Introduction – Formation of Partial Differential Equations – Solution of Partial Differential Equations – Equations solvable by Direct Integration– Linear Equations of First order -Homogeneous Linear Equations with Constant Co-efficient – Rules for finding the complementary function - Rules for finding the Particular integral – Non-Homogeneous linear equations.

UNIT IV 12 Periods

Application of Partial Differential Equations: Introduction – Method of separation of variables – Vibrations of a stretched string- Wave equation – One dimensional Heat flow - Two dimensional Heat flow – Solution of Laplace's equation.- Laplace's equation in Polar Co-ordinates.

UNIT V 12 Periods

Fourier Transforms: Introduction – definition – Fourier integral theorem - Fourier sine and cosine integrals – Complex form of Fourier integrals – Fourier integral representation of a function – Fourier Transforms – Properties of Fourier Transforms – Convolution Theorem – Parseval's identity for Fourier transforms – Fourier Transforms of the Derivatives of functions – Application of Transforms to Boundary value problems – Vibrations of a string.

TEXT BOOK:

1. Dr. B.S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, New Dehli.

REFERENCE BOOKS:

1. A Text book on Engineering Mathematics by N.P. Bali Etal, Laxmi pub.(p)Ltd.
2. Advanced. Engineering Mathematics by H.K.Dass
3. Advanced Engineering Mathematics by Erwin kreyszig.
4. Higher Engineering Mathematics by Dr.M.K. Venkataraman, National Pub.Co.Madras.

BUILDING TECHNOLOGY

CIV 212 **Credits : 3**
Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

The objective of the course is to prepare the student to

1. Learn about building byelaws laid by planning authorities
2. Understand about masonry types in brick and stone construction
3. Learn about building components and foundations

Course Outcomes:

At the end of the course the student will be able to

1. Know the various building bye-Laws laid by town planning authorities and local regulatory bodies for Planning various buildings like residential, educational, office buildings and hospital buildings.
2. Learn about masonry types in brick and stone construction
3. Understand about various Building components.
4. Learn about various types of foundation.
5. Know about damp prevention and fire protection methods.
6. Understand about various types of roofs.

SYLLABUS

UNIT I 12 Periods

Introduction: Component Parts of a Building - Load bearing construction - Framed buildings - Tall buildings, Advantages, problems - Other types of Buildings - Setting and laying out a building - Responsibilities and Duties of the Client and Engineer.

Walls: Classification of walls; Technical terms - Stone masonry construction - types and rules - Brick masonry walls - bonds and rules - cavity wall construction - Hollow concrete block masonry - Light weight wall construction - Prefabricated brick panel for walls – reinforced masonry - composite masonry - Arches and lintels

UNIT II 12 Periods

Doors, Windows and Ventilators: Location of doors and windows, technical terms, Dimensions of doors and windows, Door frames, Types of doors and windows, Ventilators, Fixtures and fastenings.

Building Conveyance Verticality: Stair cases - Lifts - Escalators - Ramps - Basic terms - Types - Design considerations – Maintenance

UNIT III 12 Periods

Floors: Terminology; Materials – Types of floors – suitability (Industrial, Indoor, Stilt & Terrace Floors) and construction; Concrete, mosaic, terrazzo, tiled, stone & synthetic floors and floor finish.

Roofs: Terminology; Classification of roofs - Steel sloping roofs - Roof covering materials - Types of flat roofs - Basic roofing elements - Roof coverings - Pitched, flat and curved roofs - Lean–to–roof - couple roofs, trussed roofs - roof drainage - roof cladding materials and their fixtures. Flat roofs: RCC roofs.

Surface Finishes: Plastering - Pointing - White washing - distempering – Painting - Pebble dash – Dado/Skirting, Tiles etc.

UNIT IV 12 Periods

Foundations: Need for foundation - types of foundation - open foundation - Shallow foundations – Spread, combined- strap and raft foundation - deep foundations - pile foundation - well foundations and caissons - Factors affecting selection of foundations Foundation on black cotton soils; setting out of foundations - excavations for foundation trenches and base - general principles of dewatering foundation excavations - coffer dams.

Form Work, Scaffolding: Form work, Types of formwork; Centering - scaffolding - Types of scaffolding.

UNIT V 12 Periods

Construction safety: safety in construction - general requirements - common hazards during excavation; piling and other deep foundations - common hazards during walling; roofing; additional safety requirements for erection of concrete framed structures - additional safety requirements for erection of structural steel work - general requirements; safety in demolition of buildings

Introduction to Green Buildings: Introduction - Necessity - Concept of Green building. Principles of green building - Selection of site and Orientation of the building - usage of low energy materials - effective cooling and heating systems - effective electrical systems - effective water conservation systems - Certification systems - GRIHA and LEED - case studies

TEXT BOOKS:

1. The Text Book Of Building Construction by S.P.Arora, S.P.Bindra, Dhanpatrai Publications.
2. Building Construction by B.C. Punmia, Laxmi Publications (p) Ltd.

REFERENCE BOOKS:

1. TERI *"Sustainable Building Design Manual- Volume I & II"* Tata Energy Research Institute.
2. National Building Code of India, SP 7 (1): 1983, First Revision 1992, Bureau of Indian Standards

3. Building Construction by Sushil kumar, Standard publishers distributors.
4. Building construction by P.C.Verghese, PHI Learning (P) Ltd.
5. Building Construction, Vol.II & III By W.B. Mckay, E.L.B.S. and Longman, London, U.K.
6. Green Building Design, Construction and Operations, Sustainable Building Technical Manual, U.S.Green Building Council, 1996, Public technology Inc.

ENGINEERING GEOLOGY

CIV 213 **Credits : 2**

Instruction : 3 Lecture & 1 Practical / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

The objective of the course is to prepare the students

1. To identify & classify different minerals and map the geological structures present in subsurface.
2. Investigate the selected project site to obtain data and determine the favourable considerations in study area.
3. Measure earthquakes and landslides to classify the hazardous zones and interpret geological maps.

Course Outcomes:

At the end of the course the student will be able to

1. Identify and classify the different minerals and rocks based on their physical properties and geological genesis
2. Map the various geological structures present in the subsurface and their importance in the study of natural hazards like earthquakes etc.
3. Apply the different investigation techniques from initial stage to final stage for the selection of proper project site.
4. Do the interpretation of available data to determine the favorable geological considerations (i.e., Lithological structural and ground water) in the study area for the construction of different civil engineering projects dams etc.
5. Classify and measure the earthquake, Landslides and subsidence prone areas to practice the hazard zonation.
6. Prepare, analyze and interpret the Engineering Geologic maps.

SYLLABUS

UNIT I 12 Periods

Introduction: Definition of Geology and Engineering Geology, Branches of Geology, Scope and importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some civil engineering constructions due to geological draw backs. Role of engineering geologist in planning, design and construction stages in Civil Engineering works

Earth: Solar System, Origin of the Earth, Internal structure of the Earth and its composition, Elementary knowledge on isostasy, continental drift, plate tectonics and sea floor spreading.

Geological Cycle: Weathering, Effect of Weathering over the properties of rocks, Importance of Weathering with reference to civil engineering constructions like dams, reservoirs and tunnels-Land forms produced by, running water, and glaciers. Land forms produced by wind, sea waves and currents.

UNIT II 12 Periods

Petrology: Definition of rock, Civil Engineering importance – Geological classification of rocks –Rock cycle, Formation, Structure, texture and mineralogical composition of igneous, sedimentary and metamorphic rocks, Study of physical properties of different types of igneous, sedimentary and metamorphic rocks. Igneous rocks: Granite, synite, dolerite, gabro, diorite, basalt. Sedimentary rocks, dykes and sills: Breccia, conglomerate, Sandstone, Shale, limestone. Metamorphic rocks: Gneiss, khondalite, schist, slate, marble, quartzite, charnokite. Engineering properties of rocks.

Soils: Soil formation, Soil profile, – Geological classification – Engineering classification and description of Indian soils; Soil erosion and conservation.

UNIT III 12 Periods

Minerology: Definition of mineral, Importance of study of minerals, Different methods of study of minerals, Study of physical properties of different rock forming minerals: Silicate structures, Quartz, feldspars, pyroxenes, amphiboles, micas and clays, Introductory knowledge on Chemical and optical properties of minerals.

Structural Geology: Elements of structural geology: Strike, dip, outcrop, plunge – Study of folds, faults, joints, unconformities, Classification of folds, faults and joints. and their importance in Civil Engineering works. Potential problems from rock structures in engineering constructions, Treatment of rocks by grouting.

UNIT IV 12 Periods

Geophysical Exploration: Principles of geophysical methods, Electrical, Seismic, Gravity and Magnetic methods. Principle of Resistivity method and configurations. Applications of Resistivity method in prediction of soil profile, hard rock and ground water table. Principles of Seismic refraction and reflections methods and their applications to Civil Engineering problems.

Geological Applications in Civil Engineering: Geological investigations for dams and reservoirs. Case histories of dam failures and their causes. Geology of the major dam sites of India. Factors affecting the seepage and leakage of reservoir and the remedial measures. Geological investigations for bridges and Multi- storied structures. Geological investigations for highways, railways, canals, runways, powerhouses, power channels and flumes. Geological investigations for tunnels and coastal structures (Seawalls, groins and bulkheads); Environmental geology. Coastal Management, Underground water in relation to Engineering Works.

UNIT V 12 Periods

Earthquakes: Terminology, Causes and effects, Classification, Earthquake waves, Seismograph, Locating Epicenter, Determination of depth of focus, Intensity, Magnitude, Mercalli & Richter scales, Prediction, Effects, Seismic belts, Shield areas – Seismic zones of India – Civil Engineering considerations in seismic areas – Precautions of building constructions in seismic areas. Safety measures for buildings and dams – Reservoir induced seismicity.

Landslides: Causes, effects, methods of mitigating impact of landslides.

Tsunamis: Meaning of Tsunami, causes & Effects of Tsunami, warning and mitigation.

TEXT BOOKS:

1. Engineering Geology by D.Venkata Reddy, Vikas Publishing House Pvt Ltd. 2011.
2. Text book of Engineering Geology, by N.Chenna Kesavulu, MacMillan India Ltd, Hyderabad, 2014

REFERENCE BOOKS:

1. Engineering Geology by Subinoy Gangopadhyay, Oxford University Press. 2013.
2. Fundamental of Engineering Geology by F.G. Bell, Butterworth Publications, New Delhi, 1992.
3. Engineering Geology: Principles and Practice by David George Price, Springer, 2009.
4. Principles of Engineering Geology by KVGK Gokhale. B.S.Publications-2005
5. Engineering and General Geology by Parbin Singh, K Kataria & Sons, New Delhi, 2009
6. Engineering Geology for Civil Engineers by P.C. Varghese, PHI learning pvt. Ltd., 2012

ENGINEERING MECHANICS

CIV 214 **Credits : 3**
Instruction : 3 Lecture & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

The objective of the course is to enable the student

1. To develop logical thinking approach to engineering problems.
2. Learn about the basic concepts of force, moment, resultant forces.
3. Learn about centroid & centre of gravity, static analysis of simple plane trusses, area moment of inertia,

Course Outcomes:

At the end of the course the student will be able to

1. Analyze a given physical problem into a suitable forces and moments.
2. Identify the centroid of a given plane area and find its area/ mass moment of inertia.
3. Apply the concept of friction to simple engineering problems.
4. Calculate the displacement, velocity and acceleration of a moving particle.
5. Apply the work-energy, D ALEMBERTS principle to particles and connected systems.

SYLLABUS

UNIT I 12 Periods

Basic Concepts: Introduction to Engineering Mechanics – Scalar and Vector quantities – Forces – Characteristics of a force – Definitions and examples of various types of force systems – Definition of resultant – Composition and resolution of forces – Moment of a force – Principles of moments of force – Couples – characteristics of a couple – on Transformations of a couple – Resolution of a force into a force and couple. Resultants of Force Systems, possible resultants of different types of force systems.

UNIT II 12 Periods

Equilibrium Analysis: Free body diagrams – Equations of equilibrium for a concurrent coplanar force system – Equilibrium of Bodies acted on by two or three forces – Equilibrium of bodies acted on by non-concurrent coplanar force system – Equilibrium of bodies acted on by parallel, non-coplanar force system – Equilibrium of non-concurrent, non-coplanar non-parallel force system.
Analysis of trusses: Method of joints, Method of sections and tension coefficient method.

UNIT III 12 Periods

Friction: Nature of friction – Laws of friction – Coefficient of friction – Angle of friction – Cone of friction – Problems involving frictional forces – Frictional forces on flexible bands and belts – Rolling friction – Thrust bearing.

Centroid and Centre of Gravity: Centre of gravity of parallel forces in a plane – Centre of gravity of parallel forces in space – centroids and centres of gravity of composite bodies – Theorems of Pappus.

UNIT IV 12 Periods

Moments of Inertia: Definition – Parallel axis theorm for areas – Second moments of areas by integration – Radius of gyration of areas – Moments of inertia of composite areas.

Kinematics: Absolute Motion: Introduction – basic terminology of mechanics – Newton's Laws – Introduction to Kinematics of Absolute Motion – Rectilinear motion of a particle – Angular motion of a line.

UNIT V 12 Periods

Kinetics: Introduction to kinetics – Force, mass and acceleration approach, Newton's laws of motion - D Alembert's principle – Work - Energy principle – Work done by a force – Work done by a varying force – Work done by a force system – Energy – Power – Work Energy equation for translation – Work done by a Spring – Principle of conservation of energy.

TEXT BOOKS:

1. Engineering Mechanics by SS Bavikatti and Rajasekharappa, New Age International Pvt. Ltd.
2. Applied Mechanics by I.B. Prasad, Khanna Publishers.

REFERENCE BOOKS:

1. Engineering Mechanics by S. Timoshenko and D.H. Young, Pearson Prentice publication.
2. Engineering Mechanics by Basudeb Bhattacharyya, Oxford University Press.
3. Engineering Mechanics by F.L. Singer, HarperCollins Publishers.
4. Schaum's outline of engineering mechanics: Statics, by E. Nelson, Charles Best, W.G. McLean, Merle Potter.
5. Vector Mechanics & Statics by F.P. Beer and E.R. Jhonston Jr, McGraw Hill.
6. Engineering Mechanics: Statics by J.L. Meriam and L.G. Kraige. Wiley India Ltd.

SURVEYING - I

CIV 215 **Credits : 3**
Instruction : 3 Periods & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

The objective if the course is to prepare student

1. To measure the area by chaining.
2. To measure the area and distance between the points by compass.
3. To measure the elevation of points.

Course Outcomes:

At the end of the course the student will be able to

1. Calculate angles, distances and levels.
2. Identify data collection methods and prepare field notes.
3. Understand the working principles of survey instruments.
4. Estimate measurement errors and apply corrections.
5. Demonstrate an ability to compute volume of reservoirs using contours.

SYLLABUS

UNIT I 12 Periods

Introduction: Surveying – Definition; Objectives; Classification; Principles of surveying; Instruments for Surveying; Scale – Scales used for Maps and Plans; Preparation of Map and Plan.

Chain Survey: Classification of surveying-Principles of Surveying. Sources of errors-Linear measurements, direct measurement. Instrumentation for chaining – Errors due to incorrect chain-Chaining on un-even and sloping ground-Errors in chaining - Tape corrections – Problems: Base line measurement-Chain Triangulation – Check lines, Tie lines, Offsets. Basic problems in chaining obstacles in chaining-Problems - Conventional signs.

UNIT II 12 Periods

Compass Survey: Introduction to compass survey Definitions of Bearing. True bearing, True meridian, Magnetic Meridian, Magnetic bearing – Arbitrary Meridian, R.B. & B.B of lines – Designation of bearings – W.C.B. & R.B. – Conversion of bearings from one system to the other Related problems – Calculation of angles for bearings, Calculation of bearing for angles, Related problems – Theory of Magnetic compass (i.e. Prismatic compass) – Magnetic dip-Description of Prismatic compass. Temporary adjustments of compass-Magnetic Declination – Local attraction-Related Problems-Errors in compass survey.

UNIT III 12 Periods

Traverse Surveying : Chain and compass traversing-Free or loose needle method – Fast needle method-Checks in closed and open traverse-Plotting methods of traverse Survey - Closing error-Balancing the traverse-Bowditch's method-Transist method, Gale's Travers table.

UNIT IV 12 Periods

Levelling : Definitions of terms-Methods of leveling - Uses and adjustments of dumpy level-Temporary and permanent adjustments of dumpy level levelling staves - Differential leveling, Profile leveling - Cross sections - Reciprocal levelling. Precise leveling - Definition of BS, IS, FS, HI, TP-Booking and reduction of levels, H.I. methods-Rise and fall method-Checks-Related problems-Curvature and Refraction Related Problems-Correction-Reciprocal levelling-Related problems-L.S & C.S Levelling-Problems in leveling - Errors in levelling.

UNIT V 12 Periods

Contouring: Definitions- Contour Interval and horizontal equivalent - Characteristics of contours-methods of locating contours-Direct and indirect methods-Interpolation of contours-Contour gradient-Uses of contour maps.

Minor instruments : Uses and adjustments of the following minor instruments:
Plane Table and its accessories, Line Ranger, Optical Square, Abney level, Clinometer, Ceylon Ghattracer, Pantagraph, Sextant and Planimeter.

TEXT BOOKS:

1. Surveying By Dr. K.R. Arora, Standard Book House.
2. Surveying Vol.1, 2 and 3 – By Punmia, Standard Book House.

REFERENCE BOOKS:

1. Surveying Vol. 1 and 2 – By S.K. Duggal. Tata Mc. Graw Hill Publishing Co.
2. A text book of Surveying by C.L. Kocchar, Dhanpatrai Publishing company.
3. A Text Book of Surveying and Levelling by R.Agor, Khanna Publishers
4. Surveying and Levelling Vol. I & Vol. II by T.P Kanetkar and S.V Kulkarni, Vidyarthi Griha Prakashan, 1988

STRENGTH OF MATERIALS

CIV 216 **Credits : 3**
Instruction : 3 Periods & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

1. To create a strong understanding about the knowledge of the stresses, strains, principal stresses and principal planes.
2. To develop the ability to draw shear force and bending moment diagrams for beams.
3. To learn the concepts of bending stresses and shear stresses in beams.
4. To understand the knowledge of stresses in circular shafts, springs and thin cylinders

Course Outcomes:

At the end of this course student will be able to:

1. Understand and solve simple problems involving stresses and strain in two and three dimensions.
2. Analyses stress in two dimensions and understand the concepts of principal stresses and the use of Mohr circles to solve two dimensional stress problems.
3. Draw shear force and bending moment diagrams of simple beams and understand the relationships between loading intensity, shearing force and bending moment.
4. Compute the bending stresses and shear stresses in beams with one or two materials.
5. Apply sound analytical techniques and logical procedures in the solution of engineering problems.

SYLLABUS

UNIT I 12 Periods

Simple Stresses and Strains: Elasticity and plasticity – Types of stresses and strains – Hooke's law– stress – strain diagram for mild steel and HYSD-bars Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic constants and the relationship between them – Bars of varying section – composite bars – Temperature stresses.

UNIT II 12 Periods

Shear Force and Bending Moment in beams: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, U.D.L., uniformly varying loads, moment and combination of these loads – Point of contra flexure – Relation between S.F, B.M and rate of loading at a section of a beam.

UNIT III 12 Periods

Bending Stresses: Theory of simple bending – Assumptions – Derivation of bending equations, Neutral axis – Determination of bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections.
Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT IV 12 Periods

Principal Stresses and Planes: Introduction – Principal planes and Principal Stresses – Method of determining stresses on an inclined section of a member subjected to direct stresses in one plane – member subjected to direct stresses in two mutually perpendicular directions – member subjected to simple shear stress - member subjected to direct stresses in two perpendicular directions accompanied by a state of simple shear – Mohr's circle of stresses
Introduction to theories of failure: (i) Principal Stress theory, (ii) Principal Strain theory, (iii) Maximum Shear Stress theory and (iv) Maximum strain energy theory.

UNIT V 12 Periods

Torsion of Circular Shafts: Theory of pure torsion – Derivation of Torsional Rigidity equation – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts.
Springs: Introduction – Types of springs – deflection of closed and open coiled helical springs under axial load and axial twist.
Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in diameter, and volume of thin cylinders.

TEXT BOOKS:

1. Ramamrutham, Strength of materials, Dhanpat Rai & Sons.
2. R K Bansal, Strength of materials, Laxmi Publications Pvt. Ltd.

REFERENCE BOOKS:

1. Timoshenko and Young, Elements of strength of materials Affiliated East-West Press Pvt. Ltd.
2. Mechanics of Materials, Beer and Jhonston, Tata McGraw Hill.
3. P.N. Singer and P.K. Jha, Elementary mechanics of solids, New Age International Pvt.Ltd.
4. Mechanics of Solids by Egor P. Popov, Pearson Education.

SURVEY FIELD WORK - I

CIV 217 **Credits : 2**
Instruction : 3 Practical / week Sessional Marks : 50
End Exam : 3 Hours End Exam Marks : 50

Course Objectives:

1. To know how to conduct the experiments by using different survey instruments.
2. To improve practical knowledge.

Course Outcomes:

At the end of this course student will be able to:

1. Improve ability to function as a member of a survey party in completing the assigned field work.
2. Conduct survey and collect field data
3. Prepare field notes from survey data
4. Learn the measurement of elevation difference between two points using Level instruments.
5. Interpret survey data and compute areas and volumes.

LIST OF EXPERIMENTS:

1. Introduction & list of equipments
2. Chain surveying - Aligning, Ranging and Chaining
3. To determine the area of the given plot using chain, tape & cross–staff.
4. To find the distance between inaccessible points using Compass Surveying.
5. Traversing using prismatic compass.
6. Measurement of elevation difference between two points using and Leveling Instrument.
7. Elevation difference between two points by Reciprocal levelling method.
8. Differential levelling, reduction of levels by rise and fall method.
9. Differential levelling, reduction of levels by height of collimation method.
10. Longitudinal and Cross Sectioning.
11. Contouring of a small area by method of Blocks.

REFERENCE BOOK:

1. B.C. Punmia, Ashok Kumar Jain, Ashok Kr. Jain, Arun Kr. Jain., Surveying I & II, Laxmi Publications, 2005.

STRENGTH OF MATERIALS LABORATORY

CIV 218 **Credits : 2**

Instruction : 3 Practical / week Sessional Marks : 50

End Exam : 3 Hours End Exam Marks : 50

Course Objectives:

The student shall have the knowledge of

1. The stress – strain characteristics of mild steel/HYSD bar.
2. The methods of determining modulus of elasticity, modulus of rigidity of spring and shaft materials.
3. The concepts of hardness, compressive strength, impact strength and tensile strength of different materials.

Course Outcomes:

At the end of this course student will be able to

1. Determine the strength of given steel bar.
2. Estimate compressive strength of wood.
3. Find the impact resistance of steel specimen.
4. Calculate Young's modulus of steel and wood using deflection tests.
5. Determine rigidity modulus of given spring.

LIST OF EXPERIMENTS:

1. Tension test on Mild Steel / HYSD bars.
2. Compression test on wood (parallel to grains and perpendicular to grains)
3. Test on close coiled helical spring for the determination of rigidity modulus and spring constant
4. Hardness tests - Brinell's & Rockwell's.
5. Impact tests – Charpy and Izod
6. Torsion test.
7. Bending test.: Load deflection test for the determination of young's modulus on simply supported and cantilever beam for wood and steel.

REFERENCE BOOK:

1. P.N. Singer and P.K. Jha, Elementary mechanics of solids, New Age International Pvt.Ltd.

SYLLABUS II YEAR B.TECH. (CIVIL ENGINEERING)

AUTONOMOUS REGULATIONS 2015

(Effective for the batches admitted in 2015-16 onwards)

II YEAR II SEMESTER

DEPARTMENT OF CIVIL ENGINEERING

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES (A)

(Affiliated to AU, Approved by AICTE & Accredited by NBA)

SANGIVALASA, Bheemunipatnam Mandal, Visakhapatnam District-531162

CONCRETE TECHNOLOGY

CIV 221 **Credits : 3**
Instruction : 3 Periods & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

1. Learn about the manufacturing of cements and hydration process
2. Use different types of cement and admixtures as per their properties for different field applications.
3. Student shall learn about the various ingredients of concrete, admixtures, workability and strength of hardened concrete

Course Outcomes:

At the end of course student will be able to:

1. Understand the composition, manufacturing process and properties of cement.
2. Understand the classification, characteristics and properties of aggregate.
3. Acquire the skill of testing, supervision of concrete work & interpretation of tests results.
4. Understand the behaviour of hardened concrete.
5. Understand the need for special concretes.

SYLLABUS

UNIT I 12 Periods

Cement: Composition of ordinary Portland cement- oxide composition and compound composition- their functions in cement. Manufacture of ordinary Portland cement by wet process and dry process. Types of cement - OPC & blended (only fly ash & slag) and their uses. Tests on cement – field tests – laboratory test (Test procedure not required)

UNIT II 12 Periods

Aggreagate: Classification of aggregate based on origin , shape , size, unit weight: Manufactured sand (M – Sand) – characteristics of aggregates – strength, particle shape and texture ,specific gravity ,bulk density ,voids, porosity and absorption of aggregates – moisture content of aggregate – bulking of fine aggregate. Tests on aggregates.
(Test procedure not required)

UNIT III 12 Periods

Fresh Concrete: Manufacture of concrete – Batching, Mixing, Transportation, Placing, Vibrating, Finishing, Curing – Workability – Factors affecting workability – segregation and bleeding – Tests available for measurement of workability (Test procedure not required)

Admixtures: Admixtures – functions of admixtures – General purpose admixtures such as Retarding admixture, Accelerating admixtures, Air Entraining admixtures, Water reducing admixture

UNIT IV 12 Periods

Hardend Concrete: Strength of concrete – water-cement ratio – gel-space ratio – gain of strength with age – effect of maximum size of aggregate on strength – compressive strength – flexural strength – tensile strength of concrete – bond strength – factors affecting the strength of concrete. Introduction to creep and shrinkage of concrete – Tests on hardened concrete (Test procedure not required)

UNIT V 12 Periods

Special Concrete: Introduction to special concrete – lightweight concrete – no fines concrete – fibre reinforced concrete – self compacting concrete
Concrete Mix Design: Concrete mix design – BIS Method of mix design

TEXT BOOK:

1. Concrete Technology – M. S. Shetty – S Chand Co., Publishers – 2006.
2. Properties of Concrete – AM Nevelli – 5th Ed, Prentice Hall Publishers, 2012.

REFERENCE BOOKS:

1. Concrete Technology – M. L. Gambhir – Tata Mc Graw Hill Publishers – 2012.
2. Concrete Technology 3 Edition, Gupta B L, & Amit Gupta, Standard Publishers and Distributors
3. Concrete Technology, A.R.Santha Kumar, Oxford University Press

ENVIRONMENTAL ENGINEERING - I

CIV 222 **Credits : 3**
Instruction : 3 Periods & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

1. The principal objective of the course is to develop the technical knowledge for better understanding the concepts of water supply and its characteristics and enabling them to use these technical skills in solving the problems in industries.
2. To impart the knowledge in planning, design, construction, operation and maintenance aspects of water supply systems.
3. To provide theoretical and practical exposure in the field of water treatment and supply.
4. To increase the management skills with regard to collection, treatment and distribution of sustainable water.

Course Outcomes:

By the end of the course the student will be able to

1. Understand the sources of water, quality of water, types of water borne diseases.
2. Learn to estimate demand for water supply, and can apply the physical principles of flow in water distribution networks and pumping stations.
3. Design water treatment systems and operations and working of different units.
4. Design elements of public water systems, pumping and transportation of water, distribution systems, and components of water supply network in a town/city, functioning of water/sewer pipe appurtenances.

SYLLABUS

UNIT I 10 Periods

Introduction: Introduction: Importance and Necessity of Protected Water Supply systems, Objectives of Protected water supply system, Flow chart of public water supply system, Role of Environmental Engineer, Agency activities.

Water Demand and Quantity studies : Estimation of water demand for a town or city, Types of water demands, Per capita Demand, Factors affecting the Per Capita Demand, Variations in the Demand, Design Period, Factors affecting the Design period, Population Forecasting Studies.

UNIT II 10 Periods

Quality: Characteristics of water – Physical, Chemical and Biological. Analysis of Water – Physical, Chemical and Biological. Impurities in water, Water borne diseases. Drinking water quality standards.

UNIT III 10 Periods

Sources of Water Supply: Surface sources of water: Lakes, Rivers, Impounding Reservoirs, Capacity of storage reservoirs, Mass curve analysis. Groundwater sources of water: Types of water bearing formations, springs, Wells and Infiltration galleries, Yields from wells and infiltration galleries.

Collection and Conveyance: Factors governing the selection of the intake structure, Types of Intakes. Conveyance of Water: Gravity and Pressure conduits, Types of Pipes, Pipe Materials, Pipe joints, Design aspects of pipe lines, Laying of pipe lines.

UNIT IV 12 Periods

Treatment of Water: Layout and general outline of water treatment units –Treatment methods (Theory and Design) - Sedimentation, Coagulation, Sedimentation with Coagulation, Filtration, Chlorination and other Disinfection methods, Softening of Water, Defluoridation, Removal of Odours.

UNIT V 12 Periods

Pumping: Necessity of pumping in water supply - classification and brief description of types of pumps - selection of pump - calculation of head, horsepower - economical diameter of pumping main.
Distribution System: Distribution of Water: Methods of Distribution system, Components of Distribution system, Layouts of Distribution networks, Pressures in the distribution layouts, Analysis of Distribution networks, Water connection to the houses.
Building Plumbing: Water Supply system – Fixing the pipes in building, high rise buildings – Maintenance of building pipe line – Water Meters.

TEXT BOOKS:

1. Birdie G S and Birdie J S, "Water Supply and Sanitary Engineering", Dhanpat Rai and Sons, Delhi, Fifth Edition, 1997
2. Garg, S.K, "Environmental Engineering Vol. I ", Khanna Publishers, New Delhi, 1994.

REFERENCE BOOKS:

1. Modi, P.N, "Environmental Engineering Vol. I", Standard Book House, New Delhi, 2001.
2. Punmia B.C, "Environmental Engineering Vol. I", Lakshmi Publications (P) Ltd., New Delhi, 2002.
3. Deswal S and Deswal A, "A basic course in Environmental studies", Dhanpat Rai & Co, First edition, Delhi, 2004
4. Manual on Water supply and Treatment, CPHEEO, Government of India, New Delhi, 1999.
5. Hand book on Water Supply and Drainage, SP35, B.I.S., New Delhi, 1987.
6. National Building Code of India, SP 7 (1) – 1983, Bureau of Indian Standards, First Reprint, May 1992.

FLUID MECHANICS - I

CIV 223 **Credits : 4**
Instruction : 4 Periods & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

1. To develop an insight into engineering problems related to fluids.
2. Student is expected to learn about the pressure at a point, forces on fluid element to solve complex problems in engineering.
3. Student shall be able to know different types of fluid flows and apply the principles of conservations of mass, momentum and energy.

Course Outcomes:

By the end of the course the student will be able to

1. Determine the physical properties of fluids and different types of forces acting on a fluid element extended to forces on various gates.
2. Determine the forces that are acting on immersed bodies in static fluids through application of buoyancy and floatation.
3. Determine different types of fluid flows to find out the local and convective accelerations in 1D, 2D flows fields and derive the Laplace equation.
4. Apply conservation principles of mass momentum and energy on fluids through system and control volume approaches.
5. Calculate the force exerted by the fluid on bends, nozzles, plates and vanes by impulse momentum principle.
6. Analyze the steady laminar and turbulent flows through pipes and solve pipe networks for series and parallel pipes to solve two reservoir and three reservoir problems.

SYLLABUS

UNIT I 14 Periods

Basic Fluid Properties: Definition of Fluid, basic properties of fluid, Viscosity - Newton's Law of Viscosity, Capillarity and Surface Tension.
Fluid Pressure: Fluid Pressure at a point, Pascal's law, Variation of pressure with elevation, Hydrostatic law, Absolute, Gauge and Vaccum Pressures. Pressure measurement – Piezometers, Manometers and Pressure Gauges. Centre of Pressure, Forces on submerged surfaces, crest gates and lock gates.

UNIT II 14 Periods

Buyoancy and Floatation: Archimedes Principle- Buoyancy & Floatation - Stability of Floating Bodies- Centre of Buoyancy - Metacentric Height and its Determination.

Fluid Kinematics: Types of fluid flow, Velocity, Rate of flow, Continuity Equation, Streamline, Path line, Streak line, Local, Convective and Total Acceleration; One & Two Dimensional Flows. Stream Function, Velocity Potential- Rotational & Irrotational Flows, Laplace Equation, Flow net.

UNIT III 14 Periods

Fluid Dynamics: Energy possessed by fluid in motion, Euler's equation of motion - Bernoulli's equation. Energy correction factor.
Flow through orifices and mouth pieces: Types of orifices and mouth pieces, coefficient of contraction, velocity and discharge.
Flow through notches and weirs: Types of notches and weirs, Measurement of discharge.

UNIT IV 14 Periods

Impulse momentum equation – Momentum correction factor, Forces on pipe bends and reducers. Angular Momentum – Torque and work done; Sprinkler Problems.
Laminar Flow: Relation between shear and Pressure Gradients in Laminar Flow; Reynold's experiment; Critical velocity; Steady laminar flow through a circular pipe – Hagen Poiseuille's Law.

UNIT V 14 Periods

Flow through pipes: Flow measurement through pipes – Venturimeter, orificemeter, nozzle meter. Loss of head, head loss due to friction – Darcy –Weisbach equation, minor losses, Total Energy Line, Hydraulic Gradient Line. Pipes in Series, pipes in parallel. Problems on Two reservoir and three reservoir flows. Water hammer, surge tanks.

TEXT BOOKS:

1. Fluid Mechanics and Hydraulic Machinery by P.N. Modi & S.M. Seth, Standard Book House.
2. Fluid Mechanics by A.K. Jain, Khanna Publishers

REFERENCE BOOKS:

1. Hydraulics Fluid Mechanics and Fluid Machines, S.Ramamrutham, Dhanpat Rai Publishing Co.
2. Engineering Fluid Mechanics by K.L. Kumar, S. Chand & Co
3. Fluid Mechanics and Hydraulic Machines by R.K. Bansal, Laxmi Publications.
4. F M White, Fluid Mechanics, Tata McGraw Hill Publication 2011.

SURVEYING - II

CIV 224 **Credits : 3**
Instruction : 3 Periods & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

1. To measure the height and distance by theodolite.
2. To measure the angles and distances by using tacheometric and trigonometric methods.
3. To measure distances and angles by total station.

Course Outcomes:

By the end of the course the student will be able to

1. Learn to determine horizontal and vertical angles between points.
2. To impart experimental skills to determine heights and distances of inaccessible objects.
3. Apply surveying skills in aligning highways and railway curves.
4. Demonstrate the ability to solve surveying problems.
5. Gain the ability to use modern survey equipment (Total Station) to measure angles and distances.
6. Learn basics in GIS and GPS.

SYLLABUS

UNIT I 10 Periods

Theodolite Survey: Theodolite Component Parts, Classification, – Temporary Adjustments, Measurement of horizontal angle – Method of repitition, Method of reiterition – Uses of theodolities – Errors in theodolite or Permanent adjustments of a theodolite – Identification – Rectifying the errors.

UNIT II 12 Periods

Theodolite Traversing: Open and closed traverse – Closing errors, Balancing the error – Bowditch method – Transit method, Omitted measurements – Gales traverse table – Axis Signal Correction.
Trigonometric leveling: Elevation of the tower - Base of the object accessible and inaccessible – Reduced level of the elevated points – instrument axis at different levels.
Triangulation: Principle of triangulation - Purpose and classification of triangulation surveys – Layout of triangulation.

UNIT III 10 Periods

Tacheometry : Instruments - Principle of techeometry – Methods of Tacheometry - Stadia methods – Fixed hair method – Movable hair method – Tangential method – Subtanse bar – Beaman's stadia, Arc – Reduction diagrams or Triangulation – Classification - intervisibility of station – Signals and towers-base line measurements.

UNIT IV 12 Periods

Curves: Types of Curves - Simple curves – Elements of simple curves – Methods of setting simple curves – Rankines method – Two theodolite method – Obstacles in curve setting – Compound curves – Elements of compound curves or Reverse curves – Elements of reverse curve – Determination of various elements – Transition curves – Ideal shape – Spiral transition curves - length of transition curve - Setting out methods.

UNIT V 10 Periods

Modern Surveying Instruments: Electronic Theodolite, Introduction to geodetic surveying, EDM Instruments, Total station and global positioning system- Introduction to Geographic Information System (GIS)

TEXT BOOKS:

1. Surveying Vol.1,2 and 3 – By Punmia, Standard Book House.
2. Surveying By Dr. K.R. Arora, Standard Book House.

REFERENCE BOOKS:

1. Surveying Vol. 1and 2 – By S.K. Duggal. Tata Mc. Graw Hill Publishing Co.
2. A text book of Surveying by C.L. Kochhar, Dhanpatrai Publishing Company.
3. A Text Book of Surveying and Levelling by R.Agor, Khanna Publishers
4. Surveying and Levelling Vol. I & Vol. II by T.P Kanetkar and S.V Kulkarni, Vidyarthi Griha Prakashan, 1988
5. Principles of GIS for land resource assessment by P.A. Burrough –Clerendon Press, Oxford.

STRUCTURAL ANALYSIS - I

CIV 225 **Credits : 4**
Instruction : 4 Periods & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

1. Apply suitable methods for calculating deflections in statically determinate beams and trusses.
2. Apply suitable methods for analyzing statically indeterminate beams.
3. Analyze beams under moving loads.

Course Outcomes:

At the end of the course the student will be able to

1. Calculate deflections in statically determinate beams and trusses.
2. Analyze columns and struts under axial loading.
3. Calculate strain energy due to different types of forces.
4. Analyze statically indeterminate beams.
5. Analyze fixed and continuous beams.
6. Understand how shear force and bending moment vary with application of moving loads.

SYLLABUS

UNIT I 13 Periods

Combined bending and direct stresses: Resultant stress when a column of rectangular section is subjected to eccentric load along one axis and along both the axes- kern of a section.
Columns and Struts: Euler's theory – end conditions. Rankine – Gordon formula – other empirical formulae – Eccentrically loaded columns – Perry's formula, Secant formula.

UNIT II 15 Periods

Deflections of statically determinate beams: (a) Double integration method (b) Macaulay's method (c) Moment area method, (d) Conjugate beam method.

UNIT III 14 Periods

Strain energy: Expression for strain energy stored in body due to
(i) Axial load, (ii) Shear force, (iii) Bending Moment and (iv)Torque
Deflections of Statically Determinate Beams: (a)Unit load method (b) Castigliano's theorm – 1.
Deflections of Statically Determinate Trusses: (a) Unit load method (b) Castigliano's theorm – 1.

UNIT IV 14 Periods

Analysis of Statically Indeterminate Beams: (a) fixed beams, (b) three span continuous beams using (i) Theorem of three moments, (ii) Slope deflection method and (iii) Moment distribution method.

UNIT V 14 Periods

Moving loads and Influence lines: Maximum Shear force and Bending moment diagrams for different types of loads. Maximum Bending moment at a section under a wheel load and absolute maximum Bending moment in the case of several wheel loads. Equivalent uniformly distributed live load for Shear force and Bending moment.

TEXT BOOKS:

1. Theory of structures – Ramamrutham. Dhanpat rai Publishing company.
2. Theory of Structures by BC Punmia and Arun Kumar Jain and AK Jain, Laxmi Publications

REFERENCE BOOKS:

1. Theory of structures by S.P. Timoshenko and D.H. Young, McGraw Hill International Editions.
2. Basic Structural Analysis by CS Reddy, Tata McGraw Hill Education.
3. Analysis and Design of structures – Vazirani and Ratwani, vol 1, Khanna publishers.
4. Structural analysis by Thandavamoorthy, Oxford University Press.
5. Structural analysis by S.S.Bhavakatti. Vol I, Vikas Publishing House Pvt Ltd.

BUILDING PLANNING AND DRAWING

CIV 226 **Credits : 3**

Instruction : 1 Lecture & 3 Practical / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 60

Course Objectives:

1. To understand the principles of planning and bylaws.
2. To draw plan, elevation and section of load bearing and framed structures.
3. To prepare detailed drawings for doors, windows, etc.

Course Outcomes:

1. Understand various types of buildings and housing concept.
2. Apply the concepts of climatology and orientation of both residential and commercial buildings.
3. Apply the principles of planning and bylaws used for building planning.
4. Recommend appropriate planning for 2 Bed room and 3 Bed room houses.
5. Draw plan, elevation and section for various structures.
6. Design individual rooms with attention to functional and furniture requirements.

SYLLABUS

UNIT I 12 Periods

Climatology: Elements of climate: Sun, Wind, Relative Humidity, and Temperature. Mahoney Tables, Comfort conditions for house. Various types of Macroclimatic zones, Design of Houses and layouts with reference to climatic zones. Solar charts. Wind Roses, Ventilation.
Principles of Planning, Orientation of Buildings.

UNIT II 12 Periods

Design of Individual rooms with particulars attention to functional and furniture requirements (for internal evaluation only). Residential Buildings: Different types of Residential Buildings, Selection of site for residential buildings. Guidelines for planning and drawing of residential building. General Building regulations and Bye laws for Residential Buildings.

UNIT III 36 Periods

Drawing: At least ten sheets shall be drawn during the semester manually using mini-drafter/setsquares (along with AUTOCAD), (a) Conventional signs of materials, various equipment used in a Residential Building (copying exercise). Plan, Sectional Elevation, Front Elevation and site plan for the following.

(a) A Small House (One Room and Verandah) (Copying exercise), (b). Three bed roomed House in HOT and ARID zone, Hot and humid zone & Cold zone(copying exercise), (c) Houses with given Functional requirements and climatic data. Emphasis may be given to Hot and Humid (d) Duplex Type Houses.

Note:

1. AUTOCAD Drawings for internal assessment only.
2. The question paper consists of Part-A and Part-B. Part-A consists of 4 questions, 2 questions for each of Unit – I & II and Part-B consists of a compulsory question for 36marks

TEXT BOOKS:

1. Building Planning and Drawing by Dr.N. Kumara Swamy and A.Kameswara Rao, Charotar Publishing House.
2. Building Planning Drawing and Scheduling by Gurucharansingh and Jagadish Singh, Standard Publishers Distributors.

REFERENCE BOOK:

1. Building Drawing with an integrated approach to Built environment by M.G.Shah, C.M.Kale and S.Y.Patki, McGraw-Hill Publishing Company Limited, New Delhi.
2. Civil Engineering Drawing Series ‘B’ by R.Trimurty, M/S Premier Publishing House.

CONCRETE TECHNOLOGY LAB

CIV 227 **Credits : 2**
Instruction : 3 Practical / week Sessional Marks : 50
End Exam : 3 Hours End Exam Marks : 50

Course Objectives:

1. To apply the basic knowledge of civil engineering in selecting appropriate cement, fine and coarse aggregates in making concrete.
2. To be able to make concrete of required strength.

Course Outcomes:

At the end of this course student will be able to

1. Conduct quality control tests on cement.
2. Conduct workability tests on fresh concrete.
3. Design Concrete Mix.
4. Conduct quality control tests on hardened concrete.
5. Conduct quality control tests on coarse aggregates.
6. Conduct quality control tests on fine aggregates.

LIST OF EXPERIMENTS:

1. Specific gravity and unit weight of cement
2. Specific gravity and unit weight of coarse aggregates.
3. Specific gravity and unit weight of fine aggregates.
4. Fineness of cement,
5. Consistency of cement
6. Initial and final setting time of cement.
7. Compressive strength of cement (for different grades of cement).
8. Bulking of sand.
9. Sieve analysis of coarse and fine aggregates
10. Workability tests on fresh concrete by using: Slump cone, Compaction factor apparatus, Flow table, Vee-Bee Consistometer.
11. Compressive Strength of concrete
12. Split tensile strength of concrete
13. Modulus of rupture of concrete

REFERENCE BOOKS:

1. Properties of Concrete – AM Nevelli – 5th Ed, Prentice Hall Publishers, 2012.
2. Concrete Technology – M. S. Shetty – S Chand Co., Publishers – 2006.

FLUID MECHANICS LAB - I

CIV 228 **Credits : 2**
Instruction : 3 Practical / week Sessional Marks : 50
End Exam : 3 Hours End Exam Marks : 50

Course Objectives:

The objective of the course is to enable the student to calibrate different types of flow measuring devices to measure flow in tanks, pipes and open channels.

Course Outcomes:

At the end of this course student will be able to

1. Apply the dimensional analysis to design the experimental procedures.
2. Calibrate flow measuring devices such as orifice and mouth piece.
3. Calibrate the flow meters such as orifice meter, venturi meter and flow nozzle meter.
4. Calibration of meters used in channel flows such as trapezoidal and v notches.
5. Calibration of weirs, broad crested and sharp crested weirs.
6. Determine the time for emptying a tank through small orifice and a mouth piece.

LIST OF EXPERIMENTS:

1) Calibration of a small orifice by constant head method and falling head method
2) Time required for emptying the tank through the small orifice.
3) Calibration of a cylindrical mouth piece by constant head method and falling head method.
4) Time required for emptying the tank through the mouth piece.
5) Calibration of Venturi meter
6) Calibration of Orifice meter.
7) Calibration of Flow nozzle meter.
8) Calibration of a triangular V Notch
9) Calibration of a rectangular notch.
10) Calibration of a trapezoidal notch.
11) Experimental verification of laminar, transition and turbulent flows using Reynolds apparatus.
12) Verification of Bernoulli's Equation.

REFERENCE BOOK:

1. Fluid Mechanics and Hydraulic Machinery by P.N. Modi & S.M. Seth, Standard Book House.

SURVEYING FIELD WORK - II

CIV 229 **Credits : 2**

Instruction : 3 Practical / week Sessional Marks : 50

End Exam : 3 Hours End Exam Marks : 50

Course Objectives:

1. To know how to conduct the experiments by using different survey instruments.
2. To improve practical knowledge.

Course Outcomes:

At the end of this course student will be able to

1. Demonstrate an ability to conduct surveying for any infrastructure project.
2. Analyses data and report results.
3. Work in teams doing field work and computer analysis.
4. Demonstrate understanding of curve layout by setting a curve from more than a single point along the curve.
5. Compare and contrast textbook solutions with real world solutions.

LIST OF EXPERIMENTS:

1. To determine horizontal angle by repetition method
2. To determine horizontal angle by reiteration method
3. To determine the vertical angles.
4. To determine Reduced level of different points.
5. To determine height of the object when base is accessible and base inaccessible.
6. To determine the Tacheometric Constants.
7. To determine gradient between two points
8. Setting of simple curve using tape, Rankine's Method and Two theodolite Method
9. Study of Instrument – Determination of Distances, Directions and Elevations (Total Station)
10. Determination of Boundaries of a Field and computation of area using Total Station.
11. Determination of Heights of objects using Total Station.

REFERENCE BOOK:

1. B.C. Punmia, Ashok Kumar Jain, Ashok Kr. Jain, Arun Kr. Jain., Surveying I & II, Laxmi Publications, 2005.

TECHNICAL SEMINAR

CIV 2210 **Credits : -**
Instruction : 2 Practical / week Sessional Marks : -
End Exam : - End Exam Marks : -

Course Objectives:

The objective of this course is

1. To enhance the communication skills of the students through participation and giving seminars.
2. To develop an overview of civil engineering and its applications in the students.
3. To promote teamwork and lifelong learning among the students.

Course Outcomes:

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

1. Make presentation on a given topic related to civil engineering.
2. Improve the communication skills.
3. Broaden their knowledge about civil Engineering and its practical applications.
4. Update their knowledge on the latest developments in civil engineering.
5. Understand the environmental, safety, economical and sustainability aspects of any civil engineering structure.
6. Develop teamwork and lifelong learning skills.

OUTLINE OF SYLLABUS

Students have to prepare a Report on a case study, design or practical application in civil engineering and make a presentation in teams of maximum 2 students. Duration of each seminar shall be 20 minutes per team including discussion. Evaluation to be done by a Panel of Examiners nominated by HoD with at least one faculty member of specialization related to the seminar topic.

REFERENCES:

1. National & International Journals / Standard Magazines / Reports / Case Studies in civil engineering.
2. NPTEL courses in civil engineering.
3. World Wide Web resources on state of the art in civil engineering.