SYALLBUS

II Year B.Tech. (CE). – I Semester

Probability & Statistics

UNIT -I: Probability:

Objective: To impart the basic concepts of Probability with the help of theorems.

Introduction: Sample point, sample space, event, mutually exclusive, independent and exhaustive events, probability axioms, addition theorem, multiplication theorem, and other basic theorems on probability, conditional probability, pair-wise independence, Baye’s theorem

UNIT -II: Random variables and Distributions:

Objective: To gain the knowledge of random variables and its types with respective distributions as modern tools for engineering practices

Introduction- Random variables- Distribution function- Discrete distributions - Binomial and Poisson distributions -Continuous distributions:

Normal, Normal approximation to Binomial distribution, Gamma and Weibull distributions
UNIT III Moments and Generating functions:

Objective: To understand and identify the generating functions of various distributions and solve engineering problems.

Introduction - Mathematical expectation and properties - Moment generating function - Moments of standard distributions (Binomial, Poisson and Normal distributions) – Properties.

UNIT IV Sampling Theory:

Objective: To be familiar with types of sampling and estimation techniques and impart problem-solving skills in various engineering Applications.

Introduction - Population and samples - Sampling distribution of mean for large and small samples (with known and unknown variance) – Proportion sums and differences of means - Sampling distribution of variance – Point and interval estimators for mean and proportions - Chebyshev’s Inequality.

UNIT V Tests of Hypothesis:

Objective: To understand the multi-disciplinary inferential statistics, design of experiments and try to find out the solutions for global economical, social and economical issues.

Introduction - Type I and Type II errors - Maximum error - One tail, two-tail test - Tests concerning one mean and proportion, two means - Proportions and their differences using Z-test, Student’s t-test - F-test and Chi –square test - ANOVA for one-way and two-way classified data.

UNIT VI Curve fitting and Correlation:

Objective: To understand and analyse fitting of linear and non-linear with statistical tools and impart techniques for

Practicing the correlation – regression by identifying the formulae.

Introduction - Simple Correlation and Regression - Rank correlation - Multiple regression-Fitting a straight line - Second degree curve exponential curve- power curve by method of least squares.
Books:

1. Probability and Statistics for Engineers: Miller and John E. Freund, Prentice Hall of India

Building materials and construction

Course Learning Objectives:

The objective of the course is to expose to the student to

a. The Various construction materials and products used in the building industry, their nature, characteristics, variety and applications.

b. Various components of civil building/structure.

c. The various construction methods/Techniques to build the structures with the above materials.

UNIT-I

Stones, bricks and tiles


UNIT-II

Masonry and wood: Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls.

UNIT-III


A Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance various tests for concrete.

UNIT-IV

Building Components: Lintels, arches, vaults, stair cases - types. Different types of floors - Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs. Trussed roofs - King and Queen post Trusses. R.C.C Roofs, Madras Terrace and Pre fabricated roofs.

UNIT-V

Finishings: Damp Proofing and water proofing materials- and uses- Plastering Pointing, white washing and distempering

Paints: Constituents of a paint - Types of paints - Painting of new old wood- Varnish.

Form Works and Scaffoldings.

UNIT-VI

Aggregates: Classification of aggregate - Coarse and fine aggregates- particle shape and texture - Bond and Strength of aggregate - Specific gravity- Bulk Density, porosity and absorption - Moisture content of Aggregate- Bulking of sand - Sieve analysis introduction to geosynthetics and geotextiles.

Course Outcomes

Upon the successful completion of this course, the students will have to be able to:

1. Describe the types and properties of various building materials - stones, clay products, Timber, metals, cement and concrete and their applications in building industry.

2. Select the appropriate building materials to suit to the structural requirements including exposure conditions.
3. Describe the various components of buildings.

4. Select the appropriate construction methods to meet the local conditions.

5. Describe the various types of stairs and stair cases and their locations, sizes and materials including fire escapes and also lifts and escalators.

6. Describe the various methods of shuttering, scaffolding and centering.

7. Describe the various types expansion and construction joints and their construction.

Text Books:

References:

II Year B. Tech. (CE) – I Sem.

Building Planning & Drawing

Course Learning Objectives:

The objective of the course is impart the knowledge of

The principles of building planning

Building Byelaws and regulations, various components of buildings
Functional planning and design of residential and public buildings for different activities incorporating climatic design principles

UNIT-I

Introduction to Building Planning and Drawing – Types of Buildings

Residential Buildings: - Minimum standards for various parts of buildings-requirements of different rooms and their grouping- characteristics of various types residential buildings.

UNIT-II

Public Buildings: Planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels & motels, buildings for recreation.

UNIT- III

building byelaws and regulations: Introduction- terminology- objectives of building byelaws- floor area ratio floor space index- principles under laying building bye laws- classification of buildings- open space requirements – built up area limitations- height of buildings- wall thickness – lightening and ventilation requirements.

UNIT -IV

sign conventions and bonds: Brick, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminium alloys etc., lead, zinc, tin etc., earth, rock, timber and marbles.

English bond and Flemish bond- odd and even courses for one, one-half, two and two & half brick walls in thickness at the junction of a corner.

UNIT –V

doors – windows - ventilators and roofs: Panelled door, panelled and glassed door, glassed windows, paneled windows, swing ventilators, fixed ventilators, coupled roof, collar roofs.

King Post truss, Queen Post truss
Sloped and flat roof buildings: drawing plans, Elevations and Cross Sections of given sloped roof buildings.

UNIT –VI

Planning drawing and schematic design of buildings: Draw the Plan, Elevation and sections of a Residential & Public buildings from the given line diagram.

Course outcomes

Upon successful completion of this course, a student will be able to

1. Explain principles of building planning
2. Explain the procedure of building planning incorporating climatic and functional aspects.
3. Design/compose various rooms in a building considering the functional requirements.
4. Design and draw the plans, sections and elevations of residential and simple public buildings.

Text books:

2. Building planning and drawing by M. Chakravarthi.

References:

1. Building drawing by Shah and Kale
2. Planning and Design of buildings by Y.S. Sane
3. Planning, designing and Scheduling by Gurucharan Singh and Jagadish Singh
Course Learning Objectives:

The objective of the course is to expose to the student to

a. To impart preliminary concepts of Strength of Materials and Principles of Elasticity and Plasticity Stress-strain behavior of materials and their governing laws. Introduce student the moduli of Elasticity and their relations, Poisson’s ratio, principle of superposition.

b. To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions and to draw SFD and BMD in beams.

c. To inculcate concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections

d. The impart the knowledge of determination of deflections in beams under various loading and support conditions

e. To classify cylinders based on their thickness/ stress distribution across thickness and to derive equations for determination of stresses in cylinders subjected to both internal and external pressure.

unit- i

simple stresses and strains and strain energy: Elasticity and plasticity - Types of stresses and strains - Hooke’s law stress - strain diagram for mild steel Q 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 - Resilience - Gradual, sudden, impact and shock loadings - simple applications.

unit- ii

shear force and bending moment: 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 and combination of these loads - Point of contraflexure Relation between SA.F., B.M and rate of loading at a section of a beam.

Unit-III

flexural stresses: Theory of simple bending - Assumptions - Derivation of bending equation: $M/I = f/y = E/R$ Neutral axis - Determination bending stresses section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections - Design of simple beam sections.

Unit-IV

shear stresses: Derivation of formula - Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections, built up beams, shear centre.

Unit-V

deflection of beams: Bending into a circular arc - slope, deflection and radius of curvature Differential equation for the elastic line of a beam – Double integration and Macaulay’s methods » Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - U;D.L. Uniformly varying load. Mohr’s theorems - Moment area method - application to simple cases including overhanging beams.

Unit-VI

thin and thick 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 Thin spherical Sheng.

THICK CYLINDERS: Introduction Lame’s theory for thick cylinders - Derivation of Lame’s formulae distribution of hoop and radial stresses across thickness - design of thick cylinders – compound cylinders - Necessary difference of radii for shrinkage - Thick spherical shells.

Course Outcomes
On completion of the course the student will be able to,

1. Understand the basic materials behavior under the influence of different external loading conditions and the support conditions

2. Draw the diagrams indicating the variation of the key performance features like bending moment and shear forces.

3. Have knowledge of bending concepts and calculation of section modulus and for determination of stressed developed in the beams due to various loading conditions

4. Assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure

5. Apply Green’s theorem top for determination of forces beams subjected to distributed loads

Text Books:


References:


Surveying

Course Learning Objectives:

The objectives of the course are to enable the student to learn

a. The basic principles of surveying, various methods of linear and angles measuring instruments.

b. Be able to use various surveying equipment’s / instruments, viz., levelling instrument, Theodolite, and tachometric principle.

c. Measure linear angular distances, types of curves, set both horizontal and vertical curves.

d. Prepare contours, area and volume calculations.

Unit-I

Introduction: definition-Uses of surveying- overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications - Errors in survey measurements.
Unit-II

distances and direction: Distance measurement conventions and methods; use of chain and tape, Electronic distance measurements (EDM)- principles of electro optical EDM-errors and corrections to linear measurements- compass survey- Meridians, Azimuths and Bearings, declination, computation of angle.

Traversing-Purpose-types of traverse-traverse computation-traverse adjustments-omitted measurements.

Unit-III


Unit-IV


tacheometric surveying: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

Unit-V

Curves: Types of curves, design and setting out - simple and compound curves- transition curves. Introduction to geodetic surveying, Total Station and Global positioning system

Unit-VI

computation of areas and volumes: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.
Course Outcomes:

Upon successful completion of the course, the student will be able to

1. Demonstrate the basic surveying skills
2. Use various surveying instruments.
3. Perform different methods of surveying
4. Compute various data required for various methods of surveying.
5. To integrate the knowledge and produce topographical map.

text books:

1. Surveying (Vol No. 1, 2 & 3 ) B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P)Ltd. , New Delhi.

References:


Web-Resources: www.nptel.com

II Year B. Tech. (CE) – I Sem.

fluid mechanics
Course Learning Objectives:

Objectives of the course is to impart the knowledge of

a. Properties of fluids, Flow measurements, Hydrostatic forces exerted by fluids, on different objects, estimation of pipe flow losses.

b. Description of flow, types of flows, continuity equation/law of conservation of mass

c. Fluid dynamics, momentum equation and its applications.

d. Boundary layer theory/ concepts in an engineering application, flow around submerged objects.

e. Laminar and turbulent flows, fluid friction, losses in pipes, Energy lines, Hydraulic gradient, application in pipe network.

Unit-I

Introduction: Dimensions and units - Physical properties, of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion, pressure at a point, Pascal’s law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure. Pressure gauges, Manometers: Differential and Micro Manometers.

Unit-II

Hydrostatics: Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces - Center of pressure. Derivations and problems.

Fluid kinematics: Description of fluid flow, Stream line, path line and streak lines and stream tube.

Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows - Equation of continuity for one, two , three dimensional flows - stream and velocity potential functions, flow net analysis.

Unit-III

Fluid dynamics: Surface and body forces - Euler’s and Bernoulli’s equations for flow along a stream line for 3-D flow, Navier – Stokes equations (Explanationary) Momentum equation and its application - forces on pipe bend.

Unit-IV
boundary layer theory: Boundary layer - concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers, no derivations BL in transition, separation of BL, Control of BL, flow around submerged objects- Drag and Lift- Magnus effect.

Unit-V

Laminar flow: Reynold’s experiment; Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes.

closed conduit flow: Laws of Fluid friction - Darcy’s equation, Minor losses - pipes in series - pipes in parallel - Total energy line and hydraulic gradient line. Pipe network problems, variation of friction factor with Reynold’s number - Moody’s Chart.

Unit-VI


Course Outcomes/ Generic Skills:

Upon successful completion of this course, student will have to be able to

1. Solve manometer problems, and calculate force on submerged bodies.

2. Use conservation of mass principle to calculate flow rates through control volumes.

3. Use Bernoulli’s equation to solve simple problems

4. calculate the lift and drag forces for various objects

5. Apply appropriate equations and principles to analyze a variety of pipe flow situations.

6. Predict the flow 'rate in a pipe by use of common flow meters.
text books:
2. “A text of Fluid mechanics and hydraulic machines”, Dr. R.K. Bansal- Laxmi Publications (P) ltd., New Delhi

References:
1. “Fluid Mechanics”, Merie C. potter and David C. Wiggert, Cengage learning
2. “Introduction to Fluid Machines” Edward J. Shaughnessy; Jr Ira M.Katz and James P. Schaffer, Oxford University Press, New Delhi

Web-Resources: www.nptel.com

II Year B. Tech. (CE) – I Sem.

surveying field work

Course Learning Objectives:
To introduce various surveying instruments (linear as well as angle measuring instruments) to the students to conduct different types of engineering surveys using these survey instruments

List of Field Works:
1. Survey in an area by chain survey (Closed circuit)
2. Finding the area of the given boundary using compass (Closed Traverse)
3. Plane table survey; finding the area of a given boundary by the method of Radiation and intersection.
4. Fly levelling: Height of the instrument method (differential levelling) and rise and fall method.
5. Theodolite Survey: Determining the Horizontal and Vertical Angles by the method of repetition method.
7. One Exercise on Curve setting.
8. One Exercise on contours.
9. Total Station: Determination of area using total station
10. Total Station: Determination of Remote height.

Course out comes

Upon successful completion of the course, the student will be able:

1. To demonstrate the basic surveying skills
2. To use various surveying instruments.
3. To perform different methods of surveying
4. To compute various data required for various methods of surveying.
5. To integrate the knowledge and produce topographical map.

References:

2. GIET Lab Manuals

Web-Resources: www.nptel.com

II Year B. Tech. (CE) – I Sem.

strength of materials lab

Course Learning Objectives:

The objectives of the course are

a. To introduce various strength and strain/deflection measuring instruments to the students.

b. Determine various physical and mechanical properties and strength of various engineering materials.
c. Determine/verify constitutive model (stress-strain curve) of engineering material the laboratory.

List of Experiments

1. Tension test on Steel bar
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell’s Reciprocal theorem on beams.
11. Use of Electrical resistance strain gauges

Course Outcomes:

Upon successful completion of the course, the student will be able

1. To determine the engineering properties of materials in the laboratory.
2. To conduct laboratory tests to verify the suitability of the engineering materials for the given purpose.
3. To verify the basic principles of behavior of materials.
4. To verify the quality of materials through laboratory tests.

references:
II Year B. Tech. (CE) – I Sem.

Computer Aided Engineering Drawing Practice

Part-A

Development and Interpenetration of Solids: Development of surface of Right Regular Solids - Prims, Cylinder, Pyramid Cone and their parts. Interpenetration of Right Regular Solids-Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

Transformation of Projections: Conversion of Isometric Views to Orthographic Views - Conventions

Part-B

1. Introduction to computer aided drafting : Generation of points, lines, curves, polygons, dimensioning.

2. types of modelling : object selection commands – edit, zoom, cross hatching, pattern filling, utility commands.

3. 2D wire frame modelling.

4. 3D wire frame modelling.

5. view points and view ports : view point coordinates and view (s) displayed.

6. examples to exercise different options like save, restore, delete, joint, single option.

7. computer aided solid modelling : Isometric projections.

8. orthographic projections of isometric projections.


10. Drawing of building plans and elevations.

Note: At least, a minimum of 9 shall be conducted from Part-B.

References:

GIET Lab Manuals
II Year B. Tech. (CE) – II Sem.

basic electrical and electronics engineering

Course Objective:

This course covers the topics related to analysis of various electrical circuits, operation of various electrical machines, various electronic components to perform well in their respective fields.

Learning Objectives:

i. To learn the basic principles of electrical law’s and analysis of networks.

ii. To understand the principle of operation and construction details of DC machines.

iii. To understand the principle of operation and construction details of transformer.

iv. To understand the principle of operation and construction details of alternator and 3-Phase induction motor.

v. To study the operation of PN junction diode, half wave, full wave rectifiers and OP-AMPS.

vi. To learn the operation of PNP and NPN transistors and various amplifiers.

UNIT - I

ELECTRICAL CIRCUITS: Basic definitions, Types of network elements, Ohm’s Law, Kirchhoff’s Laws, inductive networks, capacitive networks, series, parallel circuits and star-delta and delta-star transformations.

UNIT - II

UNIT - III

TRANSFORMERS: Principle of operation of single phase transformers – e.m.f equation – losses – efficiency and regulation.

UNIT - IV


UNIT V

RECTIFIERS & LINEAR ICs: PN junction diodes, diode applications (Half wave and bridge rectifiers). Characteristics of operation amplifiers (OPAMP) - application of OP-AMPS (inverting, non inverting, integrator and differentiator).

UNIT VI

TRANSISTORS: PNP and NPN junction transistor, transistor as an amplifier, single stage CE Amplifier, frequency response of CE amplifier, concepts of feedback amplifier.

Outcomes:

i. Able to analyse the various electrical networks.

ii. Able to understand the operation of DC generators,3-point starter and conduct the Swinburne’s Test.

iii. Able to analyse the performance of transformer.

iv. Able to explain the operation of 3-phase alternator and 3-phase induction motors.

v. Able to analyse the operation of half wave, full wave rectifiers and OPAMPs.

vi. Able to explain the single stage CE amplifier and concept of feedback amplifier.
TEXT BOOKS:


REFERENCE BOOKS:

4. Industrial Electronics by G.K. Mittal, PHI.

Web-Resources: www.nptel.com

II Year B. Tech. (CE) – II Sem.

Strength of Materials – II

Course Learning Objectives:

a. To give preliminary concepts of Principal stresses and strains developed in cross section of the beams analytically as well as graphically due to stresses acting on the cross section and stresses on any inclined plane. To impart concepts of failures in the material considering different theories.

b. To give concepts of torsion and governing torsion equation, and there by calculate the power transmitted by shafts and springs and design the cross section when subjected to loading using different theories of failures.

c. To classify columns and calculation of load carrying capacity using different empirical formulas and to assess stresses due to axial and lateral loads for different edge conditions and to calculate combined effect of direct and bending stresses with different engineering structures.

d. Introduce the concept of unsymmetrical bending in beams Location of neutral axis Deflection of beams under unsymmetrical bending.
e. Impart concepts for determination of Forces in members of plane, pin-jointed, perfect trusses by different methods.

Unit-I

principal stresses and strains and theory of failures: 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 stresses – Principal stresses and strains – Analytical and graphical solutions.


Unit –II

Torsion of circular shafts and springs:


Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

Unit –III


Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.
Unit – IV

Direct and bending stresses: Stresses under the combined action of direct loading and B.M. Core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and B.M. about both axis.

Unit – V

Shear center and unsymmetrical bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis Deflection of beams under unsymmetrical bending.

Unit – VI

Analysis of pin-jointed plane frames: Determination of Forces in members of plane, pin-jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply supported trusses by method of joints, method of sections.

Course Outcomes:

Upon successful completion of this course

1. The student will be able to understand the basic concepts of Principal stresses developed when subjected to stresses along different axes and design the sections.

2. The student can assess stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions.

3. The student will be able to assess forces in different types of trusses used in construction.

Text books:


2. Strength of materials by S. S. Bhavakatti


References:

II Year B. Tech. Civil Engineering – II Sem.

Hydraulics and hydraulic machinery

Course Learning Objectives:

Objectives of the course are

a. To provide the student with an understanding of Hydraulics as it applies to the environment and to civil engineering works.

b. To enable the students to understand the working principles of various type of hydraulic machines – pumps and turbines with emphasis on developing ability to solve real – life problems in Hydraulics Engineering

Unit –I

Open channel flow: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy’s, Manning’s; and Bazin formulae for uniform flow – Most Economical sections.


Unit –II

Hydraulic similitude: Dimensional analysis-Rayleigh’s method and Buckingham’s pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.
Unit –III

Basics of turbo machinery: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines. Layout of a typical Hydropower installation – Heads and efficiencies - classification of turbines.

Unit –IV

Hydraulic turbines – I: Pelton wheel - Francis turbine – Kaplan turbine - working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency.

Hydraulic turbines – II: Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

Unit –V


Reciprocating pumps: Introduction, classification of reciprocating pumps, main components of reciprocating pumps, working of a reciprocating pumps, discharge through pumps, indicator diagram, work done by reciprocating pumps, slip of reciprocating pumps.

Unit –VI

Hydropower engineering: Classification of Hydropower plants-Definition of Terms – Load factor, Utilisation factor, Estimation of hydropower potential.

Course outcomes

Upon successful completion of this course the student will be able to:

1. Solve uniform open channel flow problems

2. Apply dimensional analysis and similitude in order to account for the implications of scale in model experiment.

3. Calculate depth profiles in channels with steady gradually – varied flow.

4. Understand the working principles of various hydraulic machineries.

5. Select the appropriate turbines and pumps to meet the field requirements.
Text books:

References:
1. Fluid mechanics and fluid machines by Rajput, S. Chand & Co.

Web references:

II Year B. Tech. Civil Engineering – II Sem.

Concrete Technology

Course Learning Objectives:

The primary objectives of the course are

a. To impart the knowledge of cement production, basic constituents/ingredients of cements and various types of cements.

b. To provide the knowledge of basic ingredients of concretes and its behavior in various environments.
c. To impart the know of how of the test procedures for the determination of properties of concrete, both fresh and hardened.

d. To provide an understanding of design of concrete material, durability of concrete in various environments, various types of concretes/special concretes

Unit –I


Quality of mixing water

Unit –II


Unit –III


Unit –IV

Unit – V


Unit – VI


Course Outcomes:

Upon successful completion of this course, student will be able to

1. understand the basic concepts of concrete.

2. realise the importance of quality of concrete.

3. familiarise the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.

4. test the fresh concrete properties and the hardened concrete properties.

5. evaluate the ingredients of concrete through lab test results.

6. design the concrete mix by BIS method.

7. familiarise the basic concepts of special concrete and their production and applications.

8. understand the behaviour of concrete in various environments.

Text books:

References:
2. Concrete Technology by A.R. Santha Kumar, Oxford University Press, New Delhi.

Web references:

II Year B. Tech. (CE) – II Sem.

Course Learning Objectives:

The objectives of the course are to inculcate/enable the student to learn/understand

a. The rudiments of structural analysis, determinate and indeterminate structures, Degree of static indeterminacy, significance of compatibility conditions.

b. Analysis of indeterminate structures viz., Propped cantilevers, fixed beams and continuous beams using different methods including energy methods and sketching of SFD and BMD.

c. To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions and to draw the diagrams of variation across the length.

d. The analysis of determinate structures (Beams and Trusses) subjected to moving loads using influence line.

unit – I

Propped Cantilevers & fixed beams: Degree of static indeterminacy- compatibility condition-Analysis of propped cantilevers with elastic and rigid prop-shear force and Bending moment diagrams-Deflection of propped cantilevers
introduction to statically indeterminate beams with U.D. load central point load, eccentric point load. Number of point loads, uniformly varying load, couple and combination of loads shear force and Bending moment diagrams – Deflection of fixed beams effect of sinking of support, effect of rotation of a support-point of inflexion/contraflexer.

unit –II
continuous beams: introduction – Clapeyron’s theorem of three moments – Analysis of continuous beams with constant moment of inertia with one or both ends fixed – continuous beams with overhang, continuous beams with different moment of inertia for different spans – Effects of sinking of supports – shear force and Bending moment diagrams.

unit –III

unit –IV
slope-deflection method: introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

unit –V
energy theorems: introduction-strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castiglino’s first theorem – Deflections of simple beams and pin jointed trusses.

unit –VI
moving loads and influence lines: introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load U.D load longer than the span, U.D. load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length.
Influence lines: Definition of influence line for SF, Influence line for SF, Influence line for BM – load position for maximum SF at a section – Load position for maximum BM at a section, single point load, U.D. load longer than the span, U.D. load shorter than the span – Influence lines for forces in members, of Pratt and Warren trusses.

Course Outcomes:

Upon successful completion of this course, the student will be able to,

1. Differentiate determinate and indeterminate structures.
2. Identify the behavior of structures due to the expected loads, including the moving loads, acting on the structure.
3. Estimate the bending moment and shear forces in beams for different boundary conditions.
4. Analyze the continuous beams using various methods – three moment method, slope deflection method, energy theorems.
5. Draw the influence line diagrams for various types of moving loads on beams/bridges.
6. Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss.

Text Books:

1. Structural Analysis by S.S. Bhavikatti
2. Theory of Structures by B.C. Punmia

References:

Web References:

1. http://nptel.iitm.ac.in/courses/1051050/1
2. http://www.youtube.com/watch?v=s4CN6aVkhPo
3. http://www.youtube.com/watch?v=qhEton-

II Year B. Tech. (CE) – II Sem.

environmental engineering – I

Course Learning Objectives:

The objective of this course is:

a. Outline planning and the design of water supply systems for a community/town/city

b. Provide knowledge of water quality requirement for domestic usage

c. Impart understanding of importance of protection of water source quality and enlightens the efforts involved in converting raw water into clean potable water.

d. Selection of valves and fixture in water distribution systems.

e. Impart knowledge on design of water distribution network.

Unit – I


Sources of water: Comparison from quality and quantity and other considerations – intakes – infiltration galleries distribution systems. – requirements – methods and layouts.
Unit –II


Unit-III

Distribution systems: Distribution systems -Design procedures- Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house.

Unit –IV


Unit –V


Unit-VI


Course Outcomes:

After completion of the course, a successful student is able to
1. Plan and design the water and distribution networks and sewerage systems.

2. Identify the water source and select proper intake structure.

3. Characterization of water.

4. Select the appropriate appurtenances in the water supply.

5. Selection of suitable treatment flow for raw water treatments.

Text books:


2. Elements of environmental engineering by K.N. Duggal, S. Chand Publishers

References:


2. Water and Waste Water Technology by Steel

3. Water and Waste Water Engineering by Fair Geyer and Okun

4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India


6. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age International


Web-Resources: www.nptel.com

II Year B. Tech. (CE) – II Sem.
Fluid mechanics and hydraulic machinery lab

Course Learning Objectives:

The objective of this course is:

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

b. The enable the students to understand the working principles of various types of hydraulic machines by conducting laboratory experiments and draw performance curves for various hydraulic machines.

List of Experiments

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and /or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli’s equation.
7. Impact of jet on vanes
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.
12. Efficiency test on reciprocating pump.

Course Outcomes

Upon successful completion of this course the students will be able to :

1. Calibrate various discharge measurement meters in a open channel flow.
2. Measure the discharge through an open channel.
3. Draw performance curves by conducting experiments on various hydraulic machineries.
4. Conduct efficiency and performance tests on turbines and pumps.

References:
GIET Lab Manuals

Web-Resources: www.nptel.com

II Year B. Tech. (CE) – II Sem.
concrete technology lab

Course Learning Objectives:
The objectives of the course is to enable student conduct necessary test for determination of engineering properties of concrete making materials, fresh concrete, and hardened concrete.

List of Experiments:
At least 10 experiments must be conducted (at least one for each property)
1. Determination of normal Consistency and fineness of cement.
2. Determination of initial setting time and final setting time of cement.
3. Determination of specific gravity and soundness of cement.
5. Determination of grading and fineness modulus of Coarse aggregate by sieve analysis.
6. Determination of specific gravity of coarse aggregate.
7. Determination of grading and fineness modulus of fine aggregate (sand) by sieve analysis.
8. Determination of bulking of sand.
10. Determination of workability concrete by slump test

14. Non-Destructive testing on concrete (for demonstration)

List of Equipment:

1. Standard set of sieves for coarse aggregate and fine aggregate
2. Vicat’s apparatus
3. Specific gravity bottle.
4. Lechatlier’s apparatus
5. Slump Test Apparatus.
6. Compaction Factor Test Apparatus
7. Vee - Bee test apparatus
8. Longitudinal compresso meter
10. Rebound hammer, Ultrasonic pulse velocity machine, micro cover meter etc.

Note: At least a minimum of 10 experiments shall be conducted.

Course Outcomes:
Upon successful completion of this course, student will be able to

1. Determine the consistency and fineness of cement.
2. Determine the setting times of cement.
3. Determine the specific gravity and soundness of cement.
4. Determine the compressive strength of cement.
5. Determine the workability of cement concrete by compaction factor, slump and Vee – Bee tests
6. Determine the specific gravity of coarse aggregate and fine aggregate by Sieve analysis.
7. Determine the flakiness and elongation index of aggregates.
8. Determine the bulking of sand.
9. Understand the non-destructive testing procedures on concrete.
III Year B.Tech. (CE). – I Semester

design of reinforced concrete structures

Course Objectives:
The objective of this course is:
a. Familiarize Students with different types of design philosophies
b. Equip student with concepts of design of flexural members
c. Understand Concepts of shear, bond and torsion
d. Familiarize students with different types of compressions members and Design
e. Understand different types of footings and their design

Unit – I


Unit – II


Unit – III

Design for Shear, Torsion and Bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing.

Limit state design for serviceability:

Deflection, cracking and code provision, Design of formwork for beams and slabs.

Unit – IV

Design of Compression members: Effective length of a column, Design of short and long columns – under axial loads, uniaxial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.

Unit – V

Footings: Different types of footings – Design of isolated and combined footings - rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments.

Unit – VI
Slabs: Classification of slabs, design of one-way slabs, two-way slabs, and continuous slabs using IS Coefficients (conventional), design of waist-slab staircase.

NOTE: All the designs to be taught in Limit State Method

Following plates should be prepared by the students.

1. Reinforcement detailing of T-beams, L-beams and continuous beams.

2. Reinforcement detailing of columns and isolated footings.

3. Detailing of one-way, two-way and continuous slabs and waist-slab staircase.

Course Outcomes

After completion of the course, a successful student is able to

1. Carryout analysis and design of flexural members and detailing

2. Design structures subjected to shear, bond and torsion

3. Work on different types of design philosophies

4. Design different type of compression members and footings

Text Books:


References:


2. ‘Reinforced Concrete Structures’ by Park and Pauley, John Wiley and Sons.

IS Codes:
Objective: To understand the concept; and nature of Managerial Economics and its relationship with other disciplines, concepts of Demand and Demand forecasting for Proper Production Planning.


Unit-II

Objective: To understand the concept of Production function, Input Output relationship, different Cost Concepts and Concept of Cost – Volume – Profit Analysis.


Unit-III

Objective: To understand the nature of Competition, Characteristics of Pricing in the different market structure and significance of various pricing methods.

Unit-IV

Objective: To know the different forms of Business Organization and their Merits and Demerits both Public and Private Enterprises and the concepts of Business Cycles.


Unit-V

Objective: To understand the different Accounting Systems preparation of Financial Statements and uses of Different tools for performance evaluation.


Unit -VI

Objective: To understand the concept of Capital, Capital Budgeting and to know the techniques used to evaluate Capital Budgeting proposals by using different methods.


Text Books:


III Year B.Tech. (CE). – I Semester

structural analysis – ii

Course Objectives:

The objective of this course is:

a. Familiarize Students with Different types of Structures
b. Equip student with concepts of Arches
c. Understand Concepts of lateral Load analysis
d. Familiarize Cables and Suspension Bridges
e. Understand Analysis methods, Kanis Method and Matrix methods.

Unit – I


Two Hinged Arches: Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches – (No analytical question).

Unit – II

Unit – III

Cable Structures And Suspension Bridges: Introduction, characteristics of cable, analysis of cables subjected to concentrated and uniformly distributed loads, anchor cable, temperature stresses, analysis of simple suspension bridge, three hinged and two hinged stiffening girder suspension bridges.

Unit – IV

Kani’s Method: Analysis of continuous beams – including settlement of supports and single bay portal frames with and without side sway.

Unit – V

Introduction to Matrix Method:

Flexibility methods: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

Unit – VI

Stiffness method:

Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

Course Outcomes

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

1. Differentiate Determinate and Indeterminate Structures

2. Carryout lateral Load analysis of structures
3. Analyze Cable and Suspension Bridge structures

4. Analyze structures, Kani’s Method and Matrix methods.

Text Books:


References:

1. ‘Theory of structures’ by Ramamuratam, Dhanpatrai Publications.
3. ‘Structural Analysis’ by R.C. Hibbeler, Pearson education, India.

Web-Resources: www.nptel.com

III Year B.Tech. (CE) – I Semester

soil mechanics

Course Objectives:

The objective of this course is:

a. To enable the student to determine the index properties of the soil and classify it.

b. To impart the concept of seepage of water through soils and determine the discharge of water through soils.

c. To impart the principles of compaction and consolidation of soils and determine the magnitude and the rate of consolidation settlement.

d. To enable the student to understand the concept of shear strength of soils, determine the shear parameters of sands and clays and the areas of their application.
Unit – I


Unit – II


Unit – III


Unit – IV

Stress Distribution In Soils: Stresses induced by applied loads - Boussinesq’s and Westergaard’s theories for point loads and areas of different shapes– Newmark’s influence chart – 2:1 stress distribution method.

Unit – V


Unit – VI

Course Outcomes

Upon the successful completion of this course

1. The student must know the definition of the various quantities related to soil mechanics and establish their inter-relationships.

2. The student should be able to know the methods of determination of the various index properties of the soils and classify the soils.

3. The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory.

4. The student should be able to apply the above concepts in day-to-day civil engineering practice.

Text Books :

1. ‘Soil Mechanics’ by B.C. Punmia & Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications (P) LTD.

References:

2. ‘An introduction to Geotechnical Engineering’ by Holtz and Kovacs; Prentice Hall.

Web-Resources: www.nptel.com
Course Objectives:

The objective of this course is:

a. To impart different concepts in the field of Highway Engineering.
b. To acquire design principles of Highway Geometrics and Pavements
c. To learn various highway construction and maintenance procedures.

Unit – I

Highway Planning and Alignment: Highway development in India; Classification of Roads; Road Network Patterns; Necessity for Highway Planning; Different Road Development Plans – First, second, third road development plans, road development vision 2021, Rural Road Development Plan – Vision 2025; Planning Surveys; Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

Unit – II


Unit – III

Traffic Engineering: Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies; Speed studies –spot speed and speed & delay studies; Parking Studies; Road Accidents-Causes and Preventive measures - Condition Diagram and Collision Diagrams; PCU Factors, Capacity of Highways – Factors Affecting; LOS Concepts; Road Traffic Signs; Road markings; Types of Intersections; At-Grade Intersections – Design of Plain, Flared, Rotary and Channelized Intersections; Design of Traffic Signals – Webster Method –IRC Method.

Unit – IV

Unit – V

Design of Pavements: Types of pavements; Functions and requirements of different components of pavements; Design Factors


Unit – VI


Pavement Failures, Maintenance of Highways, pavement evaluation, strengthening of existing pavements.

Course Outcomes

Upon the successful completion of this course, the students will be able to:

1. Plan highway network for a given area.
2. Determine Highway alignment and design highway geometrics.
3. Design Intersections and prepare traffic management plans.
4. Judge suitability of pavement materials and design flexible and rigid pavements.
5. Construct and maintain highways
Text Books:


References:

2. ‘Principles of Transportation Engineering’ by Partha Chakroborthy and Animesh Das, PHI Learning Private Limited, Delhi

Web-Resources: www.nptel.com www.nptel.com

III Year B.Tech. (CE). – I Semester

group engineering geology

Course Objectives:
The objective of this course is:

a. To introduce the Engineering Geology as a subject in Civil Engineering.

b. To enable the student to use subject in civil engineering applications.

Unit – I

Introduction: Branches of Geology, Importance of Geology in Civil Engineering with case studies.

Weathering: Weathering of rocks, Geological agents, weathering process of Rock, River process and their development.

Unit – II

The study of Minerals: Definitions of mineral and rock, Different methods of study of mineral and rock.
Unit – III

Structural Geology: Strike, Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering.

Unit – IV

Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

Earthquakes And Land Slides: Terminology, Classification, causes and effects, Shield areas and Seismic bells, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Land slides.

Unit – V


Unit – VI

Geology Of Dams, Reservoirs And Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Life of Reservoirs Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling.

Course Outcomes

Upon the successful completion of this course, the students will be able to:

1. Identify and classify the geological minerals.
2. Measure the rock strengths of various rocks.
3. Classify and measure the earthquake prone areas to practice the hazard zonation.
4. Classify, monitor and measure the Landslides and subsidence.
5. Prepares, analyses and interpret the Engineering Geologic maps
6. Analyses the ground conditions through geophysical surveys.

7. Test the geological material and ground to check the suitability of civil engineering project construction.

8. Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc...

Text Books:

References:
1. ‘Engineering Geology for Civil Engineers’ by P.C. Varghese, PHI Learning Pvt. Ltd.

Web-Resources: www.nptel.com

III Year B.Tech. (CE) – I Semester

geotechnical engineering lab

Course Objectives:

The objective of this course is:

a. To impart knowledge of determination of index properties required for classification of soils.

b. To teach how to determine compaction characteristics and consolidation behavior from relevant lab tests; to determine permeability of soils.

c. To teach how to determine shear parameters of soil through different laboratory tests.

LIST OF EXPERIMENTS

1. Specific gravity, G
2. Atterberg’s Limits.
3. Field density-Core cutter and Sand replacement methods
4. Grain size analysis by sieving
5. Hydrometer Analysis Test
6. Permeability of soil - Constant and Variable head tests
7. Compaction test
8. Consolidation test (to be demonstrated)
9. Direct Shear test
10. Triaxial Compression test (UU Test)
11. Unconfined Compression test
12. Vane Shear test
13. Differential free swell (DFS)
14. CBR Test

At least Ten experiments shall be conducted.

Course Outcomes

Upon successful completion of this course, student will be able to

1. Determine index properties of soil and classify them.
2. Determine permeability of soils.
3. Determine Compaction, Consolidation and shear strength characteristics.

Text Books:

2. ‘Soil Mechanics’ by B.C. Punmia & Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications (P) LTD.

References:
Course Objectives:

The objective of this course is:

a. To test crushing value, impact resistance, specific gravity and water absorption, percentage attrition, percentage abrasion, flakiness index and elongation index for the given road aggregates.

b. To know penetration value, ductility value, softening point, flash and fire point, viscosity and stripping for the given bitumen grade.

c. To test the stability for the given bitumen mix.

d. To carry out surveys for traffic volume, speed and parking.

I. ROAD AGGREGATES:

1. Aggregate Crushing value

2. Aggregate Impact Test.


4. Attrition Test

5. Abrasion Test.

6. Shape tests

II. BITUMINOUS MATERIALS:
1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.
5. Stripping Test
6. Viscosity Test.

III. BITUMINOUS MIX:

IV. TRAFFIC SURVEYS:
1. Traffic volume study at mid blocks.
2. Traffic Volume Studies (Turning Movements) at intersection.
4. Parking study.

V. DESIGN & DRAWING:
1. Earthwork calculations for road works.
2. Drawing of road cross sections.
3. Rotors intersection design.

Course Outcomes

At the end of the course the student will be able to
1. Ability to test aggregates and judge the suitability of materials for the road construction
2. Ability to test the given bitumen samples and judge their suitability for the road construction
3. Ability to obtain the optimum bitumen content for the mix design

4. Ability to determine the traffic volume, speed and parking characteristics.

Text Books:


References:

1. IRC Codes of Practice
2. Asphalt Institute of America Manuals

Web-Resources: www.nptel.com

III Year B.Tech. (CE) – I Semester

Mini Project / Study Project
III Year B.Tech. (CE) – II Semester

design of steel structures

Course Objectives:
The objective of this course is to:

a. Familiarize Students with different types of Connections and relevant IS codes
b. Equip student with concepts of design of flexural members
c. Understand Design Concepts of tension and compression members in trusses
d. Familiarize students with different types of Columns and column bases and their Design
e. Familiarize students with Plate girder and Gantry Girder and their Design

Unit – I

Unit – II
Beams: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams- Curtailment of flange plates, Beam to beam connection, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.

Unit – III
Tension Members and compression members: General Design of members subjected to direct tension and bending –effective length of columns. Slenderness ratio – permissible stresses. Design of compression members, struts etc.
Roof Trusses: Different types of trusses – Design loads – Load combinations as per IS Code recommendations, structural details – Design of simple roof trusses involving the design of purlins, members and joints – tubular trusses.

Unit – IV

Design of Eccentric connections: framed connections – unstiffened and stiffened seat connection.

Unit – V


Unit – VI


NOTE: Welding connections should be used in Units II – VI.

The students should prepare the following plates.

Plate 1 Detailing of simple beams

Plate 2 Detailing of Compound beams including curtailment of flange plates.

Plate 3 Detailing of Column including lacing and battens.

Plate 4 Detailing of Column bases – slab base and gusseted base

Plate 5 Detailing of steel roof trusses including joint details.

Plate 6 Detailing of Plate girder including curtailment, splicing and stiffeners.

Course Outcomes

At the end of this course the student will be able to
1. Work with relevant IS codes.
2. Carry out analysis and design of flexural members and detailing.
3. Design compression members of different types with connection detailing.
4. Design Plate Girder and Gantry Girder with connection detailing.
5. Produce the drawings pertaining to different components of steel structures.

Text Books:

References:
2. ‘Design of Steel Structures’ by P. Dayaratnam; S. Chand Publishers.
3. ‘Steel Structure Design and practice’ by N. Subramanian, Oxford University Press.

IS Codes:
1) IS -800 – 2007
2) IS – 875
3) Steel Tables.

These codes and steel tables are permitted to use in the examinations.

Web-Resources: www.nptel.com

III Year B.Tech. (CE). – II Semester

Foundation engineering
Course Objectives:

The objective of this course is:

a. To impart to the student knowledge of types of shallow foundations and theories required for the
determination of their bearing capacity.

b. To enable the student to compute immediate and consolidation settlements of shallow foundations.

c. To impart the principles of important field tests such as SPT and Plate bearing test.

d. To enable the student to imbibe the concepts of pile foundations and determine their load carrying
capacity.

Unit – I

Soil Exploration: Need – Methods of soil exploration – Boring and Sampling methods – Field tests –
Penetration Tests – Pressure meter – planning of Programme and preparation of soil investigation
report.

Unit – II

Earth And Earth-Retaining Structures: Infinite and finite earth slopes in sand and clay – types of failures
– factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices
– Taylor’s Stability Number-Stability of slopes of dams and embankments – different conditions.

Rankine’s & Coulomb’s theory of earth pressure – Culmann’s graphical method - earth pressures in
layered soils.

Unit – III

Shallow Foundations – Bearing Capacity Criteria: Types of foundations and factors to be considered in
their location - Bearing capacity – criteria for determination of bearing capacity – factors influencing
bearing capacity – analytical methods to determine bearing capacity – Terzaghi’s theory – IS Methods.

Unit – IV
Shallow Foundations – Settlement Criteria: Safe bearing pressure based on N-value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – Types of foundation settlements and their determination - allowable settlements of structures.

Unit – V

Pile Foundation: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae– Pile load tests - Load carrying capacity of pile groups in sands and clays.

Unit – VI


Course Outcomes

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

Upon the successful completion of this course:

1. The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.

2. The student must be able to compute the magnitude of foundation settlement and decide on the size of the foundation accordingly.

3. The student must be able to use the field test data and arrive at the bearing capacity.

4. The student must be able to apply the principles of bearing capacity of piles and design them accordingly.

Text Books:
1. ‘Soil Mechanics’ by B.C. Punmia & Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications (P) LTD.


References:


Web-Resources: www.nptel.com

III Year B.Tech. (CE) – II Semester

transportation engineering – ii

Course Objectives:

The objective of this course is:

a. To know various components and their functions in a railway track

b. To acquire design principles of geometrics in a railway track.

c. To know various techniques for the effective movement of trains.

d. To acquire design principles of airport geometrics and pavements.

e. To know the planning, construction and maintenance of Docks and Harbours.

A. Railway Engineering

Unit – I

Components of Railway Engineering: Permanent way components – Railway Track Gauge - Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast – Rail Fastenings –

Unit – II

Unit – III


B.AIRPORT ENGINEERING

Unit – IV

Unit – V
C. DOCKS & HARBOURS

Unit – VI

Planning, Layout, Construction & Maintenance Of Docks & Harbours:

Course Outcomes

At the end of course, Student can

1. Design geometrics in a railway track.
2. Provide good transportation network
3. Design airport geometrics and airfield pavements.
4. Plan, construct and maintain Docks and Harbours.

Text Books :

1. Railway Engineering by Satish Chandra and Agarwal M.M., Oxford University Press, New Delhi

References:

2. ‘Transportation Engineering’ by Srinivasa Kumar R, University Press, Hyderabad

Web-Resources: www.nptel.com

III Year B.Tech. (CE) – II Semester
Course Objectives:

The objective of this course is:

a. Outline planning and the design of wastewater collection, conveyance and treatment systems for a community/town/city.

b. Provide knowledge of characterisation of wastewater generated in a community.

c. Impart understanding of treatment of sewage and the need for its treatment.

d. Summarize the appurtenance in sewerage systems and their necessity.

e. Teach planning, and design of septic tank and imhoff tank and the disposal of the effluent from these low cost treatment systems.

f. Effluent disposal method and realise the importance of regulations in the disposal of effluents in rivers.

Unit – I


Unit – II

Pumping of wastewater: Pumping stations – location – components– types of pumps and their suitability with regard to wastewaters.

House Plumbing: systems of plumbing-sanitary fittings and other accessories–one pipe and two pipe systems – Design of building drainage.

Unit – III
Sewage characteristics – Sampling and analysis of wastewater - Physical, Chemical and Biological Examination-Measurement of BOD and COD - BOD equations.

Treatment of sewage : Primary treatment-Screens-grit chambers-grease traps–floatation–sedimentation – design of preliminary and primary treatment units.

Unit – IV

Secondary treatment: Aerobic and anaerobic treatment process-comparison.


Unit – V


Unit – VI

Bio-solids (Sludge) management: Characteristics- handling and treatment of sludge thickening – anaerobic digestion of sludge.

Disposal of sewage: methods of disposal – disposal into water bodies- Oxygen Sag Curve-disposal on land- sewage sickness.

Advances in sewage disposal methods.

Course Outcomes

By the end of successful completion of this course, the students will be able to:

1. Plan and design the sewerage systems
2. Characterisation of Sewage
3. Select the appropriate appurtenances in the sewerage systems
4. Selection of suitable treatment flow for sewage treatment
5. Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river

Text Books:

References:
2. Sewage treatment and disposal by Dr. P.N. Modi& Sethi.

Web-Resources: www.nptel.com

III Year B.Tech. (CE). – II Semester

Water resources engineering–i

Course Objectives:
The course is designed to
a. Introduce hydrologic cycle and its relevance to Civil engineering.
b. Make the students understand physical processes in hydrology and, components of the hydrologic cycle.
c. Appreciate concepts and theory of physical processes and interactions.
d. Learn measurement and estimation of the components hydrologic cycle.
e. Provide an overview and understanding of Unit Hydrograph theory and its analysis.
f. Understand flood frequency analysis, design flood, flood routing.
g. Appreciate the concepts of groundwater movement and well hydraulics.
Unit – I

Introduction: Engineering hydrology and its applications, Hydrologic cycle, hydrological data-sources of data.

Precipitation: Types and forms, measurement, raingauge network, presentation of rainfall data, average rainfall, continuity and consistency of rainfall data, frequency of rainfall, Intensity-Duration-Frequency (IDF) curves, Depth-Area-Duration (DAD) curves, Probable Maximum Precipitation (PMP), design storm.

Unit – II

Abstractions from Precipitation: Initial abstractions.

Evaporation: factors affecting, measurement, reduction

Evapotranspiration: factors affecting, measurement, control

Infiltration: factors affecting, Infiltration capacity curve, measurement, infiltration indices.

Unit – III

Runoff: Catchment characteristics, Factors affecting runoff, components, computation- empirical formulae, tables and curves, stream gauging, rating curve, flow mass curve and flow duration curve.

Hydrograph analysis: Components of hydrograph, separation of base flow, effective rainfall hyetograph and direct runoff hydrograph, unit hydrograph, assumptions, derivation of unit hydrograph, unit hydrographs of different durations, principle of superposition and S-hydrograph methods, limitations and applications of unit hydrograph, synthetic unit hydrograph.

Unit – IV

Floods: Causes and effects, frequency analysis- Gumbel’s and Log-Pearson type III distribution methods, Standard Project Flood (SPF) and Probable Maximum Flood (PMF), flood control methods and management.

Flood Routing: Hydrologic routing, channel and reservoir routing- Muskingum and Puls methods of routing.

Unit – V
Groundwater: Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy’s law, Dupuit’s equation- steady radial flow to wells in confined and unconfined aquifers, yield of a open well-recuperation test.

Unit – VI

Advanced Topics in Hydrology: Rainfall-runoff Modelling, instantaneous unit hydrograph (IUH) - conceptual models - Clark and Nash models, general hydrological models - Chow - Kulandaiswamy model.

Course Outcomes

At the end of the course the students are expected to

1. Have a thorough understanding of the theories and principles governing the hydrologic processes.
2. Be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related design aspects.
3. Develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulic structures.
4. Be able to develop design storms and carry out frequency analysis.
5. Be able to determine storage capacity and life of reservoirs.
6. Develop unit hydrograph and synthetic hydrograph.
7. Be able to estimate flood magnitude and carry out flood routing.
8. Be able to determine aquifer parameters and yield of wells.
9. Be able to model hydrologic processes.

Text Books :


References:

Web-Resources: www.nptel.com

III Year B.Tech. (CE) – II Semester

environmental pollution and control
(open elective)

Course Objectives:

The objective of this course is:

a. Impart knowledge on fundamental aspects of air pollution & control, noise pollution, and solid waste management.

b. Provide basic knowledge on sustainable development.

c. Introduces some basics of sanitation methods essential for protection of community health.

d. Differentiate the solid and hazardous waste based on characterization.

Unit – I

Air Pollution: Air pollution Control Methods–Particulate control devices – Methods of Controlling Gaseous Emissions – Air quality standards.


Unit – II

Unit – III
Solid Waste Management: solid waste characteristics – basics of on-site handling and collection – separation and processing - Incineration- Composting-Solid waste disposal methods – fundamentals of Land filling.

Unit – IV
Environmental Sanitation: Environmental Sanitation Methods for Hostels and Hotels, Hospitals, Swimming pools and public bathing places, social gatherings (melas and fares), Schools and Institutions, Rural Sanitation-low cost waste disposal methods.

Unit – V

Unit – VI
Sustainable Development: Definition- elements of sustainable developments-Indicators of sustainable development- Sustainability Strategies- Barriers to Sustainability–Industrialization and sustainable development – Cleaner production in achieving sustainability- sustainable development.

Course Outcomes
At the end of the course the student will be able to
By the end of successful completion of this course, the students will be able to:
1. Identify the air pollutant control devices
2. Have knowledge on the NAAQ standards and air emission standards
3. Differentiate the treatment techniques used for sewage and industrial wastewater treatment methods.
4. Understand the fundamentals of solid waste management, practices adopted in his town/village and its importance in keeping the health of the city.

5. Appreciate the methods of environmental sanitation and the management of community facilities without spread of epidemics.

6. Appreciate the importance of sustainable development while planning a project or executing an activity.

Text Books :


References:

1. Air Pollution and Control by M.N. Rao & H.N. Rao
2. Solid Waste Management by K. Sasi Kumar, S.A. Gopi Krishna. PHI New Delhi.

Web-Resources: www.nptel.com

III Year B.Tech. (CE). – II Semester

disaster management

(open elective)

Course Objectives:

The objective of this course is:
a. Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities.

b. Develop an awareness of the chronological phases of natural disaster response and refugee relief operations. Understand how the phases of each are parallel and how they differ.

c. Understand the ‘relief system’ and the ‘disaster victim.’

d. Describe the three planning strategies useful in mitigation.

e. Identify the regulatory controls used in hazard management.

f. Describe public awareness and economic incentive possibilities.

g. Understand the tools of post-disaster management.

Unit – I


Unit – II

Man Made Disastar And Their Management Along With Case Study


Unit – III


Unit – IV
Role Of Technology In Disaster Managements: Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations- roads and bridges-mitigation programme for earth quakes –flowchart, geospatial information in agriculture drought assessment-multimedia technology in disaster risk management and training transformable indigenous knowledge in disaster reduction.

Unit – V

Education And Community Preparedness: Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery -Community based disaster management and social capital-Designing resilience- building community capacity for action.

Unit – VI

Multi-sectional Issues: Impact of disaster on poverty and deprivation- Climate change adaptation and human health -Exposure , health hazards and environmental risk-Forest management and disaster risk reduction.- Institutional capacity in disaster management -The Red cross and red crescent movement.- Corporate sector and disaster risk reduction-A community focused approach.

Course Outcomes

Upon the successful completion of this course, the students will be able to:

1. Affirm the usefulness of integrating management principles in disaster mitigation work
2. Distinguish between the different approaches needed to manage preduring and post- disaster periods
3. Explain the process of risk management
4. Relate to risk transfer

Text Books :

1. ‘Disaster Management – Global Challenges and Local Solutions’ by Rajib shah & R R Krishnamurthy(2009),Universities press.


References:

Web-Resources: www.nptel.com

III Year B.Tech. (CE). – II Semester

architecture and town planning

(open elective)

Course Objectives:

The objective of this course is:

a. Initiating the students to different architectures of the world. The distinctions between the eastern and western architecture styles are focused.

b. The salient features of Egyptian, Greek, Roman, Indian Vedic, Indus valley civilization, Buddhist, Hindu and Indo-Sarsanic Architecture are introduced.

c. Architectural design concepts, principles of planning and composition are imparted.

d. To enable the student to understand town planning from ancient times to modern times.

e. To impart the concepts of town planning standards, land scaping and expansion of towns.

Unit – I

History of Architecture: Western Architecture: Egyptian, Greek, Roman Architectures- Orders. Indian Architecture: Vedic age, Indus valley civilization– Buddhist period: Stambas, Stupa, Toranas, Chaityas,

Unit – II


Unit – III

Principles of Planning: Principles of planninga residence- site selection, site orientation- aspect, prospect, grouping, circulation, privacy, furniture requirements, services and other factors.


Unit – IV

Historical Background of Town Planning: Town planning in India – Town plans of mythological Manasa- Town plans of ancient towns: Harappa, Mohenjodaro, Pataliputra, Delhi, Acropolis (Greece), Jerusalem, Mecca, Rome, London.

Unit – V


Standards of Town planning: Planning new towns, planning standards and specifications, national and regional planning, town planning and legislation planning regulations and limitations.

Unit – VI
Land Scaping and Expansion of Towns: Landscaping for the towns, horizontal and vertical expansion of towns- garden cities, satellite towns floating towns- sky scrapers-pyramidal cities.

Course Outcomes

Upon the successful completion of this course:

1. The student should be able to distinguish architectural styles of eastern and western world.
2. The student should understand the importance of Orders of architecture.
3. Should be able to compose spaces of buildings using design concepts, planning principles.
4. Should understand the town planning standards, landscaping features and regulations controlling expansion of the towns and the cities.

Text Books:

1. ‘The great ages of World Architecture’ by G.K. Hiraskar.
2. ‘Planning and Design of Buildings by Section of Architecture’ by Y. S. Sane.

References:


Web-Resources: www.nptel.com

III Year B.Tech. (CE). – II Semester

green technologies
(open elective)
Course Objectives:

The objective of this course is:

a. To present different concepts of green technologies.

b. To acquire principles of Energy efficient technologies.

c. To impart knowledge on the methods of reducing CO2 levels in atmosphere.

d. To gain knowledge of the importance of life cycle assessment

e. To learn the importance of green fuels and its impact on environment.

Unit – I


Unit – II


Unit – III


Unit – IV

Unit – V

Availability and need of conventional energy resources: major environmental problems related to the conventional energy resources, future possibilities of energy need and availability. Non-conventional energy sources: Solar Energy-solar energy conversion technologies and devices, their principles, working and application.

Unit – VI

Green Fuels: Definition-benefits and challenges – comparison of green fuels with conventional fossil fuels with reference to environmental, economical and social impacts- public policies and market-driven initiatives.

Biomass energy: Concept of biomass energy utilization, types of biomass energy, conversion processes, Wind Energy, energy conversion technologies, their principles, equipment and suitability in Indian context; tidal and geothermal energy.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Enlist different concepts of green technologies in a project
2. Understand the principles of Energy efficient technologies
3. Estimate the carbon credits of various activities
4. Identify the importance of life cycle assessment
5. Recognize the benefits of green fuels with respect to sustainable development.

Text Books :

References:

1. ‘Handbook of Organic Waste Conversion’ by Bewik M.W.M.
3. ‘Non-conventional Energy Sources’ by Rai G.D.

Web-Resources: www.nptel.com

III Year B.Tech. (CE). – II Semester

environmental engineering lab

Course Objectives:

The course will address the following:

a. Estimation some important characteristics of water and wastewater in the laboratory.

b. It also gives the significance of the characteristics of the water and wastewater.

List of Experiments

1. Determination of pH and Electrical Conductivity (Salinity) of Water and Soil.
2. Determination and estimation of Total Hardness–Calcium & Magnesium.
3. Determination of Alkalinity/Acidity
4. Determination of Chlorides in water and soil.
5. Determination and Estimation of total solids, organic solids and inorganic solids and settleable solids by Imhoff Cone.
8. Determination of N, P, K values in solid waste
10. Determination of C.O.D.
13. Presumptive Coliform test.

NOTE: At least 10 of the above experiments are to be conducted.

Course Outcomes

Upon the successful completion of this course, the students will be able to:

1. Estimation some important characteristics of water and wastewater in the laboratory.
2. Draw some conclusion and decide whether the water is potable or not.
3. Decide whether the water body is polluted or not with reference to the state parameters in the list of experiments.
4. Estimation of the strength of the sewage in terms of BOD and COD.

Text Books:


References:
1. Relevant IS Codes.


Web-Resources: www.nptel.com

III Year B.Tech. (CE). – II Semester

engineering geology lab

Course Objectives:

The objective of this course is:

a. To identify the mega-scopic types of Ore minerals & Rock forming minerals.

b. To identify the mega-scopic types of Igneous, Sedimentary, Metamorphic rocks.

c. To identify the topography of the site & material selection

LIST OF EXPERIMENTS

1. Physical properties of minerals: Mega-scopic identification of
   
   a. Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum, etc...
   
   b. Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc...

   
   a) Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc...
   
   b) Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglomerate, etc...

   c) Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite & Biotiteschist, Marble, Khondalite, etc...
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.


5. Bore hole data.

6. Strength of the rock using laboratory tests.


LAB EXAMINATION PATTERN:

1. Description and identification of FOUR minerals

2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)

3. ONE Question on Interpretation of a Geological map along with a geological section.

4. TWO Questions on Simple strike and Dip problems.

5. Bore hole problems.

6. Project report on geology.

Course Outcomes

Upon the successful completion of this course, the students will be able to:

1. Identify Mega-scopic minerals & their properties.

2. Identify Mega-scopic rocks & their properties.

3. Identify the site parameters such as contour, slope & aspect for topography.

4. Know the occurrence of materials using the strike & dip problems.

Text Books :

1. ‘Engineering Geology’ by Subinoy Gangopadhay, Oxford University press.


References:

Web-Resources: www.nptel.com

III Year B.Tech. (CE). – II Semester

Soft skills - II

(Title: Professional Communication and Employability skills)

Course Objectives: To help the students
Participate in group discussions with confidence and to make effective presentations.
With- resume packaging, preparing and facing interviews.
Build an impressive personality through effective time management and goal setting, self-confidence and assertiveness.
Understand, what constitutes proper grooming and etiquette in a professional environment.

Unit-1

Communicative Competence – The Art of Communication, basic grammar, personal SWOT Analysis, Analyzing audience, role of emotions and body language in communication-Effective listening skills, using English in different situations

Unit-2
Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence - Elements of effective presentation – Structure of presentation – Presentation tools

Unit-3

Interview Skills – Resume’ writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-pre-interview planning, opening strategies, answering strategies, mock interviews

Unit-4

Personality Development – Effective Time Management, setting realistic goals, self confidence and assertiveness, stress management, moral values.

Unit-5

Technical Communication: Report writing: Importance, structure, drafting of reports, Business Writing: Sales letters, claim and adjustment letters, Job Application letter, preparing a personal resume, notices, agenda and minutes of the meeting

Unit-6

Development of Occupational Competency

Leadership skills - Problem solving skills - Organising and Co-ordination skills - Critical thinking

Decision Making

Course Outcomes: The students will be able to

1. Be effective communicators and participate in group discussions with confidence. Also be able to make presentations in a professional context.

2. Write resumes, prepare and face interviews confidently.

3. Be assertive and set short term and long term goals. Also learn to manage time effectively and deal with stress.
4. Make the transition smoothly from campus to corporate.

Suggested Reading:

3. Effective Technical Communication - Mc Grawhill - Ashraf Rizvi
Course Objectives:
The course is designed to

introduce the types of irrigation systems

introduce the concepts of planning and design of irrigation systems

discuss the relationships between soil, water and plant and their significance in planning an irrigation system.

understand design methods of erodible and non-erodible canals

know the principles of design of hydraulic structures on permeable foundations.

know the concepts for analysis and design principles of storage and diversion head works.

learn design principles of canal structures
Unit – I

Irrigation: Necessity and importance, principal crops and crop seasons, types, methods of application, soil-water-plant relationship, soil moisture constants, consumptive use, estimation of consumptive use, crop water requirement, duty and delta, factors affecting duty, depth and frequency of irrigation, irrigation efficiencies, water logging and drainage, standards of quality for irrigation water, crop rotation.

Unit – II

Canals: Classification, design of non-erodible canals - methods of economic section and maximum permissible velocity, economics of canal lining, design of erodible canals - Kennedy’s silt theory and Lacey’s regime theory, balancing depth of cutting.

Unit – III

Canal Structures:

Falls: Types and location, design principles of Sarda type fall and straight glacis fall.

Regulators: Head and cross regulators, design principles

Cross Drainage Works: Types, selection, design principles of aqueduct, siphon aqueduct and super passage.

Outlets: types, proportionality, sensitivity and flexibility

River Training: Objectives and approaches

Unit – IV

Diversion Head Works: Types of diversion head works, weirs and barrages, layout of diversion head works, components. causes and failures of weirs on permeable foundations, Bligh’s creep theory, Khosla’s theory, design of impervious floors for subsurface flow, exit gradient.

Unit – V
Reservoir Planning: Investigations, site selection, zones of storage, yield and storage capacity of reservoir, reservoir sedimentation.

Dams: Types of dams, selection of type of dam, selection of site for a dam.

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a dam, stability analysis, drainage galleries, grouting.

Unit – VI

Earth Dams: Types, causes of failure, criteria for safe design, seepage, measures for control of seepage-filters, stability analysis-stability of downstream slope during steady seepage and upstream slope during sudden drawdown conditions.

Spillways: Types, design principles of Ogee spillways, types of spillways crest gates. Energy dissipation below spillways-stilling basin and its appurtenances.

Course Outcomes

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

estimate irrigation water requirements

design irrigation canals and canal network

plan an irrigation system

design irrigation canal structures

plan and design diversion head works

analyse stability of gravity and earth dams

design oggee spillways and energy dissipation works

Text Books :


References:


Web-Resources: www.nptel.com

IV Year B.Tech. (CE) – I Semester

construction technology and management

Course Objectives:

The objective of this course is:

To introduce to the student the concept of project management including network drawing and monitoring.

To introduce the various equipment related to construction like earth moving equipment, trucks and handling equipment, aggregate production and construction equipment and machinery.

To introduce the importance of safety in construction projects.

Unit – I


Unit – II
Project evaluation and review technique – cost analysis - updating – crashing for optimum cost – crashing for optimum resources – allocation of resources.

Unit – III


and handling equipment – calculation of truck production – compaction equipment – types of compaction rollers.

Unit – IV


Unit – V


Unit – VI


Course Outcomes

Upon the successful completion of this course, the students will be able to:

Appreciate the importance of construction planning.

Understand the functioning of various earth moving equipment.

Know the methods of production of aggregate products and concreting.

Apply the gained knowledge to project management and construction techniques.

Text Books:
Course Objectives:

The objective of this course is:

Familiarize Students with concepts of prestressing.

Equip student with different systems and devices used in prestressing.

Understand the different losses of prestress including short and long term losses.

Familiarize students with the analysis and design of prestressed concrete members under flexure, shear and torsion.

Unit – I

Basic concepts of Prestressing- Advantages and Applications of Prestressed Concretes, High Strength Concrete- Permissible Stresses, Shrinkage, Creep, Deformation Characteristics, High strength Steel-
Types, Strength- Permissible Stresses- Relaxation of Stress, Stress Corrosion- Durability, Fire Resistance, Cover Requirements.

Unit – II

Prestressing Systems- Introduction, Tensioning devices, Pre-tensioning Systems, Post tensioning Systems, Basic Assumptions in Analysis of prestress and design, Analysis of prestress, Resultant Stresses at a section- pressure line- Concepts of load balancing- Stresses in Tendons, Cracking moment.

Unit – III

Losses of Pre-stressing- Loss of Pre-stress in pre-tensioned and post tensioned members due to various causes -Elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage, differential shrinkage- bending of members and frictional losses- Total losses allowed for design.

Unit – IV


Unit – V

Design for Shear and Torsion- Shear and Principal Stresses- Design of Shear reinforcements- Codal Provisions- Design for Torsion, Design for Combined bending, shear and torsion.

Unit – VI

Transfer of Prestress in pre tensioned members- Transmission length- Bond stresses- end zone reinforcement- Codal provisions- Anchorage zone Stresses in Post tensioned members- Stress distribution in end block- Anchorage Zone reinforcement.

Course Outcomes
At the end of this course the student will be able to

Understand the different methods of prestressing.

Estimate the effective prestress including the short and long term losses.

Analyze and design prestressed concrete beams under flexure and shear.

Understand the relevant IS Codal provisions for prestressed concrete

Text Books :

1. ‘Prestressed Concrete’ by N. Krishna Raju, Tata McGraw hill
2. ‘Prestressed Concrete’ by S. Ramamrutham

References: 

1. ‘Prestressed Concrete’ by P. Dayaratnam
2. ‘Prestressed Concrete’ by T. Y. Lin & Burns, Wiley Publications

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – I Semester

remote sensing and gis applications

Course Objectives: 

The course is designed to

Introduce the basic principles of Remote Sensing and GIS techniques.

Learn various types of sensors and platforms

learn concepts of visual and digital image analyses

Understand the principles of spatial analysis

Appreciate application of RS and GIS to Civil engineering
Unit – I

Introduction to remote sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces characteristics of remote sensing systems.

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, spaceborne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT.

Unit – II

Image analysis: Introduction, elements of visual interpretations, digital image processing- image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

Unit – III

Geographic Information System: Introduction, key components, application areas of GIS, map projections.

Data entry and preparation: spatial data input, raster data models, vector data models.

Unit – IV

Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing.

Unit – V

RS and GIS applications General: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications.

Unit – VI
Application to Hydrology and Water Resources: Flood zoning and mapping, groundwater prospects and potential recharge zones, watershed management.

Course Outcomes

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

Be familiar with ground, air and satellite based sensor platforms.

Interpret the aerial photographs and satellite imageries

Create and input spatial data for GIS application

Apply RS and GIS concepts in water resources engineering

Text Books:


References:


Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – I Semester

ground improvement techniques

(Selective-I)

Course Objectives:

The objective of this course is:

To make the student appreciate the need for different ground improvement methods adopted for improving the properties of remoulded and in-situ soils by adopting different techniques such as in situ densification and dewatering methods.

To make the student understand how the reinforced earth technology and soil nailing can obviate the problems posed by the conventional retaining walls.

To enable the students to know how geotextiles and geosynthetics can be used to improve the engineering performance of soils.

To make the student learn the concepts, purpose and effects of grouting.

Unit – I

In situ densification methods- in situ densification of granular soils- vibration at ground surface and at depth, impact at ground and at depth – in situ densification of cohesive soils – pre loading – vertical drains – sand drains and geo drains – stone columns.

Unit – II

Dewatering – sumps and interceptor ditches – single and multi stage well points – vacuum well points – horizontal wells – criteria for choice of filler material around drains – electro osmosis
Unit – III


Unit – IV


Unit – V


Unit – VI


Course Outcomes

By the end of the course, the student should be able to possess the knowledge of various methods of ground improvement and their suitability to different field situations.

The student should be in a position to design a reinforced earth embankment and check its stability.

The student should know the various functions of Geosynthetics and their applications in Civil Engineering practice.

The student should be able to understand the concepts and applications of grouting.
Text Books:


References:

1. ‘Ground Improvement’ by MP Moseley, Blackie Academic and Professional, USA.
2. ‘Designing with Geosynthetics’ by RM Koerner, Prentice Hall.

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – I Semester

air pollution and control

(Elective-I)

Course Objectives:

The course will address the following:

To know the analysis of air pollutants
To know the Threshold Limit Values (TLV) of various air pollutants
To acquire the design principles of particulate and gaseous control
To learn plume behaviour in different environmental conditions
To learn carbon credits for various day to day activities

Unit – I

Air Pollution: Sampling and analysis of air pollutants, conversion of ppm into μg/m3. Definition of terms related to air pollution and control - secondary pollutants - Indoor air pollution - Climate Change and its impact - Carbon Trade.
Unit – II

Unit – III

Unit – IV
Ambient Air Quality Management: Monitoring of SPM, SO2; NOx and CO - Stack Monitoring for flue gases - Micro-meteorological monitoring - Weather Station. Emission Standards- Gaussian Model for Plume Dispersion.

Unit – V
Air Pollution Control: Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control Equipments – Settling Chambers, Cyclone separators – Fabric filters– scrubbers, Electrostatic precipitators.

Unit – VI
Air Pollution Control Methods: Control of NOx and SOx emissions – Environmental friendly fuels - In-plant Control Measures, process changes, methods of removal and recycling. Environmental criteria for setting industries and green belts.
Course Outcomes

Upon successful completion of this course, the students will be able to:

Decide the ambient air quality based on the analysis of air pollutants.
The design principles of particulate and gaseous control measures for an industry.
Judge the plume behaviour in a prevailing environmental condition
Estimate carbon credits for various day to day activities.

Text Books:


References:


Web-Resources: www.nptel.com

IV Year B.Tech. (CE) – I Semester

matrix methods of structural analysis

(Elective-I)

Course Objectives:

The objective of this course is:
Learn the fundamental concepts of matrix structural mechanics, such as the stiffness method.

The concepts of structural analysis learnt in mechanics of solids and structures course.

Understanding the analysis of statically determinate and indeterminate structures such as trusses, beams, frames and plane stress problems.

Learn the concepts of the stiffness method and apply it to a variety of structural problems involving trusses, beams, frames, and plane stress.

Unit – I


Unit – II

Generation Element stiffness matrix for truss element, beam element and torsional element- Element force - displacement equations.

Unit – III


Unit – IV


Unit – V

Unit – VI

Space trusses and frames - Member stiffness for space truss and space frame– Transformation matrix from Local to Global – Analysis of simple trusses, beams and frames.

Course Outcomes

Upon completion of the course, the student will be able to

Perform the structural analysis of determinate and indeterminate structures using classical compatibility methods, such as method of consistent deformations, force and equilibrium methods.

Perform structural analysis using the stiffness method.

Solve multiple degree of freedom two dimensional problems involving trusses, beams, frames and plane stress.

Text Books :

1. ‘Matrix Methods of Structural Analysis’ by Pundit and Gupta


References:


2. ‘Advanced structural analysis’ by Dr. P. Dayaratnam- Tata Mc Graw hill publishing company limited.

Web-Resources: www.nptel.com
IV Year B.Tech. (CE). – I Semester

urban hydrology
(Elective-I)

Course Objectives:
The course is designed to:

appreciate the impact of urbanization on catchment hydrology
understand the importance of short duration rainfall runoff data for urban hydrology studies.
learn the techniques for peak flow estimation for storm water drainage system design.
understand the concepts in design of various components of urban drainage systems.
learn some of the best management practices in urban drainage.
understand the concepts of preparation master urban drainage system.

Unit – I


Unit – II

Precipitation Analysis: Importance of short duration of rainfall and runoff data, methods of estimation of time of concentration for design of urban drainage systems, Intensity-Duration -Frequency (IDF)curves, design storms for urban drainage systems.

Unit – III

Approaches to urban drainage: Time of concentration, peak flow estimation approaches , rational method, NRCS curve number approach, runoff quantity and quality, wastewater and stormwater reuse, major and minor systems.
Unit – IV

Elements of drainage systems: Open channel, underground drains, appurtenances, pumping, source control.

Unit – V

Analysis and Management: Stormwater drainage structures, design of stormwater network– Best Management Practices–detention and retention facilities, swales, constructed wetlands, models available for stormwater management.

Unit – VI

Master drainage plans: Issues to be concentrated upon – typical urban drainage master plan, interrelation between water resources investigation and urban planning processes, planning objectives, comprehensive planning, use of models in planning.

Course Outcomes

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

develop intensity duration frequency curves for urban drainage systems.

develop design storms to size the various components of drainage systems.

apply best management practices to manage urban flooding.

prepare master drainage plan for an urbanized area.

Text Books :


References:


Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – I Semester

advanced surveying

(Elective-I)

Course Objectives:

The objective of this course is to enable the students to,

Understand the basics of Geodetic Surveying and triangulation systems.

Understand the hygrographic surveying and prediction of tides.

Understand the Photogrammetric Surveying and Astronomical Surveying.

Understand the importance and applications of total stations and GPS.

Unit – I

Geodetic Surveying: Definition, importance, triangulation system, order of triangulation, size and shape of triangulation, strength of figure criterion, triangulation fieldwork, base line measurement- tape corrections, problems in baseline measurement, measurement of angles.
Unit – II
Hydrographic Surveying: Tides-lunar tides, solar tides, spring and neap tides, measurement of tides-shore lines, soundings, sounding equipments, locating soundings by cross rope method and range and time intervals-mean sea level-prediction of tides.

Unit – III
Photogrammetric Surveying: Basic principles, photo theodolite, horizontal and vertical angles from terrestrial photographs, elevation of a point by photographic measurement, determination of focal length of the lens, Aerial camera- scale of vertical photograph, scale of tilted photograph, combined effects of tilt and relief, stereoscopic vision, mosaics.

Unit – IV
Astronomical Surveying: Spherical Trigonometry, latitude and longitude, solar system, astronomical teams, coordinate systems-altitude, azimuth system, declination, hour angle system, time and astronomical work-sidereal time, apparent solar time, mean solar time, standard time, standard time, application of astronomy in surveying, corrections to astronomical observations.

Unit – V
Total stations: Importance, measurement of horizontal angles, vertical angles, horizontal distance, slope distance, height of object-remote elevation measurement (REM), remote distance measurement (RDM)-radial and continuous distances for measuring the lengths and sides of the closed circuits, areas and perimeters calculations.

Unit – VI

Course Outcomes
Upon the successful completion of this course, the students will be able to:

The student should be able to conduct different types of surveys for obtaining better results.

The student should be able to utilize the total stations for getting the required information.

The student should be capable of using the GPS instrument to obtain appropriate information of the objects and their positions.

Text Books:

1. ‘Surveying and Levelling’ by R. Subramanian, Oxford University Press, New Delhi.

References:


Web-Resources: www.nptel.com
Understand the elements and principles of interior designs and decorations.

Learn the importance of art elements in the composition of building spaces.

Learn the new design concepts for developing interiors of buildings.

Learn the application of colors, lightings, furniture in creating beautiful interiors.

Unit – I

Development of interior design concepts- importance for interiors in modern buildings, changing trends and salient features, objectives of aesthetic planning - beauty, expressiveness, functionalism, economy-good taste - meaning and importance- developing skill in aesthetics.

Unit – II

Designs- concepts, meaning, purpose, types - structural and decorative characteristics, forms to function relationship, elements of designs - line and direction, form and shape, size, colour, light, pattern, texture and space - application of elements to form designs.

Unit – III

Application of colour harmonies in the interiors and exteriors –effects of light on colour, Illusion of colour, psychology of colour, effect of colour on each other-uses and application of colours- walls, wall finishes, ceilings, roofs, decorative exteriors.

Unit – IV

Importance of lighting – artificial lighting - light sources, types and uses of light, specific factors in lighting- measurements of lighting, psychological aspects of light, glare, types of glare and prevention—selection of lamps, lighting fixtures, lighting for various areas and activities.

Unit – V
Principles of design – balance, rhythm, emphasis, harmony, proportion - meaning and application of design concepts in the interior and exterior houses and other commercial buildings- development of design from motifs, elements of art-selection of different art forms, display of art pieces.

Unit – VI

Interior furnishings- floors, floor coverings, soft furnishings, furniture selection and arrangement, placement of accessories, home accessories interior decorations- flower arrangement, floor decorations, interior decoration trends in India.

Course Outcomes

Upon the successful completion of this course, the students will be able to:

understand the importance of interior designs and decorations.

Should realize the use of art elements in the composition of building spaces.

Should learn the new design concepts for developing interiors of buildings.

Learn be able to apply colors, lightings, furniture in creating beautiful interiors.

Text Books :


References:


Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – I Semester

Quantity Surveying lab

Course Objectives:

The objective of this course is to enable the students to:

Understand the quantity calculations of different components of the buildings.

Understand the rate analysis of different quantities of the buildings components.

Learn various specifications and components of the buildings.

Estimation & Quantity Surveying for –

1. Residential Building

2. Commercial Complex

3. Hospital

4. Bank

5. School

6. Recreation Buildings (Auditorium or Cinema Theatre)

Course Outcomes

Upon the successful completion of this course:

The student should be able to determine the quantities of different components of buildings.

The student should be in a position to find the cost of various building components.
The student should be capable of finalizing the value of structures.

Text Books:

References:
GIET Lab Manuals

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – I Semester

gis & cad lab
Course Objectives:
The course is designed to
introduce image processing and GIS software
familiarize structural analysis software
understand the process of digitization, creation of thematic map from toposheets and maps.
learn to apply GIS software to simple problems in water resources and transportation engineering.
learn to analyse 2 D and 3D frame steel tubular truss using structural analysis software.
learn to analyse and design retaining wall and simple towers.

GIS:

SOFTWARES:
1. Arc GIS 9.0
2. ERDAS 8.7
3. MapInfo 6.5
Any one or Equivalent.

EXERCISES IN GIS:
1. Digitization of Map/Toposheet
2. Creation of thematic maps.
3. Estimation of features and interpretation
4. Developing Digital Elevation model
5. Simple applications of GIS in water Resources Engineering & Transportation Engineering.

COMPUTER AIDED DESIGN AND DRAWING:
SOFTWARE:
1. STAAD PRO / Equivalent/
2. STRAAP
3. STUDDS

EXERCISES:
1. 2-D Frame Analysis and Design
2. Steel Tabular Truss Analysis and Design
3. 3-D Frame Analysis and Design
4. Retaining Wall Analysis and Design
5. Simple Tower Analysis and Design
Course Outcomes

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

work comfortably on GIS software

digitize and create thematic map and extract important features

develop digital elevation model

use structural analysis software to analyse and design 2D and 3D frames.

design and analyse retaining wall and simple towers using CADD software.

Text Books:


References:

GIET Lab Manuals.

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – I Semester

Summer Internship/Training
IV Year B.Tech. (CE) – II Semester

estimating, specifications & contracts

Course Objectives:

The objective of this course is to enable the students to:

Understand the quantity calculations of different components of the buildings.

Understand the rate analysis of different quantities of the buildings components.

Learn various specifications and components of the buildings.

Unit – I


Unit – II

Rate Analysis – Working out data for various items of work over head and contigent charges.

Unit – III

Earthwork for roads and canals, Reinforcement bar bending and bar requirement schedules.

Unit – IV


Unit – V

Detailed Estimation of Buildings using individual wall method.
Unit – VI

Detailed Estimation of Buildings using centre line method.

Course Outcomes

Upon the successful completion of this course:

The student should be able to determine the quantities of different components of buildings.

The student should be in a position to find the cost of various building components.

The student should be capable of finalizing the value of structures.

Text Books:


References:

2. IS 1200 (Parts I to XXV-1974/ Method of Measurement of Building & Civil Engg Works – B.I.S.)
3. ‘Estimation, Costing and Specifications’ by M. Chakraborti; Laxmi publications.

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester

engineering with geo-synthetics

(Elective-II)
Course Objectives:

The Objectives of the course are to impart to the student

An overview of the evolution of new construction materials in geotechnical engineering and to initiate geosynthetic materials.

Understanding the properties and the testing methods of different types of materials of geosynthetics.

The knowhow of manufacturing methods, uses and applications of geotextiles, geogrids, geomembranes and geocomposites.

The concepts of designing geosynthetics for the functions of separation, reinforcement, stabilization, filtration, drainage and moisture barriers.

Designing criteria of reinforced earth retaining walls, gabions, pond liners, covers for reservoirs, canal liners, landfill liners, caps and closures, dams and embankments.

Additional advantages of geocomposites, geowebs and geocells, and moisture barriers and natural geotextiles etc. for applications to meet various functions.

Unit – I


Unit – II


Unit – III

Use of Geosynthetics in Roads: Geosynthetics in road ways- applicationsrole of subgrade conditions-design criteria-survivability-application in paved roads.

Unit – IV

Unit – V


Unit – VI

Natural Geotextiles: Natural fibres as geotextiles- factors governing the usejute fibres-coir geotextiles-bamboo/timber-combination of geotextiles.

Course Outcomes

At the successful completion of this course the student will be able to

Realize the need and demand for the use of geosynthetic materials in the field of geotechnical construction works.

Conduct required laboratory and field tests to obtain the properties of different materials of geosynthetics.

Distinguish and describe various manufacturing methods of geotextiles, geogrids, geomembranes and geocomposites.

Understand concepts and could design the geosynthtics for the functions of separation, reinforcement, stabilization, filtration, drainage and moisture barriers.

Design reinforced earth retaining walls, gabions, pond liners, covers for reservoirs, canal liners, landfill liners, caps and closures.

Distinguish survivability requirements of geocomposites and could design geowebs, geocells, and moisture barriers and natural geotextiles etc.

Text Books :


References:


Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester

environmental impact assessment and management

(Elective-II)

Course Objectives:

The objective of this course is:

To impart knowledge on different concepts of Environmental Impact Assessment.

To know procedures of risk assessment

To learn the EIA methodologies and the criterion for selection of EIA methods.

To pre-requisites for ISO 14001 certification

To know the procedures for environmental clearances and audit

To appreciate the importance of stakeholder participation in EIA

Unit – I
Basic concept of EIA: Elements of EIA-factors affecting EIA-Initial environmental Examination-life cycle analysis preparation of Environmental Base map-Classification of environmental parameters – role of stakeholders in the EIA preparation –stages in EIA.

Unit – II

EIA Methodologies: introduction, Criteria for the selection of EIA Methodology, EIA methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis - EIS and EMP.

Unit – III

Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives - application of remote sensing and GIS for EIA.

Unit – IV

Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures - EIA with reference to surface water, Air and Biological environment:

Methodology for the assessment of Impacts on surface water environment, Generalized approach for assessment of Air pollution Impact.

Unit – V

Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation.

Environmental Risk Assessment and Risk management in EIA: Risk assessment and treatment of uncertainty-key stages in performing an Environmental Risk Assessment-advantages of Environmental Risk Assessment.

Unit – VI

EIA notification by Ministry of Environment and Forest (Govt. of India): Provisions in the EIA notification, procedure for environmental clearance, procedure for conducting environmental impact assessment

Case studies and preparation of Environmental Impact assessment statement for various Industries.

Course Outcomes

Upon successful completion of this course, the students will be able to:

Prepare EMP, EIS, and EIA report

Identify the risks and impacts of a project

Selection of an appropriate EIA methodology

Evaluation the EIA report

Estimate the cost benefit ratio of a project

Know the role of stakeholder and public hearing in the preparation of EIA

Text Books :


References:

3. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd., Delhi.

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester
advanced structural engineering
(Elective-II)

Course Objectives:

The objective of this course is:

Familiarize Students with Raft Foundations and Retaining walls.
Equip student with concepts of design of different types of RCC water tanks.
Understand Concepts of flat slabs
Familiarize different types of Bunkers, Silos and Chimneys.
Understand different types of transmission towers.

Unit – I
Analysis and Design of Raft Foundations – Design of RCC Retaining walls: Cantilever and Counter fort

Unit – II
Analysis and Design of RCC Water Tanks, Circular and Rectangular types- Intze tank including staging.

Unit – III
Analysis and Design of Flat Slabs- Direct Design and Equivalent Frame Methods- Check for Punching shear.

Unit – IV
Analysis and Design of Bunkers and Silos- Concepts of Loading.

Unit – V
Analysis and Design of Chimney, Concepts of loading
Unit – VI

Introduction to Transmission Towers- Principles and procedures

Course Outcomes

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

Design raft foundations and different types of RCC retaining walls

Carryout analysis and design of different types of RCC water tanks

Solve the problems design of RCC Bunkers, Silos and Chimneys

Understand various types of transmission towers and loading on them.

Text Books :

1. ‘Reinforced Concrete Structures’ Vol-2 by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

2. ‘Reinforced Concrete Structures’ by N. Subrahmanian, Oxford Publishers


References:


Codes: Relevant IS: codes.

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester

ground water development and management

(Elective-II)

Course Objectives:
The course is designed to

Appreciate groundwater as an important natural resource.

Understand flow towards wells in confined and unconfined aquifers.

Understand the principles involved in design and construction of wells.

Create awareness on improving the groundwater potential using various recharge techniques.

Know the importance of saline water intrusion in coastal aquifers and its control measures.

Appreciate various geophysical approaches for groundwater exploration.

Learn groundwater management using advanced tools.

Unit – I

Introduction

Groundwater in the hydrologic cycle, groundwater occurrence, aquifer parameters and their determination, general groundwater flow equation.

Well Hydraulics

Steady radial flow and unsteady radial flow to a well in confined and unconfined aquifers, Theis solution, Jocob and Chow’s methods, Leaky aquifers.

Unit – II

Well Design

Water well design-well diameter, well depth, well screen-screen length, slot size, screen diameter and screen selection, design of collector wells, infiltration gallery.

Unit – III

Well Construction and Development

Water wells, drilling methods-rotary drilling, percussion drilling, well construction-installation of well screens-pull-back method, open- hole, baildown and wash-down methods, well development-mechanical surging using compressed air, high velocity jetting of water, over pumping and back washing, well completion, well disinfection, well maintenance.
Unit – IV

Artificial Recharge

Concept of artificial recharge of groundwater, recharge methods-basin, stream-channel, ditch and furrow, flooding and recharge well methods, recharge mounds and induced recharge.

Saline Water Intrusion

Occurrence of saline water intrusion, Ghyben-Herzberg relation, Shape of interface, control of saline water intrusion.

Unit – V

Geophysics


Unit – VI

Groundwater Modelling and Management

Basic principles of groundwater modelling- Analog models-viscous fluid models and membrane models, digital models-Finite difference and finite element models, Concepts of groundwater management, basin management by conjunctive use-case studies.

Course Outcomes

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

Estimate aquifer parameters and yield of wells.

Analyse radial flow towards wells in confined and unconfined aquifers.

Design wells and understand the construction practices.

Interpret geophysical exploration data for scientific source finding of aquifers.

Determine the process of artificial recharge for increasing groundwater potential.
Take effective measures for controlling saline water intrusion.

Apply appropriate measures for groundwater management.

Text Books:

References:

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester

traffic engineering
(Elective-II)

Course Objectives:
The objective of this course is:

To know various components and characteristics of traffic.

To know various traffic control devices and principles of highway safety.

To understand the detrimental effects of traffic on environment
To know highway capacity and level of service concepts.

To learn about intelligent vehicle highway systems.

Unit – I

Components Of The Traffic System: Human-Vehicle–Environment System; characteristics of Road users, Vehicles, Highways and their classification; Traffic Studies: Inventories; Volume studies; Speed, Travel time and Delay studies; Intersection studies; Pedestrian studies; Parking studies; Accident studies.

Unit – II

Traffic Characteristics: Microscopic and macroscopic flow characteristics: Time headways; Temporal, spatial and model flow patterns; Interrupted and Un interrupted traffic. Microscopic and macroscopic speed characteristics: Vehicular speed Trajectories; Speed characteristics – Mathematical distribution; Speed and travel time variations; Travel time and delay studies.

Microscopic and Macroscopic density characteristics: Distance headway characteristics; Car-following theories; Density measurement techniques; Density contour maps.

Unit – III

Traffic Control Devices & Highway Safety: Traffic signs & Markings; Signal Warrants; Signal phasing and Development of phase plans; Fixed and Vehicle activated signals; Webster method; ARRB method; Drew's Method; IRC method; Signal coordination; Area Traffic control. Accident characteristics – Road – Driver – Vehicle; Accident recording and Analysis; Highway Safety Improvement Program; Safety Audit.

Unit – IV

Environmental Considerations: Air pollution: Kinds of pollutants; Air pollution standards; Measures of air quality; modelling and control. Noise pollution: Measurement of sound levels; Acceptable limits, Prediction of noise levels, Traffic noise control.

Unit – V

Highway Capacity And Level Of Service: Capacity and level of service; Factors affecting Capacity and LOS; Capacity of Rural Highways, Capacity of Urban Roads; HCM and IRC standards.
Unit – VI

Intelligent Vehicle – Highway Systems: Traffic surveillance and monitoring; IVHS programs, Role of IVHS, IVHS categories, Benefits and Costs of IVHS.

Course Outcomes

At the end of course, Student can

Determine traffic speed, volume, travel time and density.

Design traffic signals

Determine highway capacity

Text Books :


References:

1. ‘Traffic Engineering Hand Book’ by Institute of Transportation Engineers, 4 Ed., Prentice Hall
2. ‘Traffic Engineering’ by Mc Shane, WR and RP Roess, Prentice Hall.
4. ‘Traffic Planning and Engineering’ by Hobbs FD., Pergamon press
5. ‘Traffic flow fundamentals’ by May, AD., Prentice Hall.

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester

infrastructure management
(Elective-II)

Course Objectives:

The objective of the course is

To acquaint student with common characteristics of different infrastructures, performance & ageing identification.

To familiarize student with modes of planning, maintenance policies.

To acquaint student with costs, benefits and trade analysis in economic planning of infra management.

To familiarize student with various asset management systems, maintenance techniques and IT adoption for maintenance of accounts etc.

Unit – I

Performance Measures & Deterioration Modeling: Defining performance, Common characteristics of infrastructures, Condition assessment and condition indices; Different types of deterioration models; Empirical and Mechanistic models, Markov and Semi-Markov models, Risk-based deterioration modeling

Unit – II

PRIORITIZATION AND MAINTENANCE PLANNING & POLICY: Needs Analysis, Ranking by single criteria, Ranking by fixed and variable trigger points, Single/multiple-year prioritization; Different types of maintenance planning, Maintenance policy.

Unit – III

INFRASTRUCTURE ECONOMICS: Costs and benefits, Trade-off Analysis, Cost-effectiveness technique and Budget allocation.

Unit – IV

OPTIMIZATION: Objective functions, decision variables and constraints, Optimization techniques, Optimal maintenance planning.

Unit – V

Unit – VI

Tools and Technology: Destructive Testing, Nondestructive Testing, Database Management System for Inventory Data Control, Other Information Technology.

Course Outcomes

Upon the successful completion of this course, the students will be able to:

Appreciate the importance of assessment of characteristics of particular infra, performance, condition and depreciation etc.,

Able to identify the priorities in infra management, accordingly plan the maintenance works, estimation of maintenance costs of assets etc.

Can be able to analyses the costs & benefits, budget the financial requirement.

Can identify the components of asset management systems and plan to adopt accordingly.

Text Books:


References:


Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester
Design and Drawing of Irrigation Structures

(Elective-II)

Course Objectives:

The objective of this course is:

1. Expose and acquaint students with different types of hydraulic structures, in minor and major irrigation systems and their functions.
2. Familiarize students with concepts of design of irrigation structures.
3. Understand the different design parameters and types of structures.
4. Familiarize students with established field practices in collection of data and operational requirements.
5. Familiarize students in understanding the critical points in design of a major canal system.

Design and drawing of:

1. Surplus weir.
2. Tank sluice with a tower head
4. Canal regulator
5. Under tunnel
6. Syphon aqueduct type III

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination is three hours.

Course Outcomes

Upon successful completion of this course, student will be able to

work on different design formats and codes

Carry out design of minor or major irrigation structures, with specific study of location/situations.

Carry out the analysis or designs of masonry/concrete structures for tension, compression and stability.

Produce detailed drawings of designed structures as ready for construction.
Text Books:

2. Irrigation, water power and water resources Engineering by Dr. K.R. Arora, Standard Publishing house, Delhi.

References:


Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester
advanced foundation engineering
(Elective–III)

Course Objectives:

The objective of this course is:

To enable the student to appreciate how Meyerhof’s general bearing capacity equations are important over Terzaghi’s bearing capacity equation.

To teach the student special methods of computation of settlements and the corrections to be applied to settlements.

To enable the student to understand the advanced concepts of design of pile foundations.

To teach the student the problems posed by expansive soils and the foundation practices appropriate to expansive soils.

To enable the student to learn the difference between isolated and combined footings, the determination of bearing capacity of mats and proportioning of footings.
Unit – I

Bearing capacity of Foundations using general bearing capacity equation – Meyerhof’s, Brinch Hansen’s and Vesic’s methods.

Unit – II


Unit – III


Unit – IV


Unit – V


Unit – VI

Course Outcomes

Upon successful completion of this course, student will be able to

Compute the safe bearing capacity of footings subjected to vertical and inclined loads.

Understand the advanced methods of settlement computations and proportion foundation footings.

Appreciate the methods of computing the pull-out capacity and negative skin friction of piles and compute the settlements of pile groups in clays.

Appreciate the problems posed by expansive soils and the different foundation practices devised.

Appreciate the difference between isolated footings and combined footings and mat foundations.

Text Books:


References:


Web-Resources: www.nptel.com

IV Year B.Tech. (CE) – II Semester

solid waste management

(Elective-III)
Course Objectives:

The objective of this course is:

To impart the knowledge the methods of collection and optimization of collection routing of municipal solid waste.

To acquire the principles of treatment of municipal solid waste

To know the impact of solid waste on the health of the living beings

To learn the criterion for selection of landfill and its design

To plan the methods of processing such as composting the municipal organic waste.

Unit – I

Introduction to Solid Waste Management: Goals and objectives of solid waste management, Classification of Solid Waste - Factors Influencing generation of solid waste - sampling and characterization –Future changes in waste composition, major legislation, monitoring responsibilities.

Unit – II

Basic Elements In Solid Waste Management: Elements and their inter relationship – principles of solid waste management- onsite handling, storage and processing of solid waste


Unit – III

Transfer and Transport: Need for transfer operation, compaction of solid waste - transport means and methods, transfer station types and design requirements.

Unit – IV

Separation and Transformation of Solid Waste: unit operations used for separation and transformation: shredding - materials separation and recovery, source reduction and waste minimization.
Unit – V


Unit – VI


Course Outcomes

Upon successful completion of this course, the students will be able to:

Design the collection systems of solid waste of a town

Design treatment of municipal solid waste and landfill

To know the criteria for selection of landfill

To characterise the solid waste and design a composting facility

Text Books :


References:


Web-Resources: www.nptel.com
IV Year B.Tech. (CE). – II Semester

earthquake resistant design

(Elective-III)

Course Objectives:

The objective of this course is:

Familiarize Students with Engineering Seismology

Equip student with concepts of Structural Dynamics

Understand Concepts of Seismic Design

Familiarize with Design philosophies for Seismic loading

Familiarize students with various IS codal provisions for ductile design and detailing

Unit – I

Engineering seismology – rebound theory – plate tectonics – seismic waves - Earthquake size and various scales – local site effects – Indian seismicity – seismic zones of India – theory of vibrations – near ground and far ground rotation and their effects.

Unit – II


Unit – III


Unit – IV
Calculation of equivalent lateral force- Design Base Shear- Storey Shear, Estimation of Natural period of Structure, Computation of Response acceleration Coefficient- Zone factor- Seismic weight- Response reduction factors- Seismic Coefficient Method.

Unit – V
Design and ductile detailing of Beams and columns of frames -Concept of strong column weak beams, Ductility criteria for earthquake resistant design, Ductile detailing of flexural members as per IS 13920- Longitudinal reinforcement, Shear reinforcement, Anchorage of reinforcement- Development length, Lap Splices.

Unit – VI
Seismic Analysis and design of simple 2-storied RC Building frame – Equivalent static lateral force method and response spectrum method.

Course Outcomes
At the end of this course the student will be able to
Explain fundamentals of Engineering Seismology
Acquaint with the principles Structural dynamics
Solve SDOF Systems and suggest ductile design
Compute equivalent lateral seismic loads and carryout a seismic design as per IS codal provisions

Text Books :
2. ‘Earthquake Resistant Design of Building Structures’ by Vinod Hosur, Wiley India Ltd.
3. ‘Reinforced Concrete Design’ by A. K. Jain.

References:
2. Relevant code of practices.

Web-Resources: www.nptel.com

IV Year B.Tech. (CE) – II Semester

Water shed management
(Elective-III)

Course Objectives:
The course is designed to:
introduce the concept of watershed management
understand the watershed characteristics
learn the principles of soil erosion and measures to control erosion
appreciate various water harvesting techniques.
learn land management practices for various land use/land cover.
introduce concepts of watershed modelling.

Unit – I
Introduction: Concept of watershed development, objectives of watershed development, need for watershed development, Integrated and multidisciplinary approach for watershed management.

Unit – II
Characteristics of Watersheds: Size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

Unit – III


Measures to Control Erosion: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, check dams, rock-fill dams, brushwood dam, Gabion.

Unit – IV

Water Harvesting: Techniques of rain water harvesting- rain water harvesting from roof top, surface flow harvesting, subsurface flow harvesting, stop dams, farm ponds and dugout ponds, percolation tanks.

Unit – V

Land Management: Land use and Land capability classification, management of forest, agricultural, grassland and wild land, land grading operation, Reclamation of saline and alkaline soils.

Unit – VI

Watershed Modelling: Data of watershed for modelling, application and comparison of watershed models, model calibration and validation, advances of watershed models.

Course Outcomes

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

calculate watershed parameters and analyse watershed characteristics to take appropriate management action.

quantify soil erosion and design control measures.

apply land grading techniques for proper land management.
suggest suitable harvesting techniques for better watershed management.

apply appropriate models for watershed management.

Text Books:

References:

Web-Resources: www.nptel.com

IV Year B.Tech. (CE) – II Semester

pavement analysis and design
(Elective-III)

Course Objectives:
The objective of this course is:
To know various factors affecting pavement design
To know various concepts for the stresses in pavements.
To understand material characterisation and mix design concepts.
To acquire design principles of flexible and rigid pavements.
To acquire design principles of shoulders, overlays and drainage.
Unit – I


Unit – II


Unit – III


Unit – IV

Unit – V


Unit – VI


Course Outcomes

At the end of course, Student can

Design flexible and rigid pavements using various methods

Design shoulders, overlays and drainage.

Text Books :


References:

green buildings

(Elective-III)

Course Objectives:

The objective of this course is:

To expose the student to acquaint with different concepts of green technologies and relevance to buildings.

To acquaint the principles of energy efficient design mode.

To impart knowledge of methods to improve ecological and environmental standards, favourable to humanity.

To acquaint the student with latest types of building materials, friendly to green building technologies and their utility.

Economical design concepts, to conserve energy, by rational design of ventilation, lighting, water supply and drainage.

Unit – I

Green Buildings: Definition of Green Buildings, typical features of green buildings, benefits of Green Buildings- Sustainable site selection and planning of buildings to maximize comfort, day lighting, ventilation, planning for storm water drainage

Unit – II
Environmentally friendly building materials and technologies: Natural Materials like bamboo, timber, rammed earth, stabilized mud blocks, hollow blocks, lime & lime-pozzolana cements, materials from agro and industrial waste, ferro-cement and ferro-concrete, alternative roofing systems, various paints reducing the heat gain of the building, etc.

Unit – III

Energy and resource conservation: Need for energy conservation, various forms of energy used in buildings, embodied energy of materials, energy used in transportation and construction processes-water conservation systems in buildings-water harvesting in buildings – waste to energy management in residential complexes or gated communities.

Unit – IV

Use of renewable energy resources: Wind and Solar Energy Harvesting, potential of solar energy in India and world, construction and operation of various solar appliances, success case studies of fully solar energy based buildings in India.

Unit – V

Climate Design: Local climatic conditions – temperature, humidity, wind speed and direction-impact of climate change on built environment - comforts: the desirable conditions – Principles of thermal design - means of thermal –light and lighting-building acoustics- energy efficient lighting, Ventilation and air quality requirement, various techniques for passive cooling, garden roofs, case studies for passive cooling and thermal comfort.

Unit – VI


Course Outcomes

Upon the successful completion of this course, the students will be able to:
Identify the concept of green building technology, as applicable for a specific project.

Understand the principle of Energy efficient technologies, and be able to adopt in design of a green building.

Understand the modes of climate control, energy efficiency and adoption of renewable energy resources.

Understand the LEED, Green rating, modular wastewater treatment systems and adopting building automation systems.

Text Books:
3. Energy Technology – non conventional, renewable and conventional by S.Rao, Khanna Publications

References:

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester

soil dynamics and machine foundations

(Elective-IV)
Course Objectives:

The basic course in soil mechanics/geotechnical engineering generally introduces the fundamental concepts, principles and applications of soil as engineering material with properties under static loading.

This course on ‘Soil Dynamics’ discusses

About the fundamentals of vibrations

about the behaviour and properties/response of soil as a material which is subjected to various types of dynamic or cyclic time dependent loadings.

the design and analysis for machine foundations come along with this course to consider the dynamic properties of both soil and foundation as combined mass. Behaviour of various geotechnical structures such as shallow and deep foundations, retaining structures due to various types of time-dependent dynamic loading are discussed here along with the reference to design code provisions.

Phenomena like liquefaction and lateral spreading of soil are also discussed.

Discusses about the laboratory and filed tests to compute the dynamic soil properties of the soil mass.

Unit – I


Unit – II


Unit – III

Dynamic properties of soils, Determination of E, G and Poisons ratio from field and laboratory tests, recommendations of Indian codes- Stress waves in bounded elastic medium- Use of wave theory in the determination of elastic properties, Elastic coefficients of soils and their determination- damping factor from free and forced vibration tests.— Block vibration test – Determination of Damping factor.
Unit – IV

Types of machine foundations – general requirements design – criteria for machine foundations, permissible amplitudes and bearing pressure Design data, design criteria, IS code provisions for the design foundations of reciprocating machines.

Unit – V

Design data, design criteria, IS code provisions for the design foundations of Impact type of machines.

Unit – VI


Course Outcomes

On successful completion of these course, the student able to

Use theory of vibrations to find the behavior of soil under dynamic loading.

Design machine foundations under different loads and soil conditions.

Understand the liquefaction phenomena.

Conduct various laboratory and filed tests to determine the dynamic soil prosperities and its interpretation.

Design vibration isolators under any vibratory machines.

Text Books :

1. ‘Vibrations of Soils and Foundations’ by Richart Hall and Woods

References:

2. ‘Foundations of Machines- Analysis and Design’ by Prakash and Puri.
3. ‘Analysis and design of Foundations for Vibrations’ by P J Moore
4. ‘Fundamentals of Soil Dynamics’ by B M Das
5. ‘Dynamics of bases and Foundations’ by D D Barkar

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester

Environmental and Industrial Hygiene
(Elective-IV)

Course Objectives:

The objective of this course is:

To provide with information regarding Occupational health, Hygiene, workplace safety.

To make aware of regulations, codes of practice in industrial hygiene.

To impart basic knowledge on industrial fatigue and ergonomics.

To know the basic right of an employee on safety aspects.

Unit – I


Unit – II


Hierarchy of control measures for occupational health risks. Control methods and reduction strategies for noise, radiation and excessive stress. OHSAS.
Unit – III

Workplace Safety and Safety Systems: Features of the satisfactory design of work premises, ventilation. Safe installation and use of electrical supplies.

Unit – IV

Fire safety and first aid provision. Significance of human factors in the establishment and effectiveness of safe systems. Safe systems of work for manual handling operations. Control methods to eliminate or reduce the risks arising from the use of work equipment. Requirements for the safe use of display screen equipment. Procedures and precautionary measures necessary when handling hazardous substances- Contingency arrangements for events of serious and imminent danger.

Unit – V


Unit – VI

Industrial Fatigue and Ergonomics:

Fatigue: Types of fatigue - circadian rhythms- sleep cycle-sleep debt-effects of fatigue-factors contributing to fatigue- mitigation of fatigue.

Ergonomics: definition-boundaries of ergonomics- objectives and principles of ergonomics-ergonomics relation with health and safety-ergonomics problems in work place-ergonomics improvements- identification of poor posture and risks.

Course Outcomes

Upon successful completion of this course, the students will be able to:

Identify aspects related to occupational health, Hygiene, workplace safety in an industry.
Know the regulations, codes of practice available with reference to industrial hygiene.

Enlist the common points related to ergonomics.

Know the safety equipment and the basic right of an employee on safety aspects.

Text Books:

1. ‘Environmental and Health and Safety Management’ by Nicholas P. Cheremisinoff and Madelyn L.Graffia, William Andrew Inc. NY, 1995


References:


Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester

Repair and Rehabilitation of Structures

(Elective-IV)

Course Objectives:

The objective of this course is:

Familiarize Students with deterioration of concrete in structures

Equip student with concepts of NDT and evaluation

Understand failures and causes for failures in structures

Familiarize different materials and techniques for repairs

Understand procedure to carry out Physical evaluation of buildings and prepare report.

Unit – I

Unit – II

Non Destructive Testing- Non destructive test methods for concrete including Rebound hammer, Ultrasonic pulse velocity, Rebar locator, Corrosion meter, Penetration resistance and Pull out test, Core cutting- Corrosion: Methods for corrosion measurement and assessment including half-cell potential and resistivity, Mapping of data.

Unit – III

Failure of buildings: Definition of building failure-types of failures- Causes of Failures- Faulty Design, Accidental over Loading, Poor quality of material and Poor Construction practices- Fire damage - Methodology for investigation of failures-diagnostic testing methods and equipments-repair of cracks in concrete

Unit – IV


methods- Ultrasound pulse velocity methods- Pull out tests.

Unit – V

Repair Techniques: Grouting, Jacketing, Shotcreting, externally bonded plates, Nailing, Underpinning and under water repair; Materials, Equipments, Precautions and Processes.
Unit – VI

Investigation of structures: Distress, observation and preliminary test methods. Case studies: related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion and erosion damaged structures.

Course Outcomes

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

- Explain deterioration of concrete in structures
- Carry out analysis using NDT and evaluate structures
- Assess failures and causes of failures in structures
- Carry out physical evaluation and submit report on condition of the structure.

Text Books:

2. ‘Rehabilitation of Concrete Structures’ by B. Vidivelli, Standard Publishers.
3. ‘Concrete Bridge Practice Construction, Maintenance & Rehabilitation’ by V. K. Raina.

References:

1. ‘Concrete Structures- protection Repair and Rehabilitation’ by R. Doodge Woodson, BH Publishers

Web-Resources: www.nptel.com

IV Year B.Tech. (CE) – II Semester

Water Resources System Planning and Management
Course Objectives:

The course is designed to

Introduce the concepts of system analysis in the planning, design, and operation of water resources.

Appreciate mathematical optimization methods and models.

Learn and apply basic economic analysis tools to water resources projects.

Understand linear, nonlinear and dynamic programming techniques and apply them to various water resources systems planning and design problems.

Appreciate simulation and management techniques in water resources systems.

Unit – I

Introduction: Concepts of systems analysis, definition, systems approach to water resources planning and management, role of optimization models, objective function and constraints, types of optimization techniques.

Unit – II

Linear programming: Formulation of linear programming models, graphical method, simplex method, application of linear programming in water resources, revised simplex method, duality in linear programming, sensitivity analysis.

Unit – III

Dynamic programming: Principles of optimality, forward and backward recursive dynamic programming, curse of dimensionality, application for resource allocation.

Unit – IV

Non-linear optimization techniques: Classical optimization techniques, Lagrange methods, Kuhn-Tucker conditions, Search techniques, overview of Genetic Algorithm
Unit – V

Water Resources Economics: Basics of engineering economics, economic analysis, conditions of project optimality, benefit and cost analysis

Unit – VI

Simulation and management: Application of simulation techniques in water resources, planning of reservoir system, optimal operation of single reservoir system, allocation of water resources, optimal cropping pattern, conjunctive use of surface and sub-surface water resources.

Course Outcomes

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

Apply optimization methods to solve problems related to water resource systems.

Perform basic economic analysis to evaluate the economic feasibility of water resources projects

Formulate optimization models for decision making in water resources systems.

Use simulation models for planning and design of Water Resources Systems.

Text Books:


References:

Web-Resources: www.nptel.com

IV Year B.Tech. (CE) – II Semester

Urban Transportation Planning

(Elective-IV)

Course Objectives:

The objective of this course is:

To learn various procedures for travel demand estimation.

To various data collection techniques for OD data.

To know various models and techniques for trip generation, trip distribution, mode choice and traffic assignment.

To develop alternative urban transport network plans.

Unit – I


Unit – II


Unit – III

Unit – IV

Mode Choice Analysis: Mode Choice Behaviour, Competing Modes, Mode Split Curves, Aggregate and Disaggregate Approaches; Discrete Choice Analysis, Choice sets, Maximum Utility, Probabilistic Models: Binary Logit, Multinomial Logit Model – IIA property; Aggregation

Unit – V

Traffic Assignment: Diversion Curves; Basic Elements of Transport Networks, Coding, Route Properties, Path Building Criteria, Skimming Tree, All-or-Nothing Assignment, Capacity Restraint Techniques, Reallocation of Assigned Volumes, Equilibrium Assignment.

Unit – VI

Corridor Identification, Plan Preparation & Evaluation: Master plans, Selection of Corridor, Corridor Identification, Corridor deficiency Analysis; Travel Forecasts to Evaluate Alternative Improvements, Impacts of New Development on Transportation Facilities. Pivot Point Analysis, Environmental and Energy Analysis; Case studies

Course Outcomes

At the end of course, Student can

Estimate travel demand for an urban area.

Plan the transportation network for a city.

Identify the corridor and plan for providing good transportation facilities.

Evaluate various alternative transportation proposals.

Text Books:


References:


2. ‘Introduction to Transportation Planning’ by Bruton M.J., Hutchinson of London.

3. ‘Metropolitan Transportation Planning’ by Dicky, J.W., Tata McGraw Hill.


Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester

Safety Engineering

(Elective-IV)

Course Objectives:

To import concepts of safety w.r.t construction Industry

To understands various hazards in construction industry and preventive measures

To learn safety operation of construction machinery

To learn techniques to distinguish civil structures safety

To understand fire safety principles

Unit – I

Accidents Causes And Management Systems : Problems impeding safety in construction industry- causes of fatal accidents, types and causes of accidents related to various construction activities, human factors associated with these accident – construction regulations, contractual clauses – Pre contract activates,
preconstruction meeting - design aids for safe construction – permits to work – quality assurance in construction - compensation –

Recording of accidents and safety measures – Education and training.

Unit – II


Unit – III

Working At Heights: Fall protection in construction OSHA 3146 – OSHA requirement for working at heights, Safe access and egress – safe use of ladders, Scaffoldings, requirement for safe work platforms, stairways, gangways and ramps – fall prevention and fall protection, safety belts, safety nets, fall arrestors, controlled access zones, safety monitoring systems – working on fragile roofs, work permit systems, height pass – accident case studies.

Unit – IV

Construction Machinery: Selection, operation, inspection and testing of hoisting cranes, mobile cranes, tower cranes, crane inspection checklist - builder’s hoist, winches, chain pulley blocks – use of conveyors – concrete mixers, concrete vibrators – safety in earth moving equipment, excavators, dozers, loaders, dumpers, motor grader, concrete pumps, welding machines, use of portable electrical tools, drills, grinding tools, manual handling

scaffolding, hoisting cranes – use of conveyors and mobile cranes – manual handling.

Unit – V

Safety In Demolition Work: Safety in demolition work, manual, mechanical, using explosive - keys to safe demolition, pre survey inspection, method statement, site supervision, safe clearance zone, health hazards from demolition - Indian standard - trusses, girders and beams – first aid – fire hazards and preventing methods – interesting experiences at the construction site against the fire accidents.
Unit – VI


Course Outcomes

Students will have ability to

Develop management plans to prevent accidents in construction industry.

Prepare plans to safeguard workers in construction of high risk buildings.

Ensure safety while operating construction machinery

Outline safety plans for demolition of buildings

Prepare fire safety plans for a given building

Text Books:


References:


Web-Resources: www.nptel.com
IV Year B.Tech. (CE). – II Semester

Bridge Engineering

(Elective-IV)

Course Objectives:

The objective of this course is:

Familiarize Students with different types of Bridges and IRC standards.

Equip student with concepts and design of Slab Bridges, T Beam Bridges, Box Culverts.

Understand concepts of design of Plate Girder Bridges

Familiarize with different methods of inspection of bridges and maintenance.

Unit – I

Introduction- Bridges- Types- Slab bridges, T Beam, Arch bridges, Cable Stayed bridges, prestressed concrete bridges, Truss Bridges, Culverts, - Nomenclature- Selection of Bridge Site- Economical span- Abutments pier and end connections- types of foundations- Open, Pile, Well Foundations, Bearings – Types- Introduction to Loading standards- Railway and IRC Loading.

Unit – II

Slab bridges- Wheel load on slab- effective width method- slabs supported on two edges- cantilever slabs- dispersion length- Design of interior panel of slab- Guyon’s – Massonet Method –Hendry- Jaeger Methods- Courbon’s theory- Pigeaud’s method.

Unit – III

T-Beam bridges- Analysis and design of various elements of bridge –Design of deck slab, Longitudinal girders, Secondary beams- Reinforcement detailing.

Unit – IV

Plate Girder Bridges: Elements of plate girder and their design-web- flangeintermediate stiffener- vertical stiffeners- bearing stiffener- Splices, Design problem with detailing.
Unit – V
Box Culverts: Loading – Analysis and Design - Reinforcement detailing.

Unit – VI

Course Outcomes
At the end of this course the student will be able to
Explain different types of Bridges with diagrams and Loading standards
Carryout analysis and design of Slab bridges, T Beam bridges, Box culvers and suggest structural detailing
Carryout analysis and design of Plate girder bridges
Organize for attending inspections and maintenance of bridges and prepare reports.

Text Books :
1. ‘Essentials of Bridge Engineering’ by Jhonson Victor D
2. ‘Design of Bridge Structures’ by T. R. Jagadeesh, M.A. Jayaram, PHI

References:
1. ‘Design of Concrete Bridges’ by Aswini, Vazirani, Ratwani.
2. ‘Design of Steel Structures’ by B. C. Punmai, Jain & Jain, Lakshmi Publications.
3. ‘Design of Bridges’ by Krishna Raju.

Web-Resources: www.nptel.com
IV Year B.Tech. (CE) – II Semester

Project Work

Course Objectives:

The main objective of the Project work is

To enable the student apply engineering knowledge that has been taught all through the programme for solving practical engineering problem.

To enable the student capable for problem solving / problem shooting.

To in still and inculcate team spirit/ team work in to the minds of the students.

To enable/ train the students report making/ documentation.

To provide students an opportunity to use any civil engineering software for their project work.

Course Outcomes of the Project Work

Up on completion of the Project work, the student will be able to

Apply all levels of Engineering knowledge in solving the Engineering problems.

Work together with team spirit.

Use Civil Engineering software at least one.

Document the projects

IV Year B.Tech. (CE) – II Semester

INTELLECTUAL PROPERTY RIGHTS

Unit I


Unit II

Unit III


Unit IV


Unit V


Unit VI


REFERENCE BOOKS:

3. Cyber Law. Texts & Cases, South-Western’s Special Topics Collections.
6. Dr.SR Mynani. Law & IP. Asian Law House, Hyderabad.