# Jawaharlal Nehru Technological University Hyderabad

## B.Tech. Civil Engineering

### Course Structure & Syllabus (2016-17)

#### II Year I Semester

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<tr>
<th>S. No</th>
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**Total Credits** 18 3 12 24

#### II Year II Semester

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**Total Credits** 21 3 9 24

*Satisfactory/ Unsatisfactory
MA301BS: MATHEMATICS - IV
(Complex Variables and Fourier Analysis)

B.Tech. II Year I Sem.  
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Prerequisites: Foundation course (No Prerequisites).

Course Objectives: To learn
- differentiation and integration of complex valued functions
- evaluation of integrals using Cauchy’s integral formula
- Laurent’s series expansion of complex functions
- evaluation of integrals using Residue theorem
- express a periodic function by Fourier series and a non-periodic function by Fourier transform
- to analyze the displacements of one dimensional wave and distribution of one dimensional heat equation

Course Outcomes: After learning the contents of this paper the student must be able to
- analyze the complex functions with reference to their analyticity, integration using Cauchy’s integral theorem
- find the Taylor’s and Laurent’s series expansion of complex functions
- the bilinear transformation
- express any periodic function in term of sines and cosines
- express a non-periodic function as integral representation
- analyze one dimensional wave and heat equation

UNIT–I
Functions of a complex variable: Introduction, Continuity, Differentiability, Analyticity, properties, Cauchy, Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions-Milne-Thompson method

UNIT–II

UNIT–III
Evaluation of Integrals: Types of real integrals:
\[(a) \ \text{Improper real integrals} \quad \int_{-\infty}^{\infty} f(x)dx \quad (b) \ \int_{c}^{c+2\pi} f(\cos \theta, \sin \theta)d\theta \]
Bilinear transformation- fixed point- cross ratio- properties- invariance of circles.
UNIT–IV
Fourier series and Transforms: Introduction, Periodic functions, Fourier series of periodic function, Dirichlet’s conditions, Even and odd functions, Change of interval, Half range sine and cosine series.
Fourier integral theorem (without proof), Fourier sine and cosine integrals, sine and cosine, transforms, properties, inverse transforms, Finite Fourier transforms.

UNIT–V
Applications of PDE: Classification of second order partial differential equations, method of separation of variables, Solution of one dimensional wave and heat equations.

TEXT BOOKS:
3. Advanced engineering Mathematics with MATLAB by Dean G. Duffy

REFERENCES:
CE302ES: STRENGTH OF MATERIALS - I

B.Tech. II Year I Sem.  

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Pre Requisites: Engineering Mechanics

Course 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.

Course Outcomes: At the end of the course, the student will be able to:
- Analyze the statically determinate and indeterminate problems.
- Determine the stresses and strains in the members subjected to axial, bending.
- Evaluate the slope and deflection of beams subjected to loads.
- Determine the principal stresses and strains in structural members.

UNIT – I

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, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III
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:**

**REFERENCES:**
B.Tech. II Year I Sem. 

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Pre Requisites: Engineering Mechanics

Course Objectives: Students who take this class can expect to
- Develop an appreciation for the properties of Newtonian fluids.
- Study analytical solutions to variety of simplified problems.
- Understand the dynamics of fluid flows and the governing non-dimensional parameters.
- Apply concepts of mass, momentum and energy conservation to flows.
- Grasp the basic ideas of turbulence.

Course Outcomes: At the end of the course, the student will be able to:
- Apply conservation laws to derive governing equations of fluid flows.
- Compute hydrostatic and hydrodynamic forces.
- Analyze and design simple pipe systems.
- Apply principles of dimensional analysis to design experiments.
- Compute drag and lift coefficients.

UNIT - I

UNTI – II
Buoyancy and floatation: stability of bodies, meta centre, liquids in relative equilibrium.
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, circulation and vorticity, flownet analysis.

UNIT – III
Fluid Dynamics and Measurement of Flow: Surface and body forces – Euler’s and Bernoulli’s equations for flow along a stream line for 3-D flow, (Navier – stokes equations (Explanational) Momentum equation and its application – forces on pipe bend. Pitot tube,
Venturi meter, and orifice meter – classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches - Broad crested weirs.

UNIT - IV

UNIT – V
Boundary Layer Theory: Approximate Solutions of Navier Stokes 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:

REFERENCES:
Course Objectives: To give the students a basic idea about the construction materials, building components and to introduce various.

Course Outcomes: At the end of the course, the student will be able to identify various building materials required for 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, Fly ash, Ceramics.

UNIT - II
Admixtures – mineral & chemical admixtures – uses.

UNIT - III

UNIT - IV
Mortars, Masonry and Finishing’s
Mortars: Lime and Cement Mortars
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: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.
UNIT – V

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

**TEXT BOOKS:**

**REFERENCES:**
3. Building Materials by P. C. Varghese, PHI.
4. Building Construction by PC Varghese PHI.
Course Objectives: The first step in engineering practice is surveying and the soundness of any civil engineering work is dependent on the reliability and accuracy of 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.

Course Outcomes: At the end of the course, the student will be able to:
- Calculate angles, distances and levels
- Identify data collection methods and prepare field notes
- Understand the working principles of survey instruments
- Estimate measurement errors and apply corrections
- Interpret survey data and compute areas and volumes

UNIT - I
Measurement of Distances and Directions
Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination, and dip.

UNIT - II
 Levelling and Contouring
Levelling- 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:
5. Surveying by Bhavikatti; Vikas publishing house ltd.
Course Objectives: The objective of the course is to make the student understand the behavior of materials under different types of loading for different types of structures.

Course Outcomes: At the end of the course, the student will be able to:
- Conduct tension test on Materials like steel etc.
- Conduct compression tests on spring, wood and concrete
- Conduct flexural and torsion test to determine elastic constants
- Determine hardness of metals

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

Course Outcomes: At the end of the course, the student will be able to:
Master the usage of Autocad commands for drawing 2D & 3D building drawings required 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 storied buildings   b) multi storied buildings
5. Developing sections and elevations for
   a) Single storied buildings   b) multi storied 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:
1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications,
CE308ES: SURVEYING LAB – I

B.Tech. II Year I Sem. L T/P/D C
0 0/3/0 2

Pre Requisites: Surveying Theory

Course 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.

Course Outcomes: At the end of the course, the student will be able to:
Practically able to draw plans & maps to determine the areas 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
MC300HS: GENDER SENSITIZATION LAB

B.Tech. II Year I Sem.  

Course Objectives:
- To develop students’ sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Course Outcomes:
- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT-I
UNDERSTANDING GENDER
Gender: Why Should We Study It? (Towards a World of Equals: Unit -1)
Socialization: Making Women, Making Men (Towards a World of Equals: Unit -2)

UNIT-II
GENDER AND BIOLOGY
Missing Women: Sex Selection and Its Consequences (Towards a World of Equals: Unit -4)
Declining Sex Ratio. Demographic Consequences.
Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit -10)
Two or Many? Struggles with Discrimination.
UNIT-III
GENDER AND LABOUR

Housework: the Invisible Labour (Towards a World of Equals: Unit -3)
“My Mother doesn’t Work.” “Share the Load.”

Women’s Work: Its Politics and Economics (Towards a World of Equals: Unit -7)

UNIT-IV
ISSUES OF VIOLENCE

Sexual Harassment: Say No! (Towards a World of Equals: Unit -6)
Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “Chupulu”.

Domestic Violence: Speaking Out (Towards a World of Equals: Unit -8)
Thinking about Sexual Violence (Towards a World of Equals: Unit -11)
Blaming the Victim-“I Fought for my Life…” - Additional Reading: The Caste Face of Violence.

UNIT-V
GENDER: CO - EXISTENCE

Just Relationships: Being Together as Equals (Towards a World of Equals: Unit -12)
Additional Reading: Rosa Parks-The Brave Heart.

TEXTBOOK

All the five Units in the Textbook, “Towards a World of Equals: A Bilingual Textbook on Gender” written by A. Suneetha. Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad, Telangana State in the year 2015.

Note: Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

REFERENCE BOOKS:
CE401ES: STRENGTH OF MATERIALS – II

B.Tech. II Year II Sem. L T/P/D C
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Pre Requisites: Strength of Materials - I

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

Course Outcomes: At the end of the course, the student will be able to
- Determine stresses in the member subjected to Torsion
- Analyze columns and struts
- Understand the concept of direct and bending stresses
- Analyze and design springs, thin and thick cylinders
- Understand the concept of unsymmetrical bending.

UNIT – I
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
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:** Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells.

**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.

UNIT – V

**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.

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

**TEXT BOOKS:**

**REFERENCES:**
5. Strength of Materials by R.K Rajput, S. Chand & Company Ltd.
### Course Description:

**CE402ES: FLUID MECHANICS - II**

**B.Tech. II Year II Sem.**

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**Pre Requisites:** Fluid Mechanics

**Course Objectives:** To understand basic concept of fluid flow and its application to chemical process industries including pipe flow, fluid machinery and agitation & mixing.

**Course Outcomes:** At the end of the course, the student will be able to:

- Understand the concepts of channel flows.
- Compute flow profiles in channel transitions and analyze hydraulic transients.
- Design the working proportions of hydraulic machines.

**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. Scale Effect.

**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 and preventive measures.
UNIT – V

**Centrifugal Pump:** installation details-classification-types work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel-performance of pumps-characteristic curves- NPSH-cavitation.

**Reciprocating pumps:** Basics, types, air vessels, slip


**TEXT BOOKS:**

**REFERENCES:**
2. Elements of Open channel flow by Ranga Raju, McGraw Hill Education(India) Pvt Ltd, 2013
CE403ES: STRUCTURAL ANALYSIS

B.Tech. II Year II Sem.  

Pre Requisites: Strength of Materials –I

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

Course Outcomes: At the end of the course, the student will be able to:
- Analyze Perfect , Imperfect And Redundant Frames
- Formulate Equilibrium and compatibility equations for structural members
- Analyze one dimensional and two dimensional problems using classical methods
- Analyze indeterminate structures
- Analyze structures for gravity loads, moving loads and lateral loads

UNIT - I
Introduction to Structures and Indeterminacy: Equilibrium and compatibility equations - types of supports and reactions, types of joints and equilibrium equations, Static and kinematic indeterminacies of beams and frames. Effect of force releases like moment hinge, shear releases, link on static indeterminacy, Relative Merits of indeterminate structures over determinate structures.

Propped Cantilever and Fixed Beams: Types of props : Elastic and Rigid props, Determination of - 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 – II
Frames: Classification- plane and space frames, pin jointed and rigid jointed frames.
Analysis of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed frames, assumptions, transfer of load to joints from wind and other forces - Analysis of determinate pin jointed frames using method of joints and method of sections for vertical loads, horizontal loads and inclined loads.

UNIT – III
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.

UNIT – IV
Slope Deflection Method: Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams and Elastic curve.
Moment Distribution Method: application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams and Elastic curve.

UNIT – V
Moving Loads and Influence Lines: Introduction-applications to bridges (only description), 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- maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load UDL longer than the span, UDL shorter than the span, two point loads with fixed distance between them and several point loads- Equivalent uniformly distributed load-Focal length. Influence lines for forces in members of deck and through type trusses like Pratt and Warren trusses. Equivalent uniformly distributed load. Focal length. Muller Breslau’s principle for determinate and indeterminate beams (qualitative)

TEXT BOOKS:

REFERENCES:
1. Structural Analysis by R. C. Hibbeler, Pearson Education
CV404ES: ENGINEERING GEOLOGY

B.Tech. II Year II Sem.  

Course Objectives: The objectives of the course is to give the basics knowledge of Geology that is required for constructing various Civil Engineering Structures, 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.

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

- Understand weathering process and mass movement
- Distinguish geological formations
- Identify geological structures and processes for rock mass quality
- Identify subsurface information and groundwater potential sites through geophysical investigations
- Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels

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 drawbacks. 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:** Outcrop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, 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. Landslides, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and landslides.


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. Factors 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, McMillan, India Ltd. 2005

**REFERENCES:**
4. Engineering Geology for Civil Engineers – P.C. Varghese PHI
Course Objective: To learn the basic Business types, impact of the Economy on Business and Firms specifically. To analyze the Business from the Financial Perspective.

Course Outcome: The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm’s financial position by analysing the Financial Statements of a Company.

UNIT – I
Introduction to Business and Economics:

UNIT – II
Demand and Supply Analysis:
Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

UNIT – III
Production, Cost, Market Structures & Pricing:
Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.
Cost analysis: Types of Costs, Short run and Long run Cost Functions.
Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition.
UNIT-IV

UNIT -V
Financial Analysis through Ratios:
Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems).
Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS:

REFERENCES:
CE406ES: FLUID MECHANICS LAB

B.Tech. II Year II Sem.                  L    T/P/D  C
0     0/3/0    2

Pre Requisites: FM Theory

Course Objectives: To give the student an exposure to various hydraulic devices and Pipe Flow.

Course Outcomes: At the end of the course, the student will be able to:
- Determine coefficient of discharge for orifice and mouthpiece.
- Calibrate notches venturimeter orifice meters
- Determine minor losses in pipes

List of Experiments:
1. Determination of Coefficient of discharge for a small orifice.
2. Determination of Coefficient of discharge for a mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch / Triangular Notch/Trapezoidal Notch.
4. Determination of friction factor of a pipe
5. Calibration of Venturimeter
6. Calibration of Orifice meter
7. Determination of Coefficient for minor losses - Sudden Expansion
8. Determination of Coefficient for minor losses-Sudden Contraction
9. Verification of Bernoulli’s equation.
10. Study of Water Hammer due to sudden Closure of valve.
CE408ES: SURVEYING - II LAB

B.Tech. II Year II Sem.  

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

Course Outcome: 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
CV407ES: ENGINEERING GEOLOGY LAB

B.Tech. II Year II Sem.  | L  | T/P/D | C
|----------------------|----|-------|----
|                      | 0  | 0/3/0 | 2  

Pre Requisites: Engineering Geology Theory

Course 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.

Course Outcomes: At the end of the course, the student will be able to:
Identify the various rocks, minerals depending on geological classifications

1. Study of physical properties and identification of minerals referred under theory.
2. Megasscopic 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.
MC400ES: ENVIRONMENTAL SCIENCE AND TECHNOLOGY

B.Tech. II Year II Sem.  
L  T/P/D  C  
3  0/0/0  0

Course Objectives:
- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations.

Course Outcomes: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

UNIT-I
Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids, Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II
Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

UNIT-IV

**UNIT-V**


**TEXT BOOKS**:
1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

**REFERENCE BOOKS**: