JNTUH COLLEGE OF ENGINEERING HYDERABAD  
(AUTONOMOUS)  
B.Tech. 5 year (10 semesters) Integrated Dual Degree Programme (IDP)  
[Leading to B.Tech. & M.Tech. / MBA] in  
COURSE STRUCTURE (for NON CIRCUIT BRANCHES)  
(Applicable from the batch admitted from the Academic Year 2015-2016 and onwards)  

I YEAR

I SEMESTER

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1. Concrete Technology
2. Air Pollution and Control
3. Ground Water Development & Management
4. Introduction to offshore structures

Professional Elective 2
1. Structural Analysis-II
2. Stochastic Hydrology
3. Geo Environmental Engineering
4. FEM for Civil Engineering

Professional Elective 3
1. Water Resources Engineering – II
2. Traffic Engineering
3. Bridge Engineering
4. Soil Dynamics and Machine Foundations

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**Total Credits 30**

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### V YEAR

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### II SEMESTER

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JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year B.Tech. Civil Engg. I-Sem

PROBABILITY AND STATISTICS

Pre Requisites: Mathematic - I

Objectives: To make the student to understand the statistics and probability theories such as random variables, sampling distribution, tests of significance etc. so that he can apply them to engineering problems.

Outcomes: Students will able to perform probability theories & statistics on engineering problems

UNIT-I: Probability

UNIT-II: Single Random variables and probability distributions

UNIT-III: Multiple Random variables, Correlation & Regression
Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation -Coefficient of correlation, The rank correlation. Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

UNIT-IV: Sampling Distributions and Testing of Hypothesis
Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.
Parameter estimations – likelihood estimate, interval estimations.
Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, Two sided test,

Large sample tests:
(i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known varience & unknown varience, equal and unequal variances)
(ii) Tests of significance of difference between sample S.D and population S.D.
(iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.
Small sample tests:
Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples
Snedecor’s F-distribution and it’s properties. Test of equality of two population variances
Chi-square distribution, it’s properties, Chi-square test of goodness of fit

UNIT- V: Queuing Theory & Stochastic Processes

Text Books:
1) FUNDAMENTALS OF MATHEMATICAL STATISTICS BY S C GUPTA AND V.K.KAPOOR
2) PROBABILITY AND STATISTICS FOR ENGINEERS AND SCIENTISTS BY SHELDON M.ROSS,ACADEMIC PRESS
3) PROBABILITY AND STATISTICS FOR ENGINEERING AND THE SCIENCEC BY JAY L.DEVORE.

References:
1) MATHEMATICS FOR ENGINEERS SERIES –PROBABILITY STATISTICS AND STOCHASTIC PROCESS BY K.B.DATTA AND M.A S.SRINIVAS,CENGAGE PUBLICATIONS
2) PROBABILITY, STATISTICS AND STOCHASTIC PROCESS BY PROF.A R K PRASAD., WIELY INDIA
3) PROBABILITY AND STATISTICS BY T.K.V.IYENGAR &B.KRISHNA GANDHI etel
4) A TEXT BOOK OF PROBABILITY AND STATISTICS, SHAHNAZ BATHUL , CENGAGE LEARNING
Pre Requisites: Engineer Mechanics

Objectives: The subject provide the knowledge of simple stress strains flexural stresses in members, shear stresses and deflection in beams so that the concepts can be applied to the Engineering problems.

Outcomes: Student can able to find out the bending moments, shear force diagram shear stresses and deflection in beams to the engineering problems

UNIT – I
SIMPLE STRESSES AND STRAINS:


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 cantiliver, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contraflexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III
FLEXURAL STRESSES:

SHEAR STRESSES :
Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT – IV
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.
**CONJUGATE BEAM METHOD:** Introduction – Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

**UNIT – V**

**PRINCIPAL STRESSES AND STRAINS:**
Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr’s circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

**THEORIES OF FAILURE:** Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Maximum shear stress theory- Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

**Text Books:**
2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.

**References:**
7) Strength of Materials by R.Subramanian, Oxford University Press.
Pre Requisites: Engineering Mechanics

Objectives: To give the students a basic idea about the construction materials, building components and to introduce component methodologies.

Outcomes: Student able to identify various building materials to perform construction & planning

UNIT – I
Stones and Bricks, Tiles:
Building stones – classifications and quarrying – properties – structural requirements – dressing
Bricks – Composition of Brick earth – manufacture and structural requirements.

Wood, Aluminum, Glass and Paints

UNIT-II
Cement & Admixtures :
Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests
Admixtures – mineral & chemical admixtures – uses.

UNIT-III
Building Components :

Building Services :
Plumbing Services : Water Distribution, Sanitary – Lines & Fittings ; Ventilations : Functional requirements systems of ventilations. Air-conditioning - Essentials and Types ; Acoustics – characteristic – absorption – Acoustic design ; Fire protection – Fire Hazards – Classification of fire resistant materials and constructions

UNIT -IV
Masonry and Finishing’s
Brick masonry – types – bonds ; Stone masonry – types ; Composite masonry – Brick-stone composite ; Concrete, Reinforced brick.
Finishers : Plastering, Pointing, Painting, Claddings – Types – Tiles - ACP

Form work :
Requirements – Standards – Scaffoldng – Design ; Shoring, Underpinning.
UNIT –V

Building Planning : Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:


REFERENCES:

2. Building Materials by P.C. Varghese, PHI.
3. Building Construction by PC Varghese PHI.
5. Basics of Civil Engg by Subhash Chander; Jain Brothers
Pre Requisites: Engineering Mechanics

Objectives: The first step in engineering practice is surveying and the soundness of the any civil engineering work is dependent on the reliability and accuracy of the surveying. Therefore, it is imperative that a student of engineering should have good knowledge of surveying. To impart the knowledge of surveying and latest technologies in surveying it is necessary to introduce this subject in the curriculum.

Outcomes: Able to perform various surveying techniques using latest technologies in surveying

Unit-I:
Introduction and Basic Concepts
Introduction, Objectives, classification and principles of surveying, Scales, Shrinkage of Map, Conventional symbols and Code of Signals, Surveying accessories, phases of surveying.
Measurement of Distances and Directions
Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination and dip

Unit-II
Levelling and Contouring
Leveling- Basics definitions, types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels- HI Method-Rise and Fall method, Effect of Curvature of Earth and Refraction.
Contouring- Characteristics and uses of Contours, Direct & Indirect methods of contour surveying, interpolation and sketching of Contours.
Computation of Areas and Volumes
Areas- Determination of areas consisting of irregular boundary and regular boundary (coordinates, MDM, DMD methods), Planimeter.
Volumes- Computation of areas for level section and two level sections with and without transverse slopes, determination of volume of earth work in cutting and embankments, volume of borrow pits, capacity of reservoirs.

Unit-III
Theodolite Surveying
Types of Theodolites, Fundamental Lines, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical levelling when base is accessible and inaccessible.
Traversing
Methods of traversing, traverse computations and adjustments, Gale’s traverse table, Omitted measurements.
Unit-IV
**Tacheometric Surveying**
Principles of Tacheometry, stadia and tangential methods of Tacheometry.

**Curves**
Types of curves and their necessity, elements of simple curve, setting out of simple Curves, Introduction to compound curves.

Unit-V
**Modern Surveying Methods**
Total Station and Global Positioning System. : Basic principles, classifications, applications, comparison with conventional surveying. Electromagnetic wave theory - electromagnetic distance measuring system - principle of working and EDM instruments, Components of GPS – space segment, control segment and user segment, reference systems, satellite orbits, GPS observations. Applications of GPS.

**TEXT BOOKS:**

**REFERENCES:**
2. Arora K R “Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004
3. Surveying (Vol – 1, 2 & 3), by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delhi
5. Surveying by BHAVIKATTI; Vikas publishing house ltd.
Pre Requisites: Engineering Mechanics

Objectives: This subject introduces the basic concepts of fluids, their behavioural properties, analyzing the fluid flows using primary equations. This subject further deals with various flow measuring devices and concepts of boundary layer flows.

Outcomes: Engineering Mechanics

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

UNIT II
FLUID KINEMATICS : Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, nonuniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT III

UNIT IV

UNIT V
BOUNDARY LAYER THEORY:Approximate Solutions of Navier Stoke’s Equations – 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.
TEXT BOOKS:
3. Introduction to Fluid Machines by Edward J. Shaughnessy, Jr, Ira M. Katz and James P. Schaffer, Oxford University Press, New Delhi

REFERENCES:
4. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi
COMPUTER AIDED DRAFTING LAB-I

Pre Requisites: Engineering Mechanics

Objectives: The object of this lab is to teach the student basic drawing fundamentals in various civil engineering applications, specially in building drawing.

Outcomes: Student will be able to master the usage of autocad commands for drawing 20 & 30 building drawings and also the usage autocad for different civil engg applications.

1. Introduction to computer aided drafting
2. Software for CAD – Introduction to different softwares
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software
   a) single storeyed buildings   b) multi storyed buildings
5. Developing sections and elevations for
   a) single storeyed buildings   b) multi storyed buildings
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD softwares
7. Exercises on development of working drawings of buildings

Text Books:

STRENGTH OF MATERIALS LAB

Pre Requisites: Strength of Materials – Theory

Objectives: The object of the course to make the student to understand the behaviour of materials under different types of loading for different types structures

Outcomes: Able to identify the various properties of engineering material.

1. Tension test
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

List of Major Equipment:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell’s / Rock well’s hardness testing machine
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell’s theorem verification.
11. Continuous beam setup
SURVEYING LAB –I

Pre Requisites: Surveying Theory

Objectives: To impart the practical knowledge in the field, it is essential to introduce in curriculum. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

Outcomes: Practically able to give drawing of plans & maps & determining the area before taking up any civil engineering works.

1. Surveying of an area by chain survey (closed traverse) & plotting.
2. Chaining across obstacles
3. Determine of distance between two inaccessible points with compass
4. Survey of a given area by prismatic compass (closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane table survey.
6. Two point and three point problems in plane table survey.
7. Levelling – Longitudinal and cross-section and plotting
8. Trigonometric leveling using theodolite
9. Height and distances using principles of tacheometric surveying
    b) Distance between inaccessible point by theodolite
HUMAN VALUES AND PROFESSIONAL ETHICS

Pre Requisites: NIL

Objectives: The object of subject is to develop personality development, professional responsibility in Engineering, have a knowledge about rights, global issues

Outcomes: Student will be perfect with human values up professional ethics which is essential in any kind of work in engineering field


Unit IV Professional Rights: professional rights and employee rights communicating risk and public policy – Whistle blowing - collective bargaining. Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership- Regulatory compliances, Monitoring and control- Mini-Cases


Mini-projects

Project 1: The student of this course should invariably attend (or watch on internet/any TV channel/youtube/social media) two speeches of 30 minutes duration each dealing with spiritual discourse and submit a report on the contents of the lecture proceedings.

Project 2: Visit any organization (including shops/ hotels or shopping malls in your region) of your choice and observe how the professionals perform the given job with a focus on professional ethics and human values.

References
1. Aryasri, Human Values and Professional Ethics, Maruthi Publications.
2. S B George, Human Values and Professional Ethics, Vikas Publishing.
STRENGTH OF MATERIALS – II

Pre Requisites: Strength of Materials -I

Objectives: Study of the subject provides the understanding of principal stress, strains, springs, columns and structures.

Outcomes: Students will be able to know the principles for practical design of columns, curved beams, springs, thick & thin cylinders, circular shafts etc.

UNIT – I
TORSION OF CIRCULAR SHAFTS :

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 – II
COLUMNS AND STRUTS :

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

UNIT - III
DIRECT AND BENDING STRESSES :
Stresses under the combined action of direct loading and bending moment, 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 bending moment about both axis.

BEAMS CURVED IN PLAN:
Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semi-circular beam simply-supported on three equally spaced supports.
UNIT – IV

THIN CYLINDERS:

THICK CYLINDERS:

UNIT – V

UNSYMETRICAL 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.

SHEAR CENTRE: Introduction - Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

Text Books:
2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.

References:
2) Introduction to Strength of Materials by U.C.Jindal, Galgotia Publications Pvt. Ltd.
3) Mechanics of Materials by R.C.Hibbeler, Pearson Education
HYDRAULICS & HYDRAULIC MACHINERY

Pre Requisites: Fluid Mechanics

Objectives: The main objective of this course to deal with the concepts of flow through open channels and their applications and the principles of hydraulic machines and hydraulic models

Outcomes: Students will be able to know about the flow through open channels & also practical applications of hydraulic mechanics important of hydraulic models.

UNIT – I

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. Distorted and non-distorted models.

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.

UNIT - IV
HYDRAULIC TURBINES : Layout of a typical Hydropower installation – Heads and efficiencies-classification of turbines-pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation .

UNIT – V


TEXT BOOKS:
2. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) Ltd., New Delhi

REFERENCES:
3. Fluid mechanics and fluid machines by Rajput, S. Chand & Co.
Pre Requisites: Strength of Materials –I

Objectives: To make the students to understand the principles of analysis of structures of static and moving loads by various methods.

Outcomes: Students will be able to know the principles for practical design of structures subjected to static & moving loads.

UNIT – I
ANALYSIS OF PERFECT FRAMES: Types of frames- Perfect, Imperfect and Redundant pin jointed frames. - Analysis of determinate pin jointed frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

UNIT – II
ENERGY THEOREMS: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano’s first theorem-Unit Load Method. Deflections of simple beams and pin- jointed plane trusses. Deflections of statically determinate bent frames.

UNIT-III
PROPPED CANTILEVER and FIXED BEAMS: Determination of static and kinematic indeterminacies for beams- Analysis of Propped cantilever and fixed beams, including the beams with different moments of inertia, subjected to uniformly distributed 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 for Propped Cantilever and Fixed Beams-Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT – IV
CONTINUOUS BEAMS: Introduction-Continuous beams. Clapeyron’s theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed-continuous beams with overhang. Effects of sinking of supports.

UNIT – V

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. Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section - Point loads, UDL longer than the span, UDL shorter than the span- Influence lines for forces in members of Pratt and Warren trusses. Equivalent uniformly distributed load. Focal length.

Text Books:

References:
1) Structural Analysis by R.C.Hibbeler, Pearson Education
3) Structural Analysis by Devdas Menon, Narosa Publishing House.
5) Fundamentals of Structural Analysis by M.L.Gamhir, PHI Learning Pvt. Ltd
Pre Requisites: Building Materials

Objectives: The objectives was course is to give the basics knowledge of Geology that is required for constructing various Civil Engineering Structures in the syllabus include the basic Geology, Geological Hazardous and Environmental Geology which gives a complete picture on the Geological aspects that are to be considered for the planning and construction of major Civil Engineering projects.

Outcomes: Student will acquire basic knowledge of geology.

UNIT - I
INTRODUCTION: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological draw backs. Importance of Physical geology, Petrology and Structural geology.

WEATHERING OF ROCKS: Its effect over the properties of rocks importance of weathering with REFERENCE to dams, reservoirs and tunnels weathering of common rock like “Granite”

UNIT - II
MINERALOGY: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite, Hematite, Magnetite, Chromite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.


UNIT - III
STRUCTURAL GEOLOGY: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults uncomformities, and joints - their important types and case studies. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils. Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.
UNIT - IV

EARTH QUAKES: Causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and land slides.


UNIT - V

GEOLOGY OF DAMS, RESERVOIRS AND TUNNELS: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factor’s Contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs - Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (i.e. Tithological, structural and ground water) in tunneling over break and lining in tunnels.

TEXT BOOKS:
1) Engineering Geology by N.Chennakesavulu, Mc-Millan, India Ltd. 2005
2) Engineering Geology for Civil Engineers – P.C. Varghese PHI

REFERENCES:
II Year B.Tech. Civil Engg. II-Sem

ENVIRONMENTAL ENGINEERING

Pre Requisites: Fluid Mechanic

Objectives: This subject provides the knowledge of water sources, water treatment, design of distribution system waste water treatment, and safe disposal methods. The topics of characteristics of waste water, sludge digestion are also included.

Outcomes: Student will able to provide fundamental for water treatment, design of distribution system waste water

UNIT – I

UNIT II

UNIT-III
Distribution systems requirement –method and layouts -Design procedures- Hardy Cross and equivalent pipe methods pipe – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house - Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow

UNIT - IV

UNIT – V
TEXT BOOKS:

REFERENCE BOOK:
1. Water and Waste Water Technology by Steel
2. Water and Waste Water Engineering by Fair Geyer and Okun
3. Text book of Environmental Engineering by P. Venugopal Rao (PHI)
5. Unit operations in Environmental Engineering by R. Elangovan and M.K. Sasutharam (Newage)
ENGINEERING GEOLOGY LAB

Pre Requisites: Engineering Geology Theory

Objectives: The object of this lab is that to provide practical knowledge about physical properties of minerals, rocks, drawing of geological maps, showing faults, uniformities etc.

Outcomes: Identify the various rocks, minerals depending on geological classifications

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic description and identification of rocks referred under theory.
3. Microscopic study of rocks.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
5. Simple Structural Geology problems.
6. Electrical resistivity meter.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.
5. Microscopic identification of rocks.
ENVIRONMENTAL ENGINEERING LAB

Pre Requisites: Chemistry Laboratory

Objectives: The laboratory provides knowledge of estimating various parameters like PH, Chlorides, Sulphates, Nitrates in water. For effective water treatment, the determination of optimum dosage of coagulant and chloride demand are also included. The estimation status of industrial effluents will also be taught in the laboratory by estimating BOD and COD of effluent.

Outcomes: Students can provide various properties of water

LIST OF EXPERIMENTS
1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids (Organic and Inorganic)
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination of iron.
7. Determination of Nitrates.
8. Determination of Optimum dose of coagulant
9. Determination of Chlorine demand
10. Determination of total Phosphorous.
11. Determination of B.O.D
12. Determination of C.O.D
13. Presumptive coliform test.

NOTE: At least 8 of the above experiments are to be conducted.
Pre Requisites: FM & HHM Theory

Objectives: To give the student an exposure to various hydraulic devices and hydraulic machines.

Outcomes: Fluid Mechanics & Hydraulics Machinery

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice / mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and / Triangular Notch
5. Determination of Coefficient for minor losses.
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. Performance characteristics of a single stage/ multi-stage centrifugal pump.
12. Performance characteristics of a reciprocating pump.
OPEN ELECTIVE – 1
### MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

**Pre-Requisites:** Mathematics

**Course Objectives:** To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

**Course Outcomes:** Student will able to solve various business problem up make various business decision


**Unit II Production & Cost Analysis:** Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.


**Unit IV Capital Budgeting:** Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital Trading Forecast Capital Budget, Cost Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

TEXT BOOKS:

REFERENCES:
DESIGN OF REINFORCED CONCRETE STRUCTURES

Pre-Requisites: Structural Analysis I & II

Course Objectives: Structural elements are subjected to different loading to withstand the structures, for external loading we need to design the structures for its safety and serviceability.

Course Outcomes: Design various structures

UNIT – I

Beams: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections

UNIT – II
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 ; Design of canopy.

UNIT – III

UNIT – IV
Footings: Different types of footings – Design of isolated, square, rectangular, circular footings and combined footings.

UNIT - V
Design of Two-way slabs, one way slab, and continuous slab Using I S Coefficients
Limit state design for serviceability for deflection, cracking and codal provision.
Design of dog-legged staircase.

TEXT BOOKS:
REFERENCES:

NOTE:
Alternate weeks two periods of drawing class should be conducted. The end examination paper should consist of Part – A and Part – B. Part – A should consist of two questions in design and drawing out of which one question to be answered. Part –B should consist of five questions in design out of which three to be answered. Weightage for Part – A is 40 % and Part – B is 60 %.
Pre-Requisites: Engineering Geology

Course Objectives: To enable the student to study the properties of soil and to determine the behaviour soil under various conditions and loads.

Course Outcomes: Can understand the mechanism and Behaviour of Soil for Different loads and Soil Condition able to determine properties of soil

UNIT – I

UNIT –II

UNIT – III
STRESS DISTRIBUTION IN SOILS: Boussinesq’s and Westergaard’s theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark’s influence chart for irregular areas.

UNIT – IV
CONSOLIDATION: Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log(p) curves – normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi’s 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement.

UNIT - V
SHEAR STRENGTH OF SOILS: Importance of shear strength – Mohr’s– Coulomb Failure theories – Types of laboratory tests for strength parameters – strength tests based on drainage conditions – strength envelops – Shear strength of sands - dilatancy – critical void ratio.
Text books:
3. Foundation Engineering by P.C. Varghese, PHI

References:
WATER RESOURCES ENGINEERING-I

Pre-Requisites: Fluid Mechanics & HHM

Course Objectives: To study the concepts of
i. Engineering Hydrology and its applications like Runoff estimation, estimation of design discharge and flood routing.

Course Outcomes: Estimate runoff, design discharge up flood waiting, Irrigation engineering

UNIT I

UNIT-II
Distribution of Runoff – Hydrograph Analysis Flood Hydrograph – Effective Rainfall – Base Flow- Base Flow Separation - Direct Runoff Hydrograph Unit pulse and Unit step function - Unit Hydrograph, definition, limitations and applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph, Synthetic Unit Hydrograph.

UNIT-III
Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy’s law, radial flow to wells in confined and unconfined aquifers. Types of wells,- Well Construction – Well Development.

UNIT-IV
Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility –Crop Rotation, preparation of land for Irrigation, standards of quality for Irrigation water.
Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies-Water Logging.

UNIT-V
Classification of canals, Design of Irrigation canals by Kennedy’s and Lacey’s theories, balancing depth of cutting, IS standards for a canal design canal lining. Design Discharge over a catchment, Computation of design discharge-rational formulae etc.

Text books:
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi

References:
1. Elementary hydrology by V.P.Singh, PHI publications.
3. Irrigation Water Management by D.K. Majundar, Printice Hall of India.
4. Irrigation and Hydraulic structures by S.K.Grag - Khanna publishers
5. Applied hydrology by Ven Te Chow, David R. Maidment larry W. Mays Tata MC. Graw Hill.
ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Pre-Requisites: English

Course Objectives: The purpose of this course is to develop the students competence in communication at an advanced level. Assuming that the students are fairly proficient in the basic communication skills of listening, speaking, reading and writing in English, this course aims to train them in communicating efficiently in the workplace and professional contexts.

Course Outcomes: Communicate efficiently in the work place up professional context

1. Introduction

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use ‘good’ English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

2. Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students’ fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

Learning Outcomes
Accomplishment of sound vocabulary and its proper use contextually.
Flair in Writing and felicity in written expression.
Enhanced job prospects.
Effective Speaking Abilities

3. Syllabus:
The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** – General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.


4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/ e-mails/assignments etc.

5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

4. Minimum Requirement:
The Advanced Communication Skills (ACS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:
- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- T. V, a digital stereo & Camcorder
- Headphones of High quality


6. **Suggested Software:**
The software consisting of the prescribed topics elaborated above should be procured and used.
Oxford Advanced Learner’s Compass, 8th Edition
DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.
Lingua TOEFL CBT Insider, by Dreamtech
TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
The following software from ‘train2success.com’
- Preparing for being Interviewed
- Positive Thinking
- Interviewing Skills
- Telephone Skills
- Time Management

7. Books Recommended:

DISTRIBUTION AND WEIGHTAGE OF MARKS:
Advanced Communication Skills Lab Practicals:
1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the
non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

1. Seminar/ Professional Presentation
2. A Report on the same has to be prepared and presented.

* Teachers may use their discretion to choose topics relevant and suitable to the needs of students.
* Not more than two students to work on each mini project.
* Students may be assessed by their performance both in oral presentation and written report.
SURVEYING LAB –II

Pre-Requisites: Surveying Theory

Course Objectives: To impart the practical knowledge in the field to set out any Civil Engineering work

Course Outcomes: Perform surveying on any civil engineering work

1. Determine of area using total station
2. Traversing using total station
3. Contouring using total station
4. Determination of remote height using total station
5. Stake out using total station
6. Distance, gradient, differential height between two inaccessible points using total station.
7. Curve settling using total station
8. Resection using total station
9. Setting out works for buildings and pipe lines
10. Finding position of stations using G.P.S
GEO TECHNICAL ENGINEERING LAB

Pre-Requisites: Soil Mechanics (Co-requisite)

Course Objectives: To obtain the properties of soils by conducting experiments, it is necessary for students to understand the behavior of soil under various loads and conditions.

Course Outcomes: Able to determine index and engg properties of soils

LIST OF EXPERIMENTS

1. Atterberg Limits (Liquid Limit, Plastic Limit)
2. a) Field density by core cutter method and
   b) Determination of Specific gravity of soil.
3. Field density by sand replacement method
4. Grain size distribution by sieve analysis
5. Permeability of soil by constant and variable head test methods
6. Standard Proctor’s Compaction Test
7. California Bearing Ratio Test (CBR Test)
8. Determination of Coefficient of consolidation (square root time fitting method)
9. Unconfined compression test
10. Direct shear test
11. Vane shear test
12. Differential free swell index (DFSI) test

Note: Any Ten experiments may be completed.

REFERENCE BOOK

OPEN ELECTIVE – II
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DEPARTMENT ELECTIVE – II
DESIGN OF STEEL STRUCTURES

Pre-Requisites: Structural Analysis I & II

Course Objectives: To make the student conversant with the design principles of steel structural elements as per IS Codal provisions

Course Outcomes: Design any type of steel structure

UNIT – I

UNIT – II

UNIT – III

UNIT – IV

UNIT – V
Design of roof trusses – Types of roof trusses, loads on trusses – purlin design – truss design, Design of joints and end bearings.

Text books :

**Reference books:**

1. Design of Steel structures by K.S. Sai Ram, Person Education.
5. Structural Design and Drawing by N.Krishna Raju, Universities Press.

**NOTE:**

Alternate weeks two periods of drawing class should be conducted. The end examination paper should consist of Part – A and Part – B. Part – A should consist of two questions in design and drawing out of which one question to be answered. Part – B should consist of five questions in design out of which three to be answered. Weightage for Part – A is 40 % and Part – B is 60 %.
TRANSPORTATION ENGINEERING

Pre-Requisites: Surveying

Course Objectives: It deals with different components of Transportation Engineering like highway, Railway & Airport Engineering Emphasis is a Geometric Design of different elements in Transportation Engineering.

Course Outcomes: Student is knowledgeable of basic concepts of transportation engineering like highway, railway & airport engineering

UNIT I
HIGHWAY DEVELOPMENT AND PLANNING:
Highway Development in India – Necessity for Highway Planning- Different Road Development Plans; Classification of Roads - Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports – Highway Project.

UNIT – II

UNIT – III
TRAFFIC ENGINEERING & REGULATIONS:

UNIT – IV
INTERSECTION DESIGN:
Types of Intersections – Conflicts at Intersections – Requirements of At-Grade Intersections - Types of At-Grade Intersections: Channelized and Unchannelized Intersections – Traffic Islands - Types of Grade Separated Intersections - Rotary Intersection – Concept of Rotary – Design Factors of Rotary – Advantages and Limitations of Rotary Intersections.
UNIT - V
PAVEMENT DESIGN


Text books:

References:
4. IRC 37-2012: Tentative guidelines for design of flexible pavement
5. IRC 58-2011: Guidelines for design of plain jointed rigid pavements.
6. IRC 81-1997: Guidelines for design of overlay using Benkelman Beam Deflection Technique
TRANSPORTATION ENGINEERING LAB

Pre-Requisites: Transportation Engineering Theory

Course Objectives: To gain the practical knowledge of properties of Highway materials and surveys

Course Outcomes: Practically student can provide or identify properties of highway materials

I. ROAD AGGREGATES:
   1. Aggregate Crushing value
   2. Aggregate Impact Test.
   4. Abrasion Test
   5. Flakiness and elongation Indices of coarse Aggregates.

II. BITUMINOUS MATERIALS:
   1. Penetration Test.
   2. Ductility Test.
   3. Softening Point Test.
   4. Marshal stability Test

III. TRAFFIC STUDIES
   1. Traffic volume counts-Mid Blocks
   2. Traffic volume counts-Junctions
   4. Parking Studies

TEXT BOOK:

OBJECTIVE: To gain the practical knowledge of properties of Highway materials and surveys.
COMPUTER AIDED DRAFTING LAB - II

Pre-Requisites: CAD Lab – I & Excel, C - Programming

Course Objectives: To make student understand detailing of all kinds of structures might be of reinforced concrete, plain concrete, steel structures.

Course Outcomes: Student can draft various structures

1. Detailing of reinforcement in Cantilever, Simply supported and Contineous Beams (Both Singly & Doubly Reinforced Beams)
2. Detailing of reinforcement in canopy & columns (both uniaxial & biaxial)
3. Detailing of reinforcement in RC isolated footings square, rectangular, circular and combined footings.
4. Detailing of reinforcement in RC one-way, two-way slabs and dog-legged staircases.
5. Drawing of Steel bolted and welded connections.
6. Drawing of steel compression and tension members.
7. Drafting of steel beams-built-up sections.
8. Drafting of steel plate girder
9. Drafting of steel roof truss.

Note: Drafting of all the exercises is to be carried out using commercially available drafting softwares.
CONCRETE TECHNOLOGY LAB

Pre-Requisites: Concrete Technology Theory

Course Objectives: To gain the practical knowledge of properties of concrete materials, behaviour of concrete and properties of fresh and hardened concrete

Course Outcomes: Provide properties of concrete material, behavior of concrete & properties of fresh & hardened concrete

I. Test on Cement
   1. Normal Consistency and fineness of cement.
   2. Initial setting time and final setting time of cement.
   3. Specific gravity of cement.
   4. Soundness of cement.
   5. Compressive strength of cement.
   6. Workability test on concrete by compaction factor, slump and Vee-bee.

II. Test on Aggregate
   1. Sieve Analysis and gradation chairs
   2. Bulking of sand.
   3. Bulk and compact densities of fine and coarse aggregates

III. Test on Fresh Concrete
   1. Slump test
   2. CF (compact factor stress)
   3. Vee-bee Test
   4. Flow Table Test

Self Compacting Concrete
   1. Slump cone
   2. V funnel
   3. L Box
   4. U – box

IV. Test on hardened concrete
   1. Compression test on cubes & Cylinders
   2. Flexure test
   3. Splitting Tensile Test
   4. Modulus of Elasticity

V. Non Destructive test of concrete
   1. Rebound hammer
   2. Ultrasound pulse Velocity (UPV)
   3. Rebar data scanner
TEXT BOOK:
1. Concrete Technology by M.S. Shetty – S.Chand & Co.
2. Concrete Manual by M.L. Gambhir, Dhanpat Rai & Sons

OBJECTIVE: To gain the practical knowledge of properties of concrete materials, behaviour of concrete and properties of fresh and hardened concrete.
PRE REQUISITES: SA – I & SA – II
COURSE OBJECTIVES: The subject provides finite element methods and analysis
COURSE OUTCOMES: Analysis Finite Element in engineering

UNIT – I

UNIT – II
Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape functions stiffness matrix – stress – strain relation

UNIT – III
FEA Beam elements – stiffness matrix - shape function– Analysis of continuous beams.

UNIT – IV

UNIT-V
Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOK:
2. Introduction to finite Elements in Engineering by Tirupathi R. Chandrupatla, and Ashok D. Belegundu, Prentice Hall of India

REFERENCES:
1. Finite Element Analysis by P.Seshu, PHI Learning Private Limited
2. Concepts and applications of Finite Element Analysis by Robert D. Cook et al., Wiley India Pvt. Ltd.
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IV Year B.Tech. Civil Engg. I-Sem
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year B.Tech. Civil Engg. I-Sem

Professional Elective - III
Prerequisites: Surveying
Course Objectives: Development of GIS interface to field problems through geofencing.
Course Outcomes: Exposed to spatial technologies, mapping the field problems and solution convergence through GIS.

UNIT 1: Development of georeferencing of map either from cadastral or Autocad based map.
UNIT 2: Identification of best locations of ground control points and mosaicing the different sources of maps of information like topo sheets & satellite data and other drawings.
UNIT 3: Digitization and GIS coordination.
UNIT 4: GIS interface and features in Arc info/ map info.
UNIT 5: Case example on mapping like water distinguish, Road alignment road network etc.,

Text Books:
Objectives:
To impart knowledge on the use of various softwares

Outcomes:
The learner will be able to understand and design the structures using the software.

Prerequisites: Advanced Structural Analysis

1. Program for design of slabs. Using Excel
2. Program for design of beams. Using Excel
3. Program for design of column using Excel
4. Analysis of truss using STAAD Pro
5. Analysis of Multistoreyed space frame, using STAAD Pro, ETABS
6. Analysis of Bridge deck slab
7. Analysis of Plane frames using STAAD. Pro.
8. Program for Design of a combined footing using ETABS Excel
MANAGEMENT SCIENCE

Pre-Requisites: Managerial Economics & Financial Analysis

Course Objectives: To obtain knowledge about managing of open business by analysing it theoretically

Course Outcomes: Able to management & make planning of any engineering project


Unit IV Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

TEXT BOOKS:

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PG CORE - II
(PG Elective – IV)
ADVANCED CONCRETE LABORATORY

Objectives: To impart knowledge on the test on cement and aggregates.

Outcomes:
The learner will be able to understand the properties of the materials and the behavior of the concrete.

Prerequisites: Concrete Technology Lab

1. Gradation Charts of Aggregates.
2. Bulking of fine Aggregate.
3. Aggregate Crushing and Impact value
4. Workability Tests on Fresh Self Compacting Concrete
6. Air Entrainment Test on Fresh Concrete
7. Rapidly Chloride Permeability Test.
8. Non Destructive Testing of Concrete.
9. Accelerated Curing of Concrete (Demo).
11. Influence of W/C Ratio on Strength and Aggregate / Cement Ratio on Strength & Workability.
12. Influence of Different Chemical Admixtures on Concrete
13. Marsh Cone Test.
PG Core – III
JNTUH COLLEGE OF ENGINEERING HYDERABAD

V Year B.Tech. Civil Engg. I-Sem

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(PG Elective – V)
JNTUH COLLEGE OF ENGINEERING HYDERABAD

V Year B.Tech. Civil Engg. I-Sem

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PG Elective – VI
JNTUH COLLEGE OF ENGINEERING HYDERABAD

V Year B.Tech. Civil Engg. I-Sem

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(PG Elective – VII)
Objectives:
To impart knowledge on the basic concepts of theory of elasticity, and solve the Structural Engineering problems.

Course outcomes:
The learner will be able to solve problems of elasticity and plasticity and be able to apply numerical methods to solve continuum problems.

Prerequisites: Strength of Materials I & II

UNIT I

UNIT II
Two dimensional problems in rectangular coordinates - solution by polynomials - Saint-Venants principle - determination of displacements - bending of simple beams – Simple Supported and Cantilever Beam.

UNIT III

UNIT IV

UNIT V
Torsion of Circular Shafts - Torsion of Straight Prismatic Bars – Saint Venants Method - torsion of prismatic bars - bars with elliptical cross sections - membrane analogy - torsion of a bar of narrow rectangular bars - solution of torsional problems by energy method - torsion of shafts, tubes, bars etc.Torsion of Rolled Profile Sections.

References
1. Theory of Elasticity by Timeshenko, McGrawhill Publications.
Objectives:
To impart knowledge on the fundamental of structural dynamics and their applications.

Outcomes: The learner will be able to understand the equation of motion, dynamics response of single and multi degree-of freedom systems.

Prerequisites: Structural Analysis I & II

UNIT I:

UNIT II


UNIT III

UNIT IV

Continuous Systems: Introduction - Flexural vibrations of beams - Elementary case – Derivation of governing differential equation of motion - Analysis of undamped free vibrations of beams in flexure - Natural frequencies and mode-shapes of simple beams with different end conditions - Principles of application to continuous beams.

UNIT V

References:
1. Dynamics of Structures by Clough & Penzien, McGraw Hill, New york
3. Dynamics of Structures by Anil K. Chopra, Pearson Education (Singapore), Delhi.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

V Year B.Tech. Civil Engg. I-Sem

ANALYSIS OF PLATES & SHELLS
(PG Core – III)

Objectives:
To impart knowledge on the behavior and design of shells and Folded plates.

Outcomes:
The learner will be able to analyse and design the shells and folded plates.

Prerequisites : Theory of Elasticity, Structural Analysis

UNIT I
Small Deflection Theory of Thin Rectangular Plates : Assumptions – Derivation of governing differential equation for thin plates – Boundary conditions – simply supported plate under sinusoidal load – Navier solution – Application to different cases – Levy’s solution for various boundary conditions subjected to different loadings like uniform and hydrostatic pressure.

UNIT II
Plates on Elastic Foundations : Governing differential equation – deflection of uniformly loaded simply supported rectangular plate – Navier and Levy type solutions - Large plate loaded at equidistant points by concentrated forces.

UNIT III
Buckling of Plates: Governing equation for Bending of plate under the combined action of in-plane loading and lateral loads – Buckling of rectangular plates by compressive forces acting in one and two directions in the middle plane of plate

UNIT IV

UNIT V
Introduction to the shells of Double curvatures: Geometry, analysis and design of elliptic paraboloid, conoid and hyperbolic parabolic shapes, inverted umbrella type.
Axi- Symmetrical shells: General equation - Analysis and axi-symmetrical by membrane theory. Application to spherical shell and hyperboloid of revolution cooling towers.

REFERENCES:
1 Design of concrete shell roofs By Billington – Tata MC Graw Hill, New York
3. Theory of Plates and Shells by Timoshenko- Tata MC Graw Hill, College
4. Analysis and design of concrete shell roofs By G.S.Ramaswami. CBS publications.
5. Design of concrete shell roofs By Chaterjee. Oxford and IBH.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

PG Electives

Elective – 1
1. Advanced Reinforced Concrete Design
2. Soil Dynamics and Machine Foundations
3. Advanced Foundation Engineering

Elective – 2
1. Experimental Stress Analysis
2. Advanced Structural Analysis
3. Forensic engineering structural evaluation and retrofitting of structures

Elective – 3
1. Stability of Structures
2. Composite Materials
3. Principles of Bridge Engineering

Elective – 4
1. Advanced Steel Design
2. Plastic Analysis and Design
3. Design of Industrial Structures

Elective – 5
1. Computer Oriented Numerical Methods
2. Optimization Techniques in Structural Engineering
3. Advanced Concrete Technology

Elective – 6
1. Design of Pre stressed Concrete Structures
2. Fracture Mechanics of Concrete Structures
3. Reinforced soil structures

Elective – 7
1. Rehabilitation and Retrofitting of Structures
2. Earthquake Resistant Design of Buildings
3. Computer aided design of structural engineering
Objectives:
To impart knowledge on the behavior and design on various reinforced concrete structural elements.

Outcome:
The learner will be able to design the reinforced concrete elements like beams, slabs and compression members.

Prerequisites: Design of Reinforced Concrete Structures

UNIT I

UNIT II
Limit Analysis of R.C. Structures: Rotation of a plastic hinge, Redistribution of moments, moment rotation characteristics of RC member, I.S. code provisions, applications for fixed and continuous beam. Yield line analysis for slabs: Upper bound and lower bound theorems – yield line criterion – Virtual work and equilibrium methods of analysis – For square and circular slabs with simple and continuous end conditions.

UNIT III
Design of Ribbed slabs, Flat slabs: Analysis of the Slabs for Moment and Shears, Ultimate Moment of Resistance, Design for shear, Deflection, Arrangement of Reinforcements.
Flat slabs: Direct design method – Distribution of moments in column strips and middle strip- moment and shear transfer from slabs to columns – Shear in Flat slabs-Check for one way and two way shears-Introduction to Equivalent frame method. Limitations of Direct design method, Distribution of moments in column strips and middle strip.

UNIT IV

UNIT V

Design of Combined Footings - Distribution of Soil Pressure - Geometry of Two-column Combined Footing – Design Considerations in Two-Column Footings.
REFERENCE:

OBJECTIVE:
To understand the wave propagation in soils, determine dynamic properties of soil for analyzing and designing foundations subjected to vibratory loading.

OUTCOME:
Able to understand the fundamentals of wave propagation in soil media, evaluate the dynamic properties of soil, and design foundations for centrifugal and reciprocating machines.

Prerequisites: Soil Machines, Foundation Engineering and Structural Analysis

Unit. I

Unit. II

Unit. III

Unit. IV

Unit. V
Text Books

1. Das, B. M. - Principles of Soil Dynamics, PWS KENT publishing Company, Boston.

References:

Prerequisites: Foundation Engineering or Geotechnical Engineering-II

OBJECTIVE:
To determine the bearing capacity of shallow and deep foundations, to estimate settlements of structures subjected to external loads, leading to design of foundations resting on soils.

OUTCOME:
Students should be in a position to design foundations for varieties of structures resting on soil deposits, and appreciate the importance of reliability based design in geotechnical engineering.

UNIT – I
Bearing capacity of Footings subjected to Eccentric and Inclined Loading – Meyrhoff’s and Hanse’s theories – elastic settlement of Footings embedded in sands and clays of Infinite thickness – Footings on soils of Finite thickness-Schmertamaunn’s method, Jaubu and Morgenstern method.

UNIT - II

UNIT – III

UNIT – IV

UNIT - V

References:
1. Analysis and Design of Substractenes – Swami Saran
Objectives:
To impart knowledge on the strain measurement, brittle coating and photo elasticity.

Outcomes: The learner will be able to understand the properties of strain-gauge systems and the computation techniques.

Prerequisites: Strength of Materials I & II

UNIT I


UNIT II
Strain Measurement using Strain Gauges: Definition of strain and its relation to Experimental Determinations, properties of strain-gauge systems, Types of strain gauges, Mechanical and Optical strain gauges. Electrical Strain Gauges- Introduction, LVDT - resistance strain gauge - various types - gauge factor, Materials for adhesion base, etc.

Strain Rosettes: Introduction, The three element rectangular Rosette - The delta rosette - Corrections for Transverse strain effects.

UNIT III
Brittle Coating Method: Introduction, Coating stresses - Failure theories - Brittle coating Crack pattern - Crack detection - Types of Brittle coating - Test procedures for brittle coating analysis - Calibration procedures - Analysis of brittle coating data.

UNIT IV

UNIT V

Text Books :
1. Experimental Stress Analysis by J.W.Dally and W.F.Riley - Dover Publications
2. Experimental Stress Analysis by Dr. Sadhu Singh - Khanna Publishers

References :
1. Experimental Stress Analysis by Dove and Adams - Macmillan Publishing Company
Objectives:
To impart knowledge on the analysis of indeterminate structures like continuous beams, trusses and portal frames.

Outcome:
The learner will be able to analyse different indeterminate structures using Matrix methods.

Prerequisites: Structural Analysis I & II

UNIT I
Transformation of coordinates - element stiffness matrix - and load vector - local and global coordinates.

UNIT II
Assembly of stiffness matrix from element stiffness matrix - direct stiffness method - general procedure - bank matrix - semi bandwidth - computer algorithm for assembly by direct stiffness matrix method.

UNIT III
Analysis of plane truss - continuous beam - plane frame and grids by flexibility methods.

UNIT IV
Analysis of plane truss - continuous beam - plane frame and grids by stiffness methods.

UNIT V
Special analysis procedures - static condensation and sub structuring - initial and thermal stresses.
Shear walls- Necessity - structural behavior of large frames with and without shear walls - approximate methods of analysis of shear walls.

Text Books:
1. Matrix methods of structural analysis by William Weaver and gere, CBS Publishers
2. Advanced Structural Analysis by A K Jain, Nemchand Publishers

References:
1. Advanced Structural Analysis by Devdas Menon, Narosa publishing house
2. Matrix methods of structural analysis by Pandit and gupta
3. Matrix methods of structural analysis by J Meek
4. Structural Analysis by Ghali and Neyveli
Pre-requisites : Advanced Concrete Technology

Course objectives:
To provide students with basic principles of failure mechanisms in cementitious materials, timbers, and metals in order to diagnose the causes of building defects. The various testing methods for concrete and structural evaluation as well as strengthening techniques are also included. Many case studies will be introduced and discussed.

Outcomes:
1. Describe and evaluate the use of structural forensics in creating and maintaining resilient stock of urban civil infrastructure.
2. Identify common failure modes of structures and classify them according to criticality/risk.
3. Classify an observed structural failure as a technical or procedural failure or a combination.

Unit I:
Introduction: Disasters and their effects, Role of the expert witness, Methods of forensic analysis, Distress in concrete structures, Deterioration of structures-Causes and prevention, Damage assessment procedure

Unit II:
Failure Mechanisms in Materials Introduction, Chloride attack of concrete. Carbonation of Concrete, Sulphate attack, Defects in timber, alkali silica reaction, Defects in timber, Fungal attack of timber, Insect attack of timber, Corrosion of steel, Galvanic action

Unit III :

Unit IV:
Maintenance of concrete structures and materials Introduction: Maintenance requirement and planning, classification of maintenance, Repair materials and techniques, Safety measures in maintenance works

Unit V :
Strengthening and Stabilization Introduction: Techniques/design consideration, Beam shear capacity strengthening, Shear transfer strengthening between members, Stress reduction techniques, Column strengthening, Flexural strengthening, Connection stabilization and strengthening, Crack stabilization

Text Books :
1. Maintenance and repair of civil structures, B.L.Gupta and Amit Gupta, Standard publishers
2. Concrete Technology by A.R.Shantakumar, Oxford university press

REFERENCES:

Non-Destructive Evaluation of Concrete Structures by Bungey
IDP (B.Tech. Civil Engg. & M.Tech)

PG ELECTIVE – III

STABILITY OF STRUCTURES

Objectives:
To impart knowledge on the elastic, inelastic buckling and torsional buckling of structures.

Outcomes:
The learner will be able to understand buckling of bars and frames.

Prerequisites: Theory of Elasticity & Advanced Structural Analysis

UNIT – I

UNIT - II
Elastic Buckling of bars and frames; Elastic Buckling of straight columns – Effect of shear stress on buckling – Eccentrically and laterally loaded columns- Buckling of frames-large deflections of buckled bars-Energy methods- Buckling of bars on elastic foundations- Buckle line of bar with intermediate compressive forces - Buckling of bars with change in cross-section – Effect of shear force on critical load- built up columns.

UNIT - III
In Elastic Buckling: Buckle line of straight bar- Double modulus theory – Tangent modulus theory, Inelastic lateral Buckling. Experiments and design formulae: Experiments on columns – Critical stress diagram – Empirical formulae for design – various end conditions

UNIT - IV
Torsion Buckling: Pure torsion of thin walled bars of open cross section – Non-uniform torsion of thin walled bars of open cross section- Torsional buckling – Buckling by torsion and flexure.

UNIT – V
Lateral buckling of simply supported Beams: Beams of Rectangular cross-section subjected to pure bending. Buckling of simply supported Rectangular plates: Derivation of equation of plate subjected to constant compression in one and two directions.

Text Books :

References
Objectives:
To impart knowledge on the properties of composite materials, their uses and advantages.

Outcomes:
The learner will be able to understand use of different composite materials and design GRP Box beams.

Prerequisites: Reinforced Concrete Design

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V
Design of GRP Box Beams: Introduction, loading, span and cross-sectional shape, Selection of material, Beam manufacture, Beam stresses, Experimental Behaviour, Effect on Beam performance- Modulus of Elasticity, Compressive Strength, I value, prevention of compression buckling failure, Behaviour under long term loading.

Design of Stressed skinned roof structure: Introduction, loading and material properties, preliminary design, and computer analysis.

Text Books:
1. Mechanics of Composite materials and Structures by Madhujith Mukhopadhyay; Universities Press

Reference:
1. GRP in Structural Engineering M.Holmes and D.J.Just - Applied Science Publishers
PRINCIPLES OF BRIDGE ENGINEERING

Objectives:
To impart knowledge about different types of bridges, their analysis and design for combination of different loading condition as per codal provisions.

Outcomes:
The learner will be in a position to understand and design different types of bridges.

Prerequisites : Structural Analysis I &II, Reinforced Concrete Design

UNIT I.

UNIT II.

UNIT III
Girder Bridges: Introduction-Method of Analysis and Design-Courbon's Theory, Grillage analogy

UNIT IV.
Pre-Stressed Concrete Bridges: Basic principles-General Design requirements-Mild steel reinforcement in prestressed concrete member-Concrete cover and spacing of pre-stressing steel-Composite Section-Propped-Design of Propped Composite Section-Unpropped composite section-Two-stage Prestressing-Shrinking stresses-General Design requirements for Road Bridges.

UNIT V.

References
1. Design of Concrete Bridges by M.G.Aswani, V.N.Vazirani and M.M.Ratwani.
2. Bridge Deck Behaviour by E.C.Hambly.
3. Concrete Bridge Design and Practice by V.K.Raina.
Objectives:
To impart knowledge on behavior and design of various connections, industrial and steel girders.

Outcomes: The learner will be able to design different steel structures.

Prerequisites: Design of Steel Structures & Structural Analysis

UNIT I:
SIMPLE CONNECTIONS – RIVETED, BOLTED PINNED AND WELDED CONNECTIONS

UNIT II:

UNIT III: ANALYSIS AND DESIGN OF INDUSTRIAL BUILDINGS:
Dead loads, live loads and wind loads on roofs. Design wind speed and pressure, wind pressure on roofs; wind effect on cladding and louvers; Design of angular roof truss, tubular truss, truss for a railway platform. Design of purlins for roofs, design of built up purlins, design of knee braced trusses and stanchions. Design of bracings.

UNIT IV: DESIGN OF STEEL TRUSS GIRDER BRIDGES:
Types of truss bridges, component parts of a truss bridge, economic Proportions of trusses, self weight of truss girders, design of bridge Compression members, tension members; wind load on truss girder Bridges; wind effect on top lateral bracing; bottom lateral bracing; portal Bracing; sway bracing.

UNIT V: DESIGN OF STEEL BUNKERS AND SILOS:

References:
2. Design Steel Structures Volume – II, Dr. Ramachandra & Vivendra Gehlot Scientitic Publishes Journals Department..
PLASTIC ANALYSIS AND DESIGN

Objectives:
To impart knowledge on the analysis of steel structures like continuous beams, steel frames and connection, using Plastic Analysis.

Outcomes:
The learner will be able to design continuous beams and steel frames.

Prerequisites: Design of Steel Structures & Structural Analysis I & II

UNIT – I

UNIT - II
Design of Continuous Beams: Continuous Beams of uniform section throughout – Continuous Beams with different cross-sections.

UNIT - III

UNIT - IV

UNIT - V

Text books & References:
JNTUH COLLEGE OF ENGINEERING HYDERABAD
IDP (B.Tech. Civil Engg. & M.Tech)
PG ELECTIVE – IV

DESIGN OF INDUSTRIAL STRUCTURES

Objectives:
To impart knowledge about different types of industrial structures their analysis and design for different conditions as per codal provision.

Outcomes:
The learner will be able to plan different types of industrial structures such as cold framed members, RC buckers, Soil, Chimneys. Cylindrical shells and design them.

Prerequisites: Design of Steel Structures & Structural Analysis

Unit 1.
Planning of Industrial Structures – types of industrial structures – different components of industrial structures – loads.

Unit 2.
Design of Single & Multi-bay Industrial Structures in Concrete & Steel.

Unit 3.

Unit 4.
RC Chimneys: loads – Design parameters – Design principles

Unit 5.
Hyperbolic Cooling Towers: Loads – Design parameters – Design principles

Text Books & References:
2. Design of Steel Structures, By B.C.Punmia, A.K.Jain – Laxmi Publications
3. Design of Steel Structures, By Ram Chandra - Scientific Publishers
4. Design of Steel Structures, By Duggal - Tata McGraw-Hill publishers
Objectives:
To impart knowledge about various methods of analysing linear equations and understand the different mathematical techniques.

Outcome:
The learner will be able to apply various mathematical techniques to Structural engineering problems.

Prerequisites: Mathematics I & II

UNIT I:

UNIT II:

UNIT III
Finite Difference and their Applications: Introduction- Differentiation formulas by Interpolating parabolas – Backward and forward and central differences- Derivation of Differentiation formulas using Taylor series-Boundary conditions- Beam deflection – Solution of characteristic value problems- Richardson’s extrapolation- Use of unevenly spaced pivotal points- Integration formulae by interpolating parabolas- Numerical solution to spatial differential equations

UNIT IV.

UNIT V

Text Books:

References:
4. Computer based numerical analysis by Dr. M.Shanta Kumar, Khanna Book publishers, New Delhi.
OBJECTIVE:
To understand the theory of optimization methods and algorithms developed for solving various types of optimization problems.

OUTCOME:
The student will be able to understand the basic principles of optimization, and in a position to formulate optimization models for a wide range of civil engineering problems and able to solve them.

Prerequisites: Mathematics I&II

UNIT I

UNIT II

UNIT III
Dynamic Programming: Introduction - Multistage decision processes - concept of sub-optimization and the principle of optimality - computational procedure in dynamic programming - example illustrating the Calculus method of solution - example illustrating the Tabular of solution - conversion of a final value problem into an initial value problem - continuous dynamic programming - Additional applications.

UNIT IV

UNIT V
Application of Optimization techniques to trusses, Beams and Frames.
Text Books:


References

ADVANCED CONCRETE TECHNOLOGY

Objectives:
To impart knowledge on concrete making materials, concrete mix design for proportioning and their testing.

Outcomes:
The learner will be able to design concrete mixes of different grades and also use the special concretes.

Prerequisites: Concrete Technology

UNIT – I

UNIT – II

UNIT – III
Polymers in concrete – different types – proportioning polymer concrete – tests on polymer concrete – High performance concrete – requirements and characteristics factors controlling performance and mechanism affecting performance – mix design methods

UNIT – IV

UNIT – V
Concrete mix design-BIS method – ACI method – DOE method – Light weight aggregate concrete.

TEXT BOOKS
1. Properties of Concrete by A.M.Neville, ELBS publications.
2. Concrete Technology by A.K. Santhakumar, Oxford University Press.
3. Concrete Technology by M.S.Shetty, S.Chand & Co.

REFERENCES:
1. Special Structural concretes by Rafat Siddique, Galgotia Publications.
2. Design of Concrete Mixes by N.Krishna Raju, CBS Publications.
3. Concrete: Micro Structure by P.K.Mehta, ICI, Chennai
Objectives:
To impart knowledge on basics of prestressing and designing of different structural elements using Prestressing techniques.

Outcomes:
The learner will be able to understand the prestressing techniques, design the various structural elements using Prestressing techniques.

Prerequisites : Reinforced Concrete Design & Structural Analysis

UNIT I:
Design of Prestressed Concrete Sections - Design of sections for flexure, Minimum section modulus- prestressing force- Limitation of prestress in long spans- limiting zone for the prestressing force- Design of sections for the limit state of collapse in flexure-Design of sections for axial tension.

UNIT II:
Statically Indeterminate Structures: Primary and secondary moments – methods of Analysis of secondary moments. –Analysis of continuous beams and simple portal frames (single bay and single storey)
Composite Beams: Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

UNIT III:
Design of sections for Compression and Bending: Load- Moment Interaction curves for prestressed concrete short columns-Design of long prestressed columns-design of prestressed concrete compression members in biaxial bending- practical design considerations-design of prestressed sections for shear and torsion.

UNIT IV:
Prestressed Concrete Slabs: Types of prestressed concrete floor slabs- design of prestressed concrete one way and two way slabs—design of prestressed concrete simple flat slabs and continuous flat slab floors.

UNIT V:

References :
Prestressed Concrete by N. Rajagopalan Narosa Publishing House
Objectives:
To impart knowledge on the mechanisms of failure and non linear fracture mechanics.

Outcomes:
The learner will be able to understand the behavior of concrete with tension and compression failure surfaces and concepts of CTOD and CMD.

Prerequisites: Concrete Technology Strength of Materials I & II

UNIT I
Fundamentals of Fracture Mechanics, Mechanisms of fracture and crack growth

UNIT II
Cleavage fracture, ductile fracture, fatigue cracking, Environment assisted cracking, Quasi brittle materials.

UNIT III
Service failure analysis, linear elastic fracture mechanics, Griffith’s criteria, stress intensity factors, crack tip plastic zone, Erwin’s plastic zone correction, R curves, compliance, J Integral, nonlinear analysis, Review of concrete behaviour in tension and compression, Basic frameworks for modeling of quasibrittle materials.

UNIT IV

UNIT V
Concept of CTOD and CMD, Material models, crack models, band models, models based on continuum damage mechanics

Text books:

Reference books:
JNTUH COLLEGE OF ENGINEERING HYDERABAD
IDP (B.Tech. Civil Engg. & M.Tech)
PG ELECTIVE – VI
REINFORCED SOIL STRUCTURES

Prerequisites: Soil Mechanics & Foundation Engineering or Geotechnical Engineering-I & II

OBJECTIVE:
To study the various retaining structures and design the earth retaining structures used in construction of road/railways/pipe lines/open excavations.

OUTCOME:
Able to design conventional/Reinforced earth retaining walls, sheet pile walls, bracing system for open excavations.

UNIT-I
Reinforced Earth: History, field of applications, natural fibres, overview of Geotextiles, Geomembranes, Geogrids, Geonets, Geowebs, Geomats and Gecomposites, economic aspects of their applications.

UNIT-II
Production of Geotextiles, composites, physico-mechanical, hydraulic and chemical Properties. Functions of Geosynthetics, fluid transmission, filtration, separation, protection.

UNIT-III
Soil Reinforcement: Basic principle of soil reinforcement, shear strength of reinforced soil, theoretical strength models, factors affecting, requirements on synthetic reinforcement, installation techniques.

UNIT-IV
Calculation methods: Basic concepts, embankment on soft soils, internal stability, overall stability, foundation stability and bearing capacity failures Construction of the steep slope, retaining walls-external stability, internal stability.

UNIT-V
Use of Geosynthetics in Roads and Railways, drainage system- Control of groundwater level, dewatering and reclamation of land, use of Geomembranes – For lining applications, management and maintenance.

Text Books:

References:
REHABILITATION AND RETROFITING OF STRUCTURES

Objectives:
To impart knowledge about different types of determination of structures testing the structures for the deterioration of structures testing the structures for the diagnosis defects and different types of repairing methods.

Outcomes:
The learner will be understand about different types of distresses in structures, their causes, testing of structures for different problems and suggest suitable repair method.

Prerequisites : Reinforced Concrete Design, Steel Design, Concrete Technology

UNIT – I

UNIT – II

UNIT – III
Inspection and Testing – Symptoms and Diagnosis of Distress - Damage assessment – NDT.

UNIT – IV

UNIT – VIII
Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

TEXT BOOKS:

REFERENCES
1. Concrete Technology by A.R. Santakumar, Oxford University press
3. Non-Destructive Evaluation of Concrete Structures by Bungey - Surrey University Press
JNTUH COLLEGE OF ENGINEERING HYDERABAD
IDP (B.Tech. Civil Engg. & M.Tech)
PG ELECTIVE – VII

EARTHQUAKE RESISTANT DESIGN OF BUILDINGS

Objectives:
To impart knowledge on the seismology and behavior of buildings during earthquakes.

Outcomes: The learner will be able to analyse and design buildings to resist seismic forces.

Prerequisites: Structural Dynamics, Reinforced Concrete Design

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

Capacity Based Design: Introduction to Capacity Design, Capacity Design for Beams and Columns- Case studies.
TEXT BOOKS:

2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCES:

2. Earthquake Resistant Design of Building structures by Vinod Hosur, Wiley India Pvt. Ltd.
3. Masonry and Timber structures including earthquake Resistant Design –Anand S.Arya, Nem chand & Bros

Reference Codes:

OBJECTIVES:
To impart knowledge on the use of various software’s for analysis of Structures

OUTCOMES:
The learner will be able to understand and design the structures using the software.

PREREQUISITES: Advanced Structural Analysis, Auto CAD

UNIT I
Introduction to computer aided design-An over view-computer as a design medium hardware components of a computer -programming languages.
C - Programming language-Introduction-An over view of programming in C-variables and data types-
declaration of variables-Initialization of variables-arithmetic operators-precedence and associability-Input and output-Character I/O-Formatted output. Print f()-Formatted input scan f()-Examples.

UNIT II
C Programming Language-Control structures-If statement-Switch statement-loops-nested loops-while and for ,Do-While-continue statement-Go to statement-Examples.
C Programming Language-Arrays-One dimensional Arrays-Two Dimensional Arrays-pointer operators-pointer arithmetic-pointers and arrays-Matrix manipulations using arrays and pointers-pointers to functions-data files-basic operations-reading and writing and file accessing files-examples.

UNIT III
Computer Graphics-introduction-applications graphic devices-display devices-output and input devices-two dimensional geometric transformations-homogeneous co-ordinates-world co-ordinates-device co-ordinates-window to view port-transformations-clipping operations.

UNIT IV
Data base management system-introduction-data base systems-hardware-software-users-operational data independence-architecture of data base system-distributed databases.

UNIT V
Knowledge based expert system-introduction-artificial intelligence-components of an expert system-stages in expert system development-knowledge representation-inference mechanisms-applications.

TEXT BOOKS:

REFERENCES