# 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

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Cat.</th>
<th>Periods</th>
<th>Sessional Marks</th>
<th>End Exam Marks</th>
<th>Total Marks</th>
<th>Credits</th>
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<td>MC</td>
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## B.TECH. I Year – II Semester

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

B.TECH. 4 YEAR DEGREE COURSE STRUCTURE

B.TECH. II Year – I Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Cat.</th>
<th>Periods</th>
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B.TECH. II Year - II Semester

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

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


UNIT IV 12 Periods


UNIT V 12 Periods


TEXT BOOK:


REFERENCE BOOKS:

BUILDING TECHNOLOGY

CIV 212
Instruction : 3 Lecture & 1 Tutorial / week
End Exam : 3 Hours

Credits : 3
Sessional Marks : 40
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

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.


UNIT II

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.


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

UNIT IV  12 Periods


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


TEXT BOOKS:


REFERENCE BOOKS:

4. Building construction by P.C.Verghese, PHI Learning (P) Ltd.
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

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


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


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

UNIT III

**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


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:**

**REFERENCE BOOKS:**
5. Engineering and General Geology by Parbin Singh, K Kataria & Sons, New Delhi, 2009
ENGINEERING MECHANICS

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


UNIT II
12 Periods


Analysis of trusses: Method of joints, Method of sections and tension coefficient method.
UNIT III 12 Periods


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 theorem for areas – Second moments of areas by integration – Radius of gyration of areas – Moments of inertia of composite areas.


UNIT V 12 Periods


TEXT BOOKS:

REFERENCE BOOKS:
SURVEYING - I

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

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

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 Ghatracer, Pantagraph, Sextant and Planimeter.

**TEXT BOOKS:**
2. Surveying Vol.1, 2 and 3 – By Punmia, Standard Book House.

**REFERENCE BOOKS:**
3. A Text Book of Surveying and Levelling by R.Agor, Khanna Publishers
STRENGTH OF MATERIALS

CIV 216
Instruction : 3 Periods & 1 Tutorial / week
End Exam : 3 Hours

Credits : 3
Sessional Marks : 40
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


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

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


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:

REFERENCE BOOKS:
1. Timoshenko and Young, Elements of strength of materials Affiliated East-West Press Pvt. Ltd.
SURVEY FIELD WORK - I

CIV 217
Instruction : 3 Practical / week
End Exam : 3 Hours
Credits : 2
Sessional Marks : 50
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.
7. Elevation difference between two points by Reciprocal levelling method.
8. Differential levelling, reduction of levels by rise and fall method.
10. Longitudinal and Cross Sectioning.
11. Contouring of a small area by method of Blocks.

REFERENCE BOOK:

STRENGTH OF MATERIALS LABORATORY

CIV 218
Instruction : 3 Practical / week
End Exam : 3 Hours

Credits : 2
Sessional Marks : 50
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:
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
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

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

Aggregate: 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

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

UNIT IV 12 Periods


UNIT V 12 Periods


Concrete Mix Design: Concrete mix design – BIS Method of mix design

TEXT BOOK:

REFERENCE BOOKS:
3. Concrete Technology, A.R.Santha Kumar, Oxford University Press
ENVIROMENTAL ENGINEERING - I

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

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

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:**

**REFERENCE BOOKS:**
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 Vacuum Pressures. Pressure measurement – Piezometers, Manometers and Pressure Gauges. Centre of Pressure, Forces on submerged surfaces, crest gates and lock gates.
UNIT II

**Buoyancy 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

**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

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


TEXT BOOKS:
2. Fluid Mechanics by A.K. Jain, Khanna Publishers

REFERENCE BOOKS:
2. Engineering Fluid Mechanics by K.L. Kumar, S. Chand & Co
SURVEYING - II

CIV 224
Instruction : 3 Periods & 1 Tutorial / week
End Exam : 3 Hours

Credits : 3
Sessional Marks : 40
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


UNIT II

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


UNIT IV


UNIT V

**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:**


**REFERENCE BOOKS:**

3. A Text Book of Surveying and Levelling by R.Agor, Khanna Publishers
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

**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 theorem – 1.

**Deflections of Statically Determinate Trusses:** (a) Unit load method (b) Castigliano’s theorem – 1.

UNIT IV

**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

**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:
2. Theory of Structures by BC Punmia and Arun Kumar Jain and AK Jain, Laxmi Publications

REFERENCE BOOKS:
4. Structural analysis by Thandavamoorthy, Oxford University Press.
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

Principles of Planning, Orientation of Buildings.

UNIT II

UNIT III

**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 36 marks

**TEXT BOOKS:**


**REFERENCE BOOK:**

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
11. Compressive Strength of concrete
12. Split tensile strength of concrete
13. Modulus of rupture of concrete

Reference books:
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:

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:

TECHNICAL SEMINAR

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

2. NPTEL courses in civil engineering.
3. World Wide Web resources on state of the art in civil engineering.