ESTD: 1980

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to Andhra University, Visakhapatnam), (Recognised by AICTE, New Delhi)
Accredited by NAAC with 'A' Grade
Recognised as Scientific and Industrial Research Organisation
CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

SCHEME OF INSTRUCTION & EXAMINATION

(Regulation R16)

II/IV B.TECH

(With effect from **2016-2017** Admitted Batch onwards)
Under Choice Based Credit System

CIVIL ENGINEERING

I-SEMESTER

Code No.	Course	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Total Contact Hrs/Week	Sessional Marks	Exam Marks	Total Marks
B16 ENG 2101	Mathematics –IV	4	3	1	--	4	30	70	100
B16 CE 2101	Engineering Mechanics	4	3	1	--	4	30	70	100
B16 CE 2102	Mechanics of Solids	4	3	1	--	4	30	70	100
B16 CE 2103	Fluid Mechanics-I	4	3	1	--	4	30	70	100
B16 CE 2104	Surveying	4	3	1	--	4	30	70	100
B16 ENG 2103	Environmental Studies	2	3	1	--	4	30	70	100
B16 CE 2105	Strength of Materials Laboratory	2	--	--	3	3	50	50	100
B16 CE 2106	Surveying Field Work	2	--	--	3	3	50	50	100
B16 ENG 2104	English Proficiency	2	1	1	--	2	50	50	100
B16 CE 2107	Auto CAD	1	--	--	2	2	50	--	50
Total		**29**	**19**	**7**	**8**	**34**	**380**	**570**	**950**

II/IV B.Tech-I Sem
CIVIL

Code: B16 ENG 2101

MATHEMATICS – IV
(Common to CIV,ECE,EEE & ME)

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

Students learn
1. The concepts of Gradient, Divergence, Curl, Directional derivative, solenoidal and Irrotational fields
2. Green's, Stokes' and Divergence theorems
3. Classification of 2^{nd} order Partial Differential Equations as well as solution of 1-Dimensional Wave equation and 1-Dimensional Heat equation
4. the concept of Analytic function, CR equations
5. Cauchy's Integral Theorem and Integral Formula
6. Taylor and Laurent series, Residues and Residue theorem

Course Outcomes:

Students will be able to
1. Apply the concepts of Gradient, Divergence, Curl, Directional derivative, solenoidal and Irrotational fields
2. Determine scalar potential, circulation and work done
3. Evaluate integrals using Green's, Stokes' and Divergence theorems
4. Obtain the solution of 1-D wave equation and 1-D heat equation
5. Determine the zeroes and poles of functions and residues at poles
6. Evaluate certain real definite integrals that arise in applications by the use of Residue theorem

SYLLABUS

Vector Calculus-1

Definitions of Scalar and Vector point functions, Differentiation of vectors, Vector differential operator del, Del applied to scalar point function – gradient, Del applied to vector point function- divergence and curl, physical interpretation of gradient, divergence and curl(without proof), Del applied twice to a point function, Del applied to product of two functions, Irrotational and Solenoidal Fields, scalar potential

Vector Calculus-2

Integration of vectors, line integral, circulation, work done, surface integral, Flux, Green's, Stokes' and Gauss Divergence Theorems (Without proofs). Introduction to orthogonal curvilinear coordinates, cylindrical polar coordinates and spherical polar coordinates.

Applications Of Partial Differential Equations

Classification of second order partial differential equations, Method of separation of variables, One –dimensional wave equation- vibrations of a stretched string (no derivation)-, one-dimensional heat equation – Heat flow along a long horizontal bar (no derivation) (problems on heat equation involving homogeneous end conditions only), two dimensional Laplace equation in Cartesian coordinates.

Complex Variables-1

Review- Cartesian form and polar form of a complex variable, Real and imaginary parts of z^n , e^z, sin z, sinh z and log z **.**

Limit and continuity of a function of the complex variable, derivative, analytic function, properties of Analytic functions, Cauchy- Riemann equations, Harmonic functions and Orthogonal system, application of analytic function to flow problems, geometric representation of w=f(z), conformal mapping – Bilinear transformation only.

Complex Variables-2

Integration of complex functions, Cauchy's theorem, Cauchy's integral formula (statements only) . Taylor and Laurent series expansions of functions (statement of theorems only), zeros and singularities, Residue, calculation of residues, Cauchy's Residue theorem (without proof), Evaluation of real and definite integrals- integration around a unit circle

Text Book:

1. "Higher Engineering Mathematics", by Dr.B.S.Grewal, 43rd Edition, Khanna Publishers.

Reference Books:

1. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley.
2. A text book of Engineering Mathematics, by N.P.Bali and Dr. Manish Goyal, Lakshmi Publications.
3. Advanced Engineering Mathematics, by H.K.Dass, S.Chand Company.
4. Higher Engineering Mathematics, by B.V.Ramana, Tata Mc Graw Hill Company.
5. Higher Engineering Mathematics, by Dr. M.K.Venkatraman, The National Publishing Company.

Code: B16 CE 2101

ENGINEERING MECHANICS

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives

Students learn

1. The course uses the Laws of Mechanics to predict forces in and motions of machines and structures.
2. The course is the key prerequisite course to sequences of courses dealing with mechanics of machines, stress analysis and design of mechanical systems.
3. Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.
4. In-depth understanding of specialist bodies of knowledge within the engineering discipline.
5. Application of established engineering methods to complex engineering problem solving.
6. Application of systematic engineering synthesis and design processes.

Course Outcomes

Students will be able to

1. Analyse 2-D and 3-D force systems by scalar and vector approaches .
2. Analyse for forces in different types of Determinate trusses by 'Method of sections' and 'Method of joints'.
3. Apply method of virtual work to statically determinate structures
4. Distinguish between rectilinear, curvilinear motion of particles and plane motion of rigid bodies .
5. Utilise the principles of kinematics and kinetics for physical bodies .
6. Solve engineering problems .

SYLLABUS

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.

Forces in plane only:
Concurrent forces in plane – principles of statics –composition and resolution of forces – equilibrium of concurrent forces in a plane – method of projections – equilibrium of three forces in a plane –method of moments – friction.

Parallel forces in plane :

Two parallel forces – general case of parallel forces in a plane –centre of parallel forces and center of gravity – centroids of composite plane figures and curves – distributed force in a plane.

General case of forces in a plane :

Composition of forces in a plane – equilibrium of force in a plane – Analysis of statically determinate trusses by (a) Method of joints and (b) Method of sections.

Virtual work:

Introduction – concept of virtual work –Equilibrium of ideal system – application of virtual work on beams(simply supported ,cantilever, continuous beams)carrying point load and uniformly distributed loads.

Kinematics of particles:

Introduction of dynamics – rectilinear motion of particles – curvilinear motion of particles.
Kinetics of particles – introduction – Newton's second law of motion – linear momentum of a particle – equations of motion – dynamic equilibrium –equations of motion in terms of radial and transverse components
Energy and momentum methods – introduction – kinetic energy of a particle – principle of work and energy – conservation of energy – principle of impulse and momentum – impulsive motion – impact–direct central impact– problems solving energy and momentum.

Kinematics of rigid bodies:

Introduction – translation – rotation about a fixed axis – equation of rotation of fixed body about a fixed axis – general plane motion –plane motion of rigid bodies –equation of motion for a rigid body – D'Alembert's principle of plane motion.
Energy and momentum methods – introduction – principle of work and energy for a rigid body – forces acting on rigid body – kinetic energy of rigid body in plane motion – conservation of energy – principle of impulse and momentum for the plane motion of a rigid body

Text Books:

1. Engineering Mechanics by Timoshenko and D.H. Young., Tata Mcgrawhill
2. Mechanics for Engineers Statics and Dynamics by F.B. Beer and E.R. Johnston , McGraw-Hill Professional

Reference Books:

1. Engineering Mechanics by Singer, BS Publications
2. Engineering mechanics by Bhavikatti, New Age International Publishers
3. Engineering mechanics by J.L Meriam , John Wiley & Sons (Asia) Pvt. Ltd.

Code: B16 CE 2102

MECHANICS OF SOLIDS

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives

Students learn

1. To introduce the concepts of stress,strain and elastic constants and their relations
2. To familiarize with shear force,bending moment and torsion induced and shear stresses and bending stresses developed for different sections of beams and shafts
3. To impart the knowledge on the concept of Principal Stresses and principal strains
4. To Familiarize with stresses and strains induced in columns

Course Outcomes:

Students will be able to

1. Summarise the behaviour of basic materials under the influence of different external loading conditions and support conditions.
2. Determine shear Force and Bending moments in statically determinate Beams and draw the Diagrams.
3. Examine the different methods to find slope and deflection of beams subjected to loads
4. Estimate the principal stresses & strains and torsional stresses in structural members
5. Evaluate the crippling load for columns with different end conditions.

SYLLABUS

Simple stresses & Strains:

Definitions of stress and strain – types of stresses and strains – Elasticity – Hooke's law – Stress – Strain diagram for Mild steel – working stress- factor of safety- Lateral strain – Poisson's ratio and volumetric strain – Elastic Moduli and the relationship between them – Bars of varying section – composite bars – temperature stresses.

Strain Energy:

Definition – Resilience – SE due to gradually applied; Suddenly applied and impact loads – simple applications.

Shear Force & Bending Moment Diagrams:

Definition of beam – Types of beams – concept of SF and BM – SF &BM diagrams for cantilever, SS and overhanging beams subjected point loads, UDL, Uniformly varying loads and combination of these loads – point of contraflexune – Relationship b/w S.F, BM and rate of loading.

Flexural Stresses:

Theory of simple Bending – Assumptions–Derivation of Bending equation - ($\frac{M}{I} = \frac{F}{Y} = \frac{E}{R}$)

Neutral axis – Determination of bending stresses – section modulus of rectangular, & Circular sections (Solid and Hollow), I,T, channel sections – Design of simple beam sections.

Shear Stresses
Derivation of shear stress formula – shear stress distribution across various beam sections like rectangular, circular, Triangular, I, T, angle sections, built up beams, Definition of shear centre.
Deflections of Beams: (i) Cantilever (ii) Simply supported and (iii) Over hanging beams using (a) Double integration and (b) Macaulay's method.

Principal Stresses and strains:
Introduction-stresses on an inclined section of a bar under axial loading- compound stresses-Normal and tangential stresses on an inclined plane for biaxial stresses-Two perpendicular normal stresses accompanied by a state of simple shear-Mohr's circle of stress-Principal planes and principal stresses- Construction of Mohr's Circle (graphical Method)

Torsion of Circular Shafts:
Theory of pure Torsion – Derivation of Torsion equation ($\frac{T}{J} = \frac{\tau\, max}{R} = \frac{G\theta}{l}$) – Torsional moment of Resistance – polar section Modulus – power transmitted by a shaft – combined bending and torsion.

Springs

Types of springs – springs in series and parallel – close coiled helical springs.

Buckling of columns:

Introduction – short, medium and long columns – axially loaded compression members – crushing load – Buckling load (or) critical load (or) crippling load – Euler's theory for long columns – Assumptions – Derivations of Euler's critical load formula for various end conditions – Effective length of column – slenderness ratio – limitations of Euler's Theory – Rankine formula – for both long and short columns – column subjected to Eccentric loading – Euler's Method and prof. Perry's formula.

Text Books:

1. Strength of materials by Ramamrutham , Dhanpat rai publishing Company
2. Strength of materials by Vazrani and Ratwani , Khanna Publishers

Reference Books:

1. Elements of strength of materials by Timoshenko and Young.,East West press private Ltd
2. Introduction to mechanics of solids by Popov. Englewood cliffs N.J Prentice Hall
3. Strength of materials by Dr R.K.Bansal, Laxmi Publications (p) Ltd
4. Strength of materials by S.S.Bhavikatti, Vikas Publishing house (p) Ltd

Code: B16 CE 2103

FLUID MECHANICS- I

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course objectives

Students learn

1. A foundation in the fundamentals of fluid mechanics
2. Develop an appreciation for the properties of Newtonian fluids
3. Study analytical solutions to variety of simplified problems
4. Understand the dynamics of fluid flowsand the governingvnon-dimensional parameters
5. Apply concepts of mass,momentum and energy conservation to flows.
6. Apply fundamental principles of fluid mechanics for the solution of practical civil engineering problems of water conveyance in pipes , pipe networks

Course Outcomes

Students will be able to

1. Define fundamental concepts of fluid mechanics as applied to civil engineering and environmental problems
2. Discuss and derive the fundamental mathematical equations of fluid mechanics
3. Solve the problems of water conveyance in pipes, orifices, mouthpieces, notches and weirs
4. Apply conservation laws to derive governing equations of fluid flows
5. Compare hydrostatic and hydrodynamic forces
6. Analyze and design simple pipe systems

SYLLABUS

Fluid Properties and Fluid Statics:

Introduction & Physical Properties of Fluids – Definition of Fluid, Fluid as Continuum; Mass Density, Specific Weight, Specific Gravity, Specific Volume, Bulk Modulus, Compressibility, Vapour Pressure, Cavitation, Viscosity – Newton's Law of Viscosity, Rheological Diagram ; Capillarity and Surface Tension.

Fluid Statics, Pressure and its measurement

Forces Acting on a Fluid Element – Pascal's law; Variation of Pressure in Static Fluid; Absolute, Gauge and Total Pressure; Pressure Measurement – Piezometers, Manometers, Micro-manometers, Mechanical Gauges and Pressure Transducers.

Forces on Immersed Bodies in Static Fluids –

Force on a Plane Surface – Centre of Pressure; Pressure Diagram; Forces on Curved Surfaces; Forces on radial Crest Gates and Lock Gates. Buoyancy & Floatation – Archimedes Principle; Stability of Floating Bodies – Centre of Buoyancy, Metacentric Height and its Determination.

Liquids in Relative Motion
Pressure of Liquids in a Container Subjected to Linear Acceleration and Rotation.

Fluid Kinematics and Conservation of Mass:
Types of Fluid Flow & Methods of Fluid Flow Analysis – Methods of Describing Fluid Motion; Types of Flow – Steady & Unsteady Flows, Uniform & Non-uniform Flows, free and forced vortex motions, Laminar & Turbulent Flows; Streamline, Path line, Streak line; Stream Surface – Stream Tube.

Fluid Kinematics
Translation, Deformation and Rotation of a Fluid Element in Motion; Local, Convective and Total Accelerations; One, Two & Three Dimensional Analysis of Flows.
Ideal Fluid Flow – Stream Function, Velocity Potential; Rotational & Irrotational Flows – Vorticity & Circulation; Laplace Equation in terms of Stream Function and Velocity Potential; Flow Nets.

Principle of Conservation of Mass –
Concepts of System and Control Volume; Continuity Equation in three dimensional Cartesian coordinates; Continuity Equation for flow through a Stream tube.

Fluid Dynamics:
Principle of Conservation of Energy – Equation of Motion for Ideal Fluids, Euler's Equation in Streamline Coordinates, Derivation of Energy Equation through integration of Euler's Equation, Bernoulli's Equation, Energy Correction Factor. Flow measuring devices – Flow Measurement in Pipes – Measurement of Static, Stagnation and Dynamic Pressures and Velocity – Pitot Tube, Prandtl Pitot Tube; Measurement of Discharge through a Pipe using Flow Meters – Venturimeter, Flow Nozzle meter and Orifice meter.

Flow through Tanks and Reservoirs
Measurement of Discharge from Tanks and Reservoirs – Steady and Unsteady Flow through Orifices and Mouthpieces – Small & Large Orifices – Different types of Mouthpieces; Discharge from tanks through Drowned Orifices, Time of Emptying Tanks, Discharge from a Tank with Inflow.

Flow Measurement in Channels
Flow Measurement in Open Channels, Flow Past Weirs and Notches, Sharp Crested and Broad Crested Weirs, Weirs with and without end contractions, Ventilation of Weirs, Triangular Notches, Cipolletti Weir.

Principle of Conservation of Momentum
Momentum of Fluids in Motion, Impulse Momentum Equation, Momentum Correction Factor. Application of Momentum Principle – Forces on Pipe Bends and Reducers, Flow through a Nozzle; Angular Momentum of fluid flow – Sprinkler Problems.

Flow through Pipes:
Introduction to Pipe Flow and Laws of Friction – Reynolds Experiment; Steady Turbulent Flow through Pipes; Laws of Friction; Darcy-Weisbach Equation.

Total Energy and Hydraulic Gradient
Energy and Hydraulic Gradient Lines; Minor Losses in Pipes; Pipes in Series and Parallel – Equivalent Length of Pipe.

Flow between Two reservoirs;
Three Reservoir Problems; Distribution Mains; Working Pressures, Design Pressure and Test Procedures; Choice of Pipe Material; Siphon; Pipe Network Analysis by Hardy-Cross Method; Hydraulic Power Transmission through Pipes and Nozzles, Water hammer (only concept).

Text Books:

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

Reference Books:

1. Engineering Fluid Mechanics Kumar, K.L., S. Chand & Co. Ltd.
2. Engineering Hydraulics, Rouse, H., John Wiley & Sons Inc.
3. Mechanics of Fluids, Shames, I.H., McGraw-Hill Professional

Code: B16 CE 2104

SURVEYING

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

Students learn

Student shall be able to
1. Learn and understand the basic methods of classifications and principles of surveying.
2. Learn how to differentiate the methods of area calculation used in surveying.
3. Differentiate the Angles and Bearings and able to identify direction of a line
4. Describe Plane tabling methods of Surveying
5. Construct the Leveling methods to identify Elevation of the required points
6. Differentiate the usage of Minor Instruments in surveying.

Course Outcomes:

After the completion of the course student should be able to

1. Appreciate the importance of preparation of Map and Plan for required site with suitable scale.
2. Prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment.
3. Judge on which type of instrument to be used for carrying out survey for a specific work
4. Describe different modern instruments used in surveying.

SYLLABUS

Introduction:
Classification and principles of surveying. Triangulation and Trilateration Earth as spheroid, datum, geoid, Azimuth, latitude, longitude, Map projections, scales, plans, & Maps. Chain surveying: Instrumentation for chaining – Errors due to incorrect chain-Chaining on uneven 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

Compass Survey :
(a) 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.
(b) 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.

Plane table surveying:
Introduction-Advantages, Accessories-Working operations such as fixing the table to tripod, levelling-centering-orientation by back-sighting. Methods of plane tabling-Plane table traversing-Three point problem – Mechanical method – Graphical method – Two point problem-Errors in plane tabling.

Levelling :
Definitions of terms-Methods of levelling-Uses and adjustments of dumpy level-Temporary and permanent adjustments of dumpy level levelling staves-Differential leveling, Profile levelling-Cross sections-Reciprocal levelling. Precise levelling-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 levelling-Errors in levelling.

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

Contouring:
Definitions-Interval, Characteristics of contours-methods of locating contours. Direct and indirect methods-interpolation of contours-Contour gradient-Uses of contour maps. Contours mapping using computer techniques (surfer, CAD)

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. Surveying: Theory & Practices by James M. Anderson and Edward M. Mikhail

Code: B16 ENG 2103

ENVIRONMENTAL STUDIES
(Common to CIV, CSE & IT)

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period.**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs**	**Credits**	**: 2**

Course Objectives:

Students learn

1. To develop an awareness and sensitivity to the total environment and its related problems.
2. To participate actively participation in environmental protection and improvement.
3. To develop skills for active identification and development of solutions to environmental problems
4. To evaluate environment programmes in terms of social, economic, ecological and aesthetic factors.
5. To Create a "CONCERN AND RESPECT FOR THE ENVIRONMENT"

Course Outcomes:

Students will be able to

1. Get awareness among the students about the nature and natural ecosystems.
2. Learn sustainable utilization of natural resources like water, land, minerals, air.
3. Learn resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation.
4. Safe guard against industrial accidents particularly nuclear accidents.
5. Learn Constitutional provisions for the protection of natural resources.

SYLLABUS

Global Environmental Crisis:

Environmental Studies - Definition, Scope and importance, Need for public awareness. Global Environmental Crisis

Ecosystems:

Basic concepts, Forest Ecosystems, Grassland Ecosystems and Desert Ecosystems, Aquatic Ecosystems

Biodiversity:

Introduction to Biodiversity**,** Value of Bio-diversity, Bio-geographical classification of India, India as a Mega-diversity habitat, Threats to biodiversity, Conservation of Biodiversity: In-situ and Ex-situ conservation of bio-diversity.

Environmental and Natural Resources Management:

Land Resources: Land degradation, soil erosion and desertification, Effects of modern agriculture **Forest Resources:** Use and over exploitation-Mining and Dams-their effects on forest and tribal people, **Water resources**: Use and over utilization of surface and ground water, Floods, droughts, conflict over water, water logging and salinity, dams – benefits and problems

Energy Resources: Renewable and non-renewable energy sources, use of alternate energy sources-impact of energy use on environment.

Environmental Pollution:

Causes, Effects and Control measures of - Air pollution, Water pollution, Soil pollution, Marine Pollution, Thermal pollution, Noise pollution, Nuclear Hazards; Climate change and global warming, acid rain and Ozone layer depletion.

Environmental Problems in India:

Drinking water, Sanitation and Public health, population growth and environment; Water Scarcity and Ground Water Depletion; Rain water harvesting, Cloud seeding and Watershed management.

Text Books:

1. Environmental Studies (From Crisis to Cure) by R. Rajagopalan, Oxford university Press, 2008
2. Environmental Studies by Anubha Kaushik & C.P. Kauskik, New Age International (P) Ltd, New Delhi, 2006

Reference Books:

1. Environmental Sciences by G.Tyler Miller, JR,10th ed, Thomson publishers, 2004

Code: B16 CE 2105

STRENGTH OF MATERIALS LABORATORY

Lab	**: 3 Periods**	**Sessionals**	**: 50**
Exam	**: 3 Hrs**	**Ext. Marks**	**: 50**
		Credits	**: 2**

Course Objectives:

Students learn

1. To introduce various strength and strain measuring equipments
2. To determine various physical, mechanical properties and strength of various engineering materials

Course Outcomes:

Students will be able to

1. Illustrate the stress strain relationship for Mild steel/ HYSD bars (K2)
2. Inspect wood samples for compressive strength (K4)
3. Determine modulus of rigidty of spring
4. Measure the hardness of metals by BHN, Rockwell & Vicker's
5. Relate bolts subjected to double shear
6. Estimate the Impact reesistance of materials by Charpy & Izod tests
7. Distinguish simply supported beam and cantilever beam and determine the youngs modulus of beam material
8. Solve coplanar force system

LIST OF EXPERIMENTS

1. Tension test on Mild/ HYSD bars.
2. Compression test on wood (parallel and perpendicular to grains).
3. Tests on springs for the determination of rigidity of modulus and spring constant.
4. Brinell's and Rockwell hardness tests.
5. Charpy and Izod impact tests.
6. Double shear test on mild steel specimen.
7. Bending test : Load deflection test for the determination of young's modulus on simply supported and cantilever beam for wood and steel.
8. Verification of Maxwell's reciprocal theorem.

Reference Books:

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

Code: B16 CE 2106

SURVEYING FIELD WORK

Lab	**: 3 Periods**	**Sessionals**	**: 50**
Exam	**: 3 Hrs**	**Ext. Marks**	**: 50**
		Credits	**: 2**

Course Objectives:

Student shall be able to

1. Understand and apply the basic methods of Chain Surveying.
2. Understand and apply the basic methods of Compass Surveying.
3. Summarize the different methods of Plane Table Surveying
4. Observe and report the different types of Leveling.

Course Outcomes:

After the completion of the course student should be able to

1. Apply the linear measurement in simple Boundary Surveys.
2. Identify direction of any line using compass survey.
3. Judge on which type of instrument to be used for carrying out survey for a specific work
4. Prepare contour maps and estimate the quantities.

LIST OF EXPERIMENTS

1. Chain Surveying

a. Introduction of instruments used for chain survey, Folding and unfolding of chain-Line ranging (direct method)-Pacing.
b. Chain traversing –Preparation of plan of a residential building by making use of chain, ranging rods, by oblique off-set method, introduction of check line.
c. Preparation of residential building by perpendicular offset, introduction of tie lines.
d. Finding the distance between inaccessible points by making use of chain, cross staff, tape, ranging rods; Arrows and field problems of obstacles to chaining.

2. Compass Survey.

a. Introduction to prismatic compass-Temporary adjustments.
b. Finding the distance between inaccessible points by making use of compass, tape and ranging rods.
c. Compass traversing-plotting of a residential building.

3. Plane Table Survey.

a. Introduction to plane table-Use of its accessories: Two & Three Point Problem.
b. Finding the distance between inaccessible points by making use of plane table, its accessories-Ranging rods and tape.

4. Levelling.

a. Introduction to dumpy level, levelling staff. Reading of level staff, temporary adjustments of dumpy level.
b. Introduction to fly levelling-Booking the readings by height of collimation method.
c. Introduction to fly levelling-Booking the readings by rise and fall method-To find closing error.
d. Check levelling.- L.S. & C.S. of a road profile.
e. Preparation of contour plan for an open area by taking level of the site.
1. Field work examination, for sessional marks.

Reference Books:

1. B.C.Punmia , Ashok Kumar jain , Arun kr. Jain , Surveying I & II ,Laxmi publications

Code: B16 ENG 2104

ENGLISH PROFICIENCY
(Common to All Branches)

Theory	**: 1 Period**	**Sessionals**	**: 50**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 50**
Exam	**: 3 Hrs.**	**Credits**	**: 2**

AIM:

Enriching the communicative competency of the students by adopting the activity-based as well as the class-oriented instruction with a view to facilitate and enable them to enhance their language proficiency skills.

Course Objectives:

Students be able to

1. Understand the importance of professional communication.
2. Learn language skills and vocabulary in order to improve their language competency.
3. Know and perform well in real life contexts.
4. Identify and examine their self-attributes which require improvementand motivation.
5. Build their confidence and overcome their inhibitions.
6. Improve their strategies in reading skills.

Course Outcomes:

1. Students enhance their vocabulary and use it in the relevant contexts .
2. They improve speaking skills.
3. They learn and practice the skills of composition writing.
4. They enhance their reading and understanding of different texts.
5. They enrich their communication both in formal and informalcontexts.
6. They strengthen their confidence in presentation skills.

SYLLABUS

Speaking Skills
PPT
Describing event/place/thing
Picture Description
Extempore
Debate
Telephonic Skills
Analyzing Proverbs

Vocabulary
Affixes
Pairs of Words

Reading Skills
Reading Comprehension
Reading/Summarizing News Paper Artic

Writing Skills
Designing Posters
Essay writing
Resume Writing

Reference Books:

1. Interchange (4th edition) Student's books 1&2 by Jack C. Richards, CUP.
2. Fundamentals of Technical Communication by Meenakshiraman, Sangeta Sharma of OUP
3. English and Communication Skills for Students of Science and Engineering, by S.P.
4. Dhanavel, Orient Blackswan Ltd. 2009
5. Enriching Speaking and Writing Skills, Orient Blackswan Publishers
6. The Oxford Guide to Writing and Speaking by John Seely OUP

(***Note: Sessional Marks will be evaluated based on Continuous Comprehensive Evaluation of the students' Performance - 40M, Attendance – 10M and External Marks will be evaluated based on Presentation Skills – 30M, Project 20M)

Code: B16 CE 2107

Auto CAD

Lab	**: 2 Periods**	**Sessionals**	**:50**
Exam	**: 3 Hrs.**	**Credits**	**: 1**

Course Objectives:

1. Increase ability to communicate with the people.
2. Learn to sketch and take field dimensions.
3. Learn basic AutoCAD skills.
4. Learn basic engineering drawing formats.
5. Prepare the student for future Engineering positions.

Course Outcomes:

1. Student's ability to perform basic sketching techniques will improve.
2. Student's ability to use architectural and engineering scales will increase.
3. Student's ability to produce engineered drawings will improve.
4. Student's ability to convert sketches to engineered drawings will increase.
5. Student's will become familiar with office practice and standards.
6. Student's will become familiar with AutoCAD two dimensional drawings.
7. Student's will develop good communication skills and teamwork.

SYLLABUS

Fundamentals of Computers

- Introduction
- Computer Hardware and Software Concepts
- Introduction of Personal Computer and Operating SystemsWINDOWS-XP,Windows-7,File Management

Drawing using AutoCAD

- Starting a New Drawing/Opening an existing drawing
- Drawing Commands
- Hatching Command Text (multi-line & single line) and Formatting Text Styles
- View Commands & Drawing Settings and Aids
- Modify Commands
- Dimension Command Formatting Dimension Style and Multi-leader Style
- Drawing Settings and Aids
- Saving and Plot

Reference Books:

1. Learning Auto CAD 2010 Volume-I , Autodesk.
2. Auto CAD 2013 fundan1entals- Elisen1oss, SDC Publications

(Note: Total Marks will be evaluated based on Continuous Evaluation - 25 Marks, Design Contest -25 Marks)

SCHEME OF INSTRUCTION & EXAMINATION
(Regulation R16)

II/IV B.TECH
(With effect from **2016-2017** Admitted Batch onwards)
Under Choice Based Credit System

CIVIL ENGINEERING

II-SEMESTER

Code No.	Course	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Total Contact Hrs/Week	Sessional Marks	Exam Marks	Total Marks
B16 CE 2201	Analysis of Structures	4	3	1	--	4	30	70	100
B16 CE 2202	Reinforced Concrete Structures	4	3	1	--	4	30	70	100
B16 CE 2203	Fluid Mechanics-II	4	3	1	--	4	30	70	100
B16 CE 2204	Building Planning & Design	4	2	--	3	5	30	70	100
B16 CE 2205	Advanced Surveying Methodologies	4	3	1	--	4	30	70	100
B16 CE 2206	Engineering Geology	4	3	1	--	4	30	70	100
B16 CE 2207	Total station and Geomatics lab	2	--	--	3	3	50	50	100
B16 CE 2208	Engineering Geology Lab	2	--	--	3	3	50	50	100
B16 CE 2209	Fluid Mechanics Lab-I	2	--	--	3	3	50	50	100
B16 CE 2210	Industry Oriented Technology Lab	1	--	--	2	2	50	--	50
	Total	**31**	**17**	**5**	**14**	**36**	**380**	**570**	**950**

Code: B16 CE 2201

ANALYSIS OF STRUCTURES

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives

Students learn

1. To familiarize with the deflection of simple determinate beams
2. To Familiarize with stresses and strains induced in Thin& Thick cylinders
3. To impart knowledge on various energy methods and theories of failure
4. To analyze the propped cantilever and fixed beams
5. To determine the deflections of determinate beams using energy methods
6. To draw the influence lines and moving loads for statically determinate beams
7. To analyze the statically indeterminate structures using energy methods

Course Outcomes:

Student will be able to :

1. Determine deflections in determinate beams by different methods(K5)
2. Evaluate the strain energy for structural members subjected to different loads(K5)
3. Analyse different indeterminate beams for BM and SF by different methods of analysis(K4)
4. Determine reactions, BM & SF in beams subjected to moving loads. (K5)
5. Distinguish between thin and thick cylinders and understand different failure theories.(K4)

SYLLABUS

Deflections of Beams using (i) Moment area method, (ii) Conjugate beam method, (iii) Unit load method, (iv) Castigliano's theorem-1.

Strain- energy due to (i) Axial load (ii) Bending Moment (iii) Shear force and (iv) Torque

Deflections of Statically Determinate Structures: (a) Single storey, single bay rectangular portal frames using (i) Unit load method, (ii) Castigliano's theorem-1. (b) Trusses (having 9 members or less) using (i) Unit load method, (ii) Castigliano's theorem-1.

Propped Cantilevers:

Analysis of propped cantilever by method of consistent deformation.

Fixed Beams:

Fixed end moments for beams of uniform section for different types of loading; Effect of sinking of support; effect of Rotation of a support; BMD for fixed beam.

Analysis of continuous beams by

1. Theorem of three moments
2. Slope deflection method
3. Moment distribution method
4. Kani's method.

Influence Lines:
Definition – Influence line for Reaction, SF and BM-Load position for Max SF at a section – Load position for max BM at a section- Single point load, U.D.L longer than the span, U.D.L. shorter than the span- Focal length.

Moving Loads:
Introduction – Max SF and BM at a given section and absolute Max SF and BM due to single concentrated load, U.D.L. longer than the span, U.D.L. shorter than the span, two point loads with fixed distance between them and several point 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 load.

Thin cylinders :
Calculation of longitudinal and hoop stresses in thin cylinders subjected to internal pressure, Wire wound thin cylinders.
Thick cylinders- Lame's theory, Compound tubes.

Theories of failures (i) Maximum Principal stress theory, (ii) Maximum Principal strain theory, (iii) Maximum shear theory (iv) Maximum strain energy theory and (v) Maximum distortion theory.

Text Books:

1. Structural Analysis Volume _II By Vazrani and Ratwani , Khanna Publishers
2. Strength of Materials – Ramamrutham, Dhanpat Rai Publishing Company

Reference Books:

1. Elementary strength of materials – Timoshenko and Young , East west press Pvt Ltd
2. Strength of materials by Dr. R.K. Bansal ,Laxmi Publications (p) Ltd
3. Strength of materials – Volume – I by S.S.Bhavikatti , Vikas Publishing house (p) Ltd

Code: B16 CE 2202

REINFORCED CONCRETE STRUCTURES

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:
Students learn to

1. Explain concept of limit state of collapse in flexure,shear,torsion & compression. (K2)
2. Estimate ultimate moment of resistance of singly, doubly reinforced rectangular beams and flanged beams by using Limit state Method.(K3)
3. Design flexural members such as singly, doubly, flanged, reinforcedrectangular beams,one way and two way rectangular slabs and staircase by using Limit state Method. (K4)
4. Design and detailing of members subjected to flexure,bond, shear and torsion by using Limit state Method.(K4)
5. Design axially loaded compression members and combined action of axial load with uniaxial bending and bi-axial moments isolated square and rectangular footing by using Limit state Method. (K4)

Course Outcomes:

1. Student should be able to understand and Design theSuper structure and sub structure elements.

General : Loading standards as per IS 875, Grades of steel and cement, Stress- Strain characteristics of concrete and steel, Introduction to working stress method and Limit State Method (L.S.D.) of design.
Limit State of Collapse of in Flexure: Introduction and Principles of L.S.D., Characteristic load and strengths, Design values, Partial safety factors, Factored loads.

Limit State of Collapse: Under reinforced, Balanced and over reinforced sections. Compression stress block, Analysis of singly reinforced rectangular section, Doubly reinforced rectangular section and singly reinforced flanged sections. Guide lines for choosing width, depth and percentage of reinforcements in beams. Design of singly reinforced rectangular section, Doubly reinforced rectangular section and singly reinforced flanged sections. Curtailment of flexural tension reinforcement.

Shear, Torsion and Bond: Limit state of collapse in shear, Modes of cracking, shear transfer mechanisms, shear span - depth ratio, shear failure modes. Nominal shear stress, critical sections for shear design, types of shear reinforcement. Truss analogy. General procedure for design of rectangular beams for shear. Limit state of collapse in torsion, Torsional shear stress in rectangular and flanged sections. Reinforcement in member subjected to torsion in RC beams. Design of RC beams subjected to combined effect of bending, shear and torsion. Concept of bond, development length, anchorage, bond, flexural bond.

Design of slabs: One way and Two-way action of slabs, Choosing slab thickness. Design of one way slab. Design of restrained and unrestrained Two way slabs as per I.S. code provision. Shear forces in uniformly loaded Two-way slabs.

Columns: Define short and long columns, estimation of effective length of a column. Code requirements on slenderness limits, minimum eccentricity and reinforcement. Design of short column under axial compression with lateral ties and helical reinforcement. Design of short columns subjected to combined axial load and uniaxial moment. Design of short columns subjected to combined axial load and biaxial moment. Design of isolated square and rectangular footing.

Text Books :

1. Limit State of Design of Reinforced Concrete – P. C. Vergheese ,PHI Learning (P) Ltd
2. Reinforced Concrete Limit state Design – A.K. Jain , Nemchand & bros ,Roorke
3. R.C.C Design – Unnikrishna Pillai and Vasudeva Menon , Mcgrawhill professional

Reference Books:

1. Reinforced Concrete Limit state Design, P. Dayaratnam , oxford & IBH publish & co Pvt Ltd
2. Reinforced Concrete Structures by R Park and Paulay ,John Wiley & Sons (p) Ltd.

Code: B16 CE 2203

FLUID MECHANICS-II

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives
Students learn

1. To understand Laminar ,turbulent flows and concepts of boundary layer theory
2. To know the concepts of the discharge through canals and closed conduits
3. To understand the principles of open channel flows.

Course Outcomes:
Students will be able to

1. Solve Turbulent Flow problems.
2. Explain development of boundary layer in external and internal flows
3. Identify variation of lift and drag coefficients with variation in flow
4. Develop an expression for the discharge of uniform flow in open channels
5. Interpret the specific energy diagram for a free surface flow
6. Analyse practical problems in varied flow

SYLLABUS

Viscous Effects on Fluid Motion:
Equation of Motion for Real Fluids – Modifications in Equation of Motion, Stress Strain Relationships, Tangential Stress Terms.
Navier-Stokes Equations (No Derivation) – N.S. equations for standard cases of Plane two Dimensional and Axisymmetric Flows.

Plane Two- dimensional Flows – Steady Flow between Parallel Plates, Couette and Poiseuille Flows; Axisymmetric Flows – Flow through a Circular Annulus, Flow without and with Pressure Gradient – Hagen-Poiseuille Equation; Relationship between Friction factor and Reynolds Number for Laminar Flow through Pipes; Stokes' law.

Boundary Layer Theory: Theory of Boundary Layer – Characteristics of Laminar Boundary Layer – Boundary Layer growth over a Flat Plate (without pressure gradient) – Boundary Layer Thickness and its Characteristics – Displacement, Momentum and Energy Thicknesses; Stability Parameter; Laminar and Turbulent boundary layers.
Boundary Layer Separation – Mechanism of Separation, Control of B.L. Separation; Boundary Layer on rough surfaces - Laminar Sublayer, Shear friction velocity; Friction Drag.

Turbulent Flow: Critical Reynolds Number – Characteristics of Turbulent Flow – Mean and Fluctuating Components of Velocity, Quantitative Description of Turbulence, Statistical Nature of Turbulent Flow, Isotropic and Homogeneous Turbulence.

Analysis of Turbulent Flows – Shear Stress due to turbulence – Semi-empirical Theories, Boussinesq Eddy Viscosity Model, Prandtl Mixing Length Concept; Velocity distribution for hydrodynamically smooth and rough pipes; Variation of Friction Factor in turbulent flow; Friction Factor for commercial pipes – Moody diagram.

Drag, Lift & Propulsion:
Concepts of Drag and Pressure Distribution over Immersed Bodies – Drag and Lift – Deformation Drag, Friction Drag, Form Drag – Drag coefficient.
Distribution of Fluid Pressure on immersed bodies – Pressure Distribution for flow past a circular disk, sphere; Effects of eddy pattern in two dimensional flow –Distribution of pressure for two dimensional flow past a cylinder – von Kármán vortex trail, Eddy shedding; Drag of immersed bodies – Variation of Drag Coefficient with Reynolds Number – Drag on Cylinder – Resistance diagram for bodies of revolution; Drag Coefficient of Practical Bodies.

Lift & Propulsion
Effect of Circulation in Irrotational Flow, Generation of Lift around a Cylinder, Magnus Effect, Computation of Lift Force; Lift on Airfoil – Lift Coefficient and its Variation with Angle of Attack, Joukowsky Profile, Polar Diagram, Stall; Induced Drag.

Open Channel Flows:
Basic Concepts – Introduction, Classification of Open Channels – Classification of Flow; Channel Geometry – Geometric Elements of a Channel Section; Velocity Distribution in a Channel Section; Wide Open Channel; Measurement of Velocity; Velocity Distribution Coefficients; Pressure Distribution in a Channel Section – Effect of Slope on Pressure Distribution; Basic Equations – Chezy's Equation, Manning's Equation.

Uniform Flow Computation;
Conveyance of a Channel Section – Section Factor and Hydraulic Exponent. Flow Characteristics in a Closed Conduit with Open Channel Flow; Determination of Normal Depth and Velocity; Design of Channels for Uniform Flow; Design of Non-erodible Channels; Best Hydraulic Section; Determination of Section Dimensions for Uniform Flow; Most Economical Channel Sections – Rectangular, Trapezoidal, Circular and Triangular Channel Sections; Critical Flow – Computation of Critical Flow, Section Factor for Critical Flow.

Application of Energy Principle in Open channels –
Definition of Specific Energy, Specific Energy Diagram, Critical depth, Critical Velocity, Conjugate or Alternate Depths, Sub-critical, Critical and Super- critical Flows, Froude Number, Relationship between Critical depth and Specific Energy for Rectangular, Trapezoidal Sections; Application of Momentum Principle in Open channels – Specific Force; Canal Transitions – Change of Depth in Channels with Change in Cross-section and Hump in the Bed; Control Sections; Venturi Flume and Parshall Flume.

Varied Flow in Open Channels:
Analysis & computation of G.V.F: Definition of G.V.F. and Derivation of Governing Equation – Mild, Steep, Critical, Horizontal and Adverse Slopes – Backwater and Drawdown Curves – G.V.F. Profiles for Channels with Changing Slopes; Computation of G.V.F. Profiles – Method of Direct Integration (Procedures Only), Direct Step Method – Computation of G.V.F. Profiles in rectangular channels using Direct and Single Step methods (Simple Slope cases only).

Rapidly Varied Flow – Hydraulic jump, Types of jump, Hydraulic jump in horizontal rectangular Channels; Surges.

Text Books:

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

Reference Books:

1. Engineering Fluid Mechanics, Kumar, K.L., S. Chand & Co. Ltd.
2. Flow in Open Channels, Subramanya, K., Tata McGraw-Hill Publishing Co. Ltd.
3. Flow through Open Channels, Ranga Raju, K.G., Tata McGraw-Hill Publishing Co. Ltd.
4. Open Channel Hydraulics, Chow, V.T.,McGraw-Hill Ltd.

Code: B16 CE 2204

BUILDING PLANNING & DESIGN

Theory	**: 2 Periods**	**Sessionals**	**: 30**
Lab	**: 3 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

Student shall be able to

1. Learn and understand the Conventional Signs.
2. Differentiate the Types of Residential Buildings.
3. Learn the different influencing parameters and factors in the design of Residential Building.
4. Design and Draw the Site Plan, Dimensional Plan, Front Elevation and Cross Section Elevations.
5. Develop Residential Plan using Auto Cad.

Course Outcomes:

After the completion of the course student should be able to

1. Use the Conventional Signs in Design
2. Design Different Types of Residential Buildings
3. Appreciate influencing parameters in the design of Residential Building
4. Develop Site Plan, Dimensional Plan, Front Elevation and Cross Section Elevations.
5. Use the Auto Cad in the Design of Residential Buildings

SYLLABUS

Residential Buildings : Different types of Residential Buildings Selection of Site for Residential Building. Brief Information of Housing Colonies for Different Income Groups in India-Sizes of Plots - Public Spaces, Evolutionary Housing Concept.

Climatology: Elements of Climate : Sun, Wind, Relative Humidity, Temperature effects, Comfort Conditions for House, various types of Macro Climatic Zones. Design of Houses and Layouts with Reference to Climatic Conditions. Orientation of Buildings. Solar Charts, Ventilation. Principles of Planning Anthropometric Data

Preliminery Drawings : (a) Conventional signs of materials various equipment used in a Residen-tial Building (copying exercise) (b) Plan section and Elevation of a small House (one room and varandah) (copying exercise) (c) Plan section and Elevation of Two Bed Room House (copying exercise) (d) (e) (f) Plan section and Elevation of three bed room house in Hot and Humid zone, Hot and Arid zone, cold zone (copying exercises)
(a) Design of Individual rooms with particular attention to functional and furniture requirements. Building regulations and Byelaws of Residential Buildings;
(b) Auto Cad drawing of residential building (only for internal assessment)

Drawing the Plan Section and Elevation of Houses with given Functional requirements and climatic data. (Emphasis may be given to Hot and Humid zones.)

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 Books:

1. Civil Engineering Drawing Series 'B' by R.Trimurty, M/S Premier Publishing House.
2. 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.

Code: B16 CE 2205

ADVANCED SURVEYING METHODOLOGIES

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objective:

Student shall be able to

1. Learn and understand the different methods of Theodolite surveying.
2. Differentiate the Concepts of Tachometry Surveying.
3. Learn the different methods of Curve Setting.
4. Explore the methods of RS and GIS
5. Describe the procedures available in Total Station Instrument for surveying.

Course Outcome:

After the completion of the course student should be able to

1. Appreciate the importance of Theodolite in Surveying
2. Apply Concepts of Tachometry in Surveying.
3. Construct the Curves in Highways, road construction and canal works.
4. Use the RS and GIS in designing
5. Use the Total Station in Surveying.

SYLLABUS

Theodolite- Types of Theodolite – 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.

Theodolite traversing – Open and closed traverse – Closing errors, Balancing the error – Bowditch method – Transit method, Omitted measurements – Gales traverse table or Trigonometric levelling – Elevation of top of the tower - same plane - Different planes – Axis signal correction.

Tacheometry – Principle of techeometry – 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 – Corrections – Satellite station and Reduction to centre – Basenet.

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.

Total Station Surveying: Electronic Theodolite, Electronic Distance Measurements, Total Station, Errors in measurements, Advantages, Disadvantages, Applications; Contour mapping, determination of height of remote point, position of hidden point, free station, Area measurement, volume measurement.

Modern surveying and mapping: GPS survey's – Introduction, Errors in GPS, Positioning methods, classification of GPS surveying, applications, advantages and disadvantages, photogrammetric surveying; sensors & platforms, aerial photogrammetry, Satellite images resolution, concept of stereo models, photogrammetric products, rectified images, orthophotography, topographic map, digital maps, DEM, GIS, Advantages & Disadvantages of photogrammetric surveying.

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. Principles of GIS for land resource assessment by P.A. Burrough – Clerendon Press, Oxford.

Code: B16 CE 2206

ENGINEERING GEOLOGY

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

Students learn

1. To identify the formation of minerals
2. To understand the mega-scopic identification of rocks and minerals
3. To understand the importance of geophysical methodologies
4. To understand the geological maps

Course outcomes:

After completion of the lab, Students will be able to

1. Elucidate the mega-scopic identification of rocks
2. Categorize the rocks according to mega-scopic description
3. Interpret geological maps
4. Estimate the types of subsurface formation by using geophysical methods

SYLLABUS

Introduction to General Geology:

Importance of geology from civil engineering point of view. Branches of Geology. Weathering – types and its engineering importance; Erosion, Soils: Soil profile, soil formation, types of Indian soils. Land forms produced by, running water and glaciers. Land forms produced by Wind, Sea Waves and Currents. Ground Water: origin, groundwater table, porosity and permeability. Aquifers, Groundwater Moment and Water, Bearing Properties of Rocks.

Mineralogy &Petrology:

Mineralogy: Mineral definition, physical properties of minerals. Study of important rock forming minerals: Silicate structures, Quartz, Feldspars, Pyroxenes, Amphiboles, Micas and Clays.

Petrology: Definition of rock. Types of rocks - Ingenious rocks: Granite, Synite, Dolerite, Gabro, Diorite, Basalt. Sedimentary rocks: Breccia, Conglomerate, Sandstone, Shale, Limestone. Metamorphic rocks: Gneiss, Khondalite, Schist, Slate, Marble, Quartzite, Charnokite. Engineering properties of rocks.

Statigraphy & Structural Geology:

Statigraphy: Geological Time scale, Major geological formations of India and their geological importance - Achaeans, Cuddapahs, Vindyans, Gondwanas and Deccan Traps. Mineral resources of Andhra Pradesh.

Structural Geology: Elements of Structural Geology- Strike, Dip, Plunge. Working principles of Clinometer compass and Brunton Compass and their use in Civil Engineering. Study of Geological Structures - Folds, Faults and Joints.

Remote Sensing and Geophysical Methods:

Remote Sensing: Introduction, Electromagnetic Spectrum, Aerial Photographs: types of aerial photos and flight planning. Aerial mosaics. Elements of photo interpretation. Satellite Remote Sensing: Satellites, Sensors and Data Products. Principles of Geographical Information Systems. RS and GIS applications to Civil Engineering.

Geophysical Methods: Principles of Geophysical Methods, Electrical, Seismic, Gravity and Magnetic. Principle of Resistivity method and configurations. Applications of Resistivity Method: Soil Profile, Hard rock and Ground Water Table. Principles of Seismic refraction and reflections methods and their applications to Civil Engineering problems.

Geological Investigations:

Role of Engineering Geologist in planning, design and construction and post construction stages in Civil Engineering works. Geological investigations for Dams and Reservoirs and Tunnels, Case Studies – Nagarjuna Sagar, Bhakra Nangal, Jawahar Tunnel. Geological investigations for bridges and multistoried structures. Geological investigations for highways, air fields and railway lines. Geological investigations for Coastal structures and Environmental Geology.

Text Books:

1. Engineering and General Geology by Parbin Singh – Katson Publishing House
2. Engineering Geology by N.Chennakesavulu, Mc-Millan, India Ltd. 2005
3. Principles of Engineering Geology by KVGK Gokhale. B.S Publications-2005
4. Principles and Applications of Photo Geology by Pandey, Willey Eastern Limited
5. Engineering Geology by K.M.Bangar

Reference Books:

1. Engineering Geology and Geo-techniques by F.G. Bell
2. Fundamentals of Remote Sensing by George Joseph. University Press (India) Private Limited.
3. Fundamentals of Engineering Geology by F.G. Bell, Button Wortus Landon

Code: B16 CE 2207

TOTAL STATION AND GEOMATICS LAB

Lab : 3 Periods		**Sessionals**	**: 50**
Exam : 3 Hrs.		**Ext. Marks**	**: 50**
		Credits	**: 2**

Course Objectives:

Student shall be able to

1. Study and identify the different methods of Theodolite surveying.
2. Distinguish the Concepts of Tachometry Surveying.
3. Learn the different methods of Curve Setting.
4. Explore the methods of RS and GIS
5. Describe the procedures available in Total Station Instrument for surveying.

Course Outcomes:

After the completion of the course student should be able to

1. Relate the importance of Theodolite in Surveying
2. Apply Concepts of Tachometry in Surveying.
3. Construct the Curves in Highways, road construction and canal works.
4. Use the RS and GIS in designing
5. Use the Total Station in Surveying.

LIST OF EXPERIMENTS

1. Measurement of Horizontal Angles by Repetition & Reiteration, Measurement of Vertical Angles, Heights & Distances
2. Distance between two in-accessible points by theodolite
3. Tachometry
4. Setting out curve by deflection angle method by two theodolites
5. Point positioning using GPS
6. Contour mapping using total station
7. Height of remote point using total station
8. Position of hidden point using total station
9. Area & volume measurement using total station
10. GIS related surveying applications

Reference Books:

1. B.C.Punmia , Ashok Kumar jain , Arun kr. Jain , Surveying I & II ,Laxmi publications

Code: B16 CE 2208

ENGINEERING GEOLOGY LAB

Lab	**: 3 Periods**	**Sessionals**	**: 50**
Exam	**: 3 Hrs.**	**Ext. Marks**	**: 50**
		Credits	**: 2**

Course Objectives: Students learn

1. To identify the formation of minerals
2. To understand the mega-scopic identification of rocks and minerals
3. To understand the importance of geophysical methodologies
4. To understand the geological maps

Course Outcomes:
After completion of the lab, Students will be able to

1. Elucidate the mega-scopic identification of rocks
2. Categorize the rocks according to mega-scopic description
3. Interpret geological maps
4. Estimate the types of subsurface formation by using geophysical methods

LIST OF EXPERIMENTS

1. Study of physical properties and identification of minerals
2. Identification of rocks and their Engineering properties
3. Description and Identification of Geomorphological models
4. Description and Identification of Structural models
5. Geophysical methods – Electrical Resistivity & Seismic Methods
6. Simple Structural Geology problems

Lab Examination Pattern:

1. Description and identification of SIX minerals
2. Description and identification of SIX rocks (Igneous, Sedimentary and Metamorphic rocks)
3. Problem on geophysical method
4. Problem on Strike and Dip

Reference Books:

1.Engineering and General Geology by Parbin Singh – Katson Publishing House

Code: B16 CE 2209

FLUID MECHANICS LAB-I

Lab	**: 3 Periods**	**Sessionals**	**: 50**
Exam	**: 3 Hrs.**	**Ext. Marks**	**: 50**
		Credits	**: 2**

Course objectives

Students learn

1. To verify the principles of channel flow in laboratory by conducting experiments

Course Outcomes:

Students will be able to

1. Define and Measure Fluid Properties.
2. Illustrate Flow Measuring Devices used in pipes, channels and Tanks
3. Analyze characteristics of broad crested weir.
4. Illustrate the characteristics of surface profiles in free and forced vibrations.
5. Compare sharp crested full width and contracted weirs

LIST OF EXPERIMENTS

1. Study of Small orifice, by constant head method and Time of emptying a tank through a small orifice.
2. Study of Cylindrical mouthpiece by constant head method and Time of emptying a tank through a cylindrical mouthpiece.
3. Study of floating body and determination of Meta -centric Height.
4. Study of surface profiles in Free and Forced Vortex motions.
5. Study of Venturimeter.
6. Study of Orifice meter.
7. Study of Flow nozzle meter.
8. Study of Sharp – crested full width and contracted weirs.
9. Study of V-notch and Trapezoidal notch.
10. Study of Broad-crested weir.
11. Study of Frictional Resistance in pipes.
12. Study of types of flow in pipes

Reference Books:

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

Code: B16 CE 2210

INDUSTRY ORIENTED TECHNOLOGY LAB

Lab	**: 2 Periods**	**Sessionals**	**: 50**
Exam	**: 3 Hrs.**	**Credits**	**: 1**

ADVANCED COMPUTATION SURVEYING / GEOINFORMATICS / GEOMATICS ENGINEERING

Course Objectives:

This course is design to fulfill the following objectives

1. To prepare the student to plan and conduct field work and application of scientific methodology in handling field samples.
2. To interpret the False Color Composite Images of Satellite data.
3. To Create Fundamental Knowledge on GIS software.
4. To learn the identification of Geographic Coordinates by GPS.
5. To Study the land use/ Land cover dynamics of certain region.

Course Outcomes:

Students who successfully complete this course will be able to:

1. Fully equipped with various surveying concepts and methods using advanced ground survey equipment's.
2. Carry out profiling and grid leveling, for generation of profiles, contour maps, and earth works computations.
3. Handle the Satellite images and interpret the satellite data.
4. The interpret data can be used to prepare plan for urban development/town planning.
5. Prepare the candidates with National Global employability.

LIST OF EXPERIMENTS

1. Transferring and Drafting the collected raw data from total station survey using AutoCAD
2. Computation on drafted data using AutoCAD.
3. Developing Contour using raw data from total station using surfer software.
4. Visual Interpretation of standard FCC (False color composite).
5. Digitization of physical features on a map / image using GIS software.
6. Coordinates measurement using GPS.
7. Field data collection under national land use / land cover mapping on 1:120000 scale using temporal AWIFS data.
8. Asset Mapping of village using Bhuvans Panchayat Moblie App.

Reference Books:

1. A M Chandra : Higher surveying
2. T M Lillesand et al: Remote sensing & Image Interpretation
3. B.Bhatta : Remote sensing&GIS
4. M.Anjireddy: Remote sensing & GIS,BS Publications
5. N K Agarwal : essentials of GPS,Spatial Networks, Hyderabad.

(Note: Total Marks will be evaluated based on Continuous Evaluation - 25 Marks, Record/Report-10 Marks, Exam-10 Marks and Attedndance-5 Marks)