CIVIL ENGINEERING

III & IV SEMESTER

With
Scheme of Teaching
& Examination
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<th></th>
<th>Name</th>
<th>Degree</th>
<th>Position</th>
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<tr>
<td>1</td>
<td>Dr. I. Ramesh Mithantaya</td>
<td>Ph.D</td>
<td>Prof/ Vice Principal/Dean(Aca)</td>
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<tr>
<td>2</td>
<td>Dr. N. Bhavani Shankar Rao</td>
<td>Ph.D</td>
<td>Professor</td>
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<td>3</td>
<td>Dr. Udaya Kumar G.</td>
<td>Ph.D</td>
<td>Professor</td>
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<td>4</td>
<td>Dr. Srinath Shetty K.</td>
<td>Ph.D</td>
<td>Prof. &amp; Head</td>
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<td>5</td>
<td>Dr. Radhakrishnan K.</td>
<td>Ph.D</td>
<td>Professor</td>
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<td>6</td>
<td>S.K. Mahadeve Gowda</td>
<td>M.Tech</td>
<td>Asso. Prof</td>
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<td>7</td>
<td>J.K. Lokesh</td>
<td>M.Tech</td>
<td>Asst. Prof Gd III</td>
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<td>8</td>
<td>Y. Umashankar Shetty</td>
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<td>9</td>
<td>Y.R. Suresh</td>
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<td>Purushotham C.T.</td>
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<td>11</td>
<td>Sundip Shenoy R.</td>
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<td>12</td>
<td>Leeladhar Pammar</td>
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<td>Pushparaj</td>
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<td>T.N. Shridharan</td>
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<td>Gururaj Aharya</td>
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<td>16</td>
<td>Prashanth Kumar</td>
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<td>17</td>
<td>Akshay N.K</td>
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<td>18</td>
<td>Rakshith Kumar Shetty</td>
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<td>19</td>
<td>Manjunath M.</td>
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<td>20</td>
<td>Roshan Rai</td>
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<td>21</td>
<td>Anil Kumar</td>
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<td>22</td>
<td>Thangamani R.</td>
<td>M.Sc.</td>
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<td>23</td>
<td>Joel Santhosh</td>
<td>M.Tech</td>
<td>Asst Prof Gd I</td>
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<tr>
<td>24</td>
<td>Akshatha Shetty</td>
<td>M.Tech</td>
<td>Asst Prof Gd I</td>
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Department of Civil Engineering, NMAMIT, Nitte

Vision:
To uphold the Department as a leader in innovation and excellence in the field of Civil Engineering by offering world class curricula, training for students and research and consultancy services to meet the global challenges and market demands.

Mission:
The Department of Civil Engineering will strive hard to

- Provide the students a strong theoretical knowledge to understand the basic concept in each stream
- Highlight the significance of the Civil Engineering subjects through practical applications
- Prepare the students to face the scholastic competitions to upgrade their knowledge
- Encourage the students to develop professional ethics through discipline and principles

Programme Educational Objectives (PEO’s):
Students will be guided to

- Acquire both theoretical and practical knowledge to solve Civil Engineering problems
- Gain potentiality in the subjects to tackle the practical problems with enthusiasm
- Develop eagerness to learn more and more to face the challenges involved to meet the global demands

Programme Outcomes (PO’s):
Students will develop the

- Ability to achieve excellence in the professional career
- Ability to analyse and design the problems related to Civil Engineering
- Understanding of the practical applications of the theory learnt
## DEPARTMENT OF CIVIL ENGINEERING
### SCHEME OF TEACHING

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<tr>
<td>13CV301</td>
<td>Engg. Mathematics-III</td>
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<td>13CV302</td>
<td>Materials of Construction</td>
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<td>13CV303</td>
<td>Strength of Materials</td>
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<td>13CV304</td>
<td>Surveying-I</td>
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<td>13CV305</td>
<td>Fluid Mechanics</td>
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<td>13CV306</td>
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<td>Basic Materials Testing Lab</td>
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<td>13CV308</td>
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<td>13CV401</td>
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<td>13CV402</td>
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<td>Surveying – II</td>
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<td>13CV406</td>
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<td>13CV407</td>
<td>Surveying Practice- II</td>
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<tr>
<td>13CV408</td>
<td>Applied Engg. Geology Lab</td>
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Syllabus of III & IV Semester B.E. / Civil Engg.

ENGINEERING MATHEMATICS -III

Subject code : 13CV301  Credits : 04
Hrs / Week : 4  Total Hours : 52

Prerequisites:
Vector algebra, infinite series, differentiation, integration and knowledge of complex numbers.

Course learning Objectives: At the end of the course the student is expected to:
1. Know the areas where vector functions and their derivatives are useful and how to apply these concepts in the relevant problems.
2. Apply the results of topics like Complex analysis, Fourier series, to solve engineering problems.
3. Apply numerical methods to solve engineering problems where the analytical solutions for some functions are not possible.

UNIT – I
Vector Calculus: Vector algebra, Vector differentiation- gradient, divergence, curl, laplacian, solenoidal and irrotational vectors.  8 Hrs

UNIT – II

UNIT – III
Fourier Analysis: Periodic functions, Euler’s formulae, Fourier series of odd and even functions, functions with arbitrary period, half range series. Harmonic Analysis. Fourier integral theorem, Fourier Transforms, Inverse Fourier transform, Convolution theorem. Fourier sine and Fourier cosine transforms, Inverse Fourier sine and Inverse Fourier cosine transforms. 10 Hrs

UNIT – IV
Numerical integration: General quadrature formula, Trapezoidal rule, Simpson’s one third rule, Simpson’s three eighth rule.  

UNIT - V

TEXT BOOKS:

REFERENCE BOOKS:
3) Murray R. Spiegel: Vector Analysis, Schuam publishing Co.

MATERIALS OF CONSTRUCTION

Subject Code : 13CV302 Credits : 03
Hrs / Week : 3 Total Hours : 39

Objective of the course:
01. Understand wide variety of materials used in Building industry.
02. Identify best suited materials for different kind of works in terms of service and durability.
03. Define various terminologies used in concrete technology.
04. Understand the workability concept and mechanism of concrete.
05. Understand the strength concept of concrete in fresh and hardened state.
06. Able to conduct strength tests for concrete and different materials
UNIT - 1
BUILDING STONE: Common building stones and their uses, Quarrying of stones, Dressing of stones, Deterioration of stones, preservation of stones.
BRICKS: Classification of bricks, Manufacture of bricks, Tests on bricks, Quality of bricks as per BIS and their uses.
TILES: Types of tiles and their uses, Tests on roof tiles, Classification of Mangalore tiles.

UNIT - II
TIMBER: Varieties and uses, defects in timber, seasoning of timber, tests for good timber, plywood and its uses, wood boards.
LIME: Types of lime, manufacture of hydraulic and fat limes, activated lime- lime pozzolana mixture, lime mortar and its uses
OTHER BUILDING MATERIALS: Properties and uses of reinforcing steel and structural steel, cast iron and plain carbon steel, glasses, electrical, thermal and sound insulating materials, paints, varnishes and enamels, plastics, rubber, bitumen and asphalt.

UNIT - III
Testing of Cement: Field testing, fineness by sieve test and Blaine’s air permeability test, normal consistency, setting time and soundness. Quality of mixing water, compressive strength of cement and grades of cement. Fine aggregate- grading as per B I S using sieve analysis, specific gravity, bulking, moisture content and deleterious materials. Coarse aggregate—Importance of size, shape and texture, grading by sieve analysis, specific gravity, flakiness and elongation index. Crushing, impact and abrasion tests.

UNIT - IV
UNIT - V


8 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
STRENGTH OF MATERIALS

Subject Code : 13CV 303
Hrs/ Week : 3-2-0
Credits : 04
Total Hours : 52

Objectives:
1. To understand the behaviour of deformable body under the action of external forces
2. To know the basic concepts and principles of design

Expected outcome: At the end of the course students shall be able to:
1. Solve the problems in strength of materials
2. Apply the methods learnt in strength of materials in solving practical engineering problems.

Pre-requisites of the course: MA101, MA201, CV103.

UNIT - 1

Simple Stresses and Strain:
Volumetric strain, expression for volumetric strain, Elastic constants, relationship among elastic constants, Thermal stresses (excluding thermal stresses in compound bars).

UNIT - II

Compound stresses and Thin & Thick Cylinders:
Introduction, Stress components on inclined planes, General two dimensional stress system, Principal planes and principal stresses, Mohr’s circle of stresses. Thin cylinders subjected to internal pressure, change in length, diameter and volume, Thick cylinders - Lame’s equations (excluding compound cylinders).

UNIT - III

Bending moment and shear force in beams:
Introduction, Types of beams, loadings and supports, Shear force in beams, Bending moment, Sign convention, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, SFD and BMD for statistically determinate beams considering point loads, UDL, UVL and Couple.
UNIT - IV

Bending stresses and shear stresses in Beams:
Introduction – Bending stress in beams, Simple bending theory, derivation of Bending equations, Modulus of rupture, Section modulus, Flexural rigidity, Expression for horizontal shear stress in beam, Shear stress diagram for rectangular, ‘I’ and ‘T’ section (Fletched beams not included).
Deflection of beams:
Introduction – Definitions of slope and deflection, Elastic curve, derivation of differential equation, Sign convention, Slope and deflection for statistically determinate beams using first principles and Mecaulay’s method subjected to point loads, UDL and Couple.

12 Hrs

UNIT - V

Torsion of circular shafts:
Introduction – Pure torsion-Torsion equations for circular shafts, Torsional rigidity and polar modulus, Power transmitted by shaft of solid and hollow circular sections.

Columns and Struts:
Introduction – Short and long columns, Euler’s theory for columns with both ends hinged, Effective length, slenderness ratio, Radius of gyration, Euler’s Buckling load for different end conditions, Limitations of Euler’s theory, Rankine’s formula.

10 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
SURVEYING – I

Subject Code : 13CV 304
Credits : 03
Hrs/ Week : 3
Total Hours : 39

Objectives of the course:
1. To study the importance of surveying in Civil engineering.
2. To study the various surveying instruments and their application in the field.

Pre-requisites of the course: MA101, MA201

UNIT - 1

INTRODUCTION
Definition of Surveying, Classification of Surveys, Uses of Surveying Units of Measurements, Basic principles of surveying, Errors, Classification, Precision and accuracy
Chain and tape, EDM devices, Ranging of lines Direct and Indirect, Measurement of distances over sloping grounds, Chain and Tape corrections, Selection of stations and lines, Offsets, setting out of right angles.

UNIT - II

CHAIN AND PLANE TABLE SURVEYING
Working principle and use of optical square, prism square, cross staff, Linear methods of setting out right angles, Booking of chain survey work, Field book entries, conventional symbols, obstacles, Error in chain surveying and precautions to be taken.
Plane table and accessories, Advantages and limitations, Orientation and methods, Methods of plotting – radiation, intersection, traversing, resection.

UNIT - III

COMPASS SURVEYING
Meridians and bearings, Principle, working and use of – Prismatic compass, Surveyor’s compass, Magnetic bearing and true bearings, WCB and Reduced bearing. Dip and Declination, Traverse - closed and open, Computation of bearing and included angles.
Local attraction, determination and corrections, Checks for closed traverse and determination of closing error. Bowditch’s graphical method of adjustment of closed traverse, Bowditch’s rule and transit rule.
UNIT - IV
LEVELING
Principles and basic definitions, fundamental axes and parts of a dumpy level, types of adjustments and objectives, temporary adjustments of a dumpy level, sensitiveness of a bubble tube, curvature and refraction correction, types of leveling, cross sectioning and fly leveling.
Salient features of Total station and its advantages over conventional instruments. 8 Hrs

UNIT - V
REDUCTION OF LEVELING AND CONTOURING
Booking of levels, Rise and fall method, Height of instrument method, comparison, arithmetic check, errors and precautions. Interpolation techniques, uses of contours, determination of intervisibility, grade contours and uses. 8 Hrs

TEXT BOOKS:

REFERENCE BOOKS:

FLUID MECHANICS
Subject Code : 13CV 305 Credits : 04
Hrs/ Week : 4 Total Hours : 52

Objective of the course:
To equip the students with the fundamentals & concepts of fluid mechanics.

Expected outcome: At the end of the course, student will have clear knowledge in the area of fluid properties, fluid pressure and its measurements, hydrostatics, kinematics of fluids and dynamics of fluid flow.

Pre-requisites of the course: CV103, CV301.
UNIT - I
INTRODUCTION
Scope and Importance of subject, Definition of fluid, Distinction between solids & fluids, liquid & gas, fluid continuum.
FLUID PROPERTIES AND CLASSIFICATION OF FLUIDS
Definitions: Mass density, Specific Volume, Specific Weight, Relative density, units and Dimensions, Viscosity, Newton’s law of viscosity, Newtonian and Non-Newtonian Fluids, Ideal and Real fluids, Compressibility, Vapour pressure, Surface tension, Equation for stability of bubble, Capillarity. 9 Hrs

UNIT - II
FLUID PRESSURE AND ITS MEASUREMENT
Definition of pressure, Units and dimensions, Pressure at a point, Pascal’s law, Hydrostatic pressure law, Absolute and Gauge pressure, Measurement of pressure, Simple & Differential manometers, Mechanical pressure gauges.
HYDROSTATICS
Definition of total pressure, Center of pressure, Centroid, centroidal depth, depth of center of pressure, Equation for hydrostatic force and depth of center of pressure for plane surfaces (vertical and inclined), Hydrostatic force on curved submerged surfaces, pressure diagram. 12 Hrs

UNIT - III
KINEMATICS OF FLUIDS
Description of fluid flow, Lagrangian and Eulerian approaches. Classification of flow, steady & unsteady, Uniform and non-uniform, Definition of path line, Streamline, Streak line, Stream tube, One, Two, Three dimensional flows, Rotational and irrotational flow, Acceleration of flow, Derivation of continuity equation in differential form, Definition of velocity potential, Stream functions, Stream line, Equipotential line, Relation between velocity potential and stream function, Laplace equation. 9 Hrs

UNIT - IV
DYNAMICS OF FLUID FLOW
Concept of Inertia force and other forces causing motion, Derivation of Euler’s equation and Bernoulli’s equation with assumption and limitation, Modification of Bernoulli’s equation, Application of Bernoulli’s equation - Pitot tube, Venturimeter, Momentum equation.
FLOW THROUGH PIPES
Flow through pipes, Reynolds number, Classification of flow, Definition of hydraulic gradient, Energy gradient, Major and minor losses in pipe flow, Equation for head loss due to friction (Darcy-Weishbach equation), Friction factor for commercial pipes, Minor losses (types), Equation for head loss due to sudden expansion. Pipes in series, Parallel and equivalent pipe. 12 Hrs

UNIT - V
FLOW MEASUREMENTS
Flow through Orifices; classification, Hydraulic co-efficients of an Orifice and relationship between them, Submerged and large rectangular Orifices, Flow through mouth pieces, Classification, Equation for discharge and pressure head for an external cylindrical mouth piece.
Flow over notches, classification, Equation for discharge over rectangular, trapezoidal, V-notch, Cippoletti notch, Flow over broad crested weirs, Submerged weirs, Types of Nappe, Ventilation of weirs. 10 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
APPLIED ENGINEERING GEOLOGY

Subject Code : 13CV 306 Credits : 03
Hrs/ Week : 3 Total Hours : 39

Objective of the Course:
1. To equip the students to identify the significance of Geology in Civil Engineering practices
2. To make them understand the earth, its structure, materials, resources, processes and forces acting on it in order to appreciate the geological problems and its solutions coming under Civil Engineering practices

Pre-requisites of the Course: MA101, MA201, PH102, CY110, CV113

UNIT - I
Physical Geology: Geology and its importance in Civil Engineering practices; Parts of the Earth- Internal Structure and its Composition; Earthquakes- Causes and effects, Seismographs, concept of plate tectonics, seismic resistant structures and engineering considerations; Rivers- Drainage pattern, drainage basin, concept of watershed, geological work of rivers, major erosional and depositional landforms, engineering significance ; Weathering- agents, types and engineering significance, influence of climate and lithology on weathering; Soil- Soil Profile, Geological classification, soil erosion and its control.  7 Hrs

UNIT - II
Materials of the Earth: Minerals and Rocks, rock forming minerals and economic minerals; physical properties of Minerals; classification, chemical composition, general characteristics, properties and uses of common rock forming minerals- Quartz group, Feldspars, Pyroxenes, Amphiboles, Micas, Carbonates, Olivine, Asbestose, Garnet, Talc, Gypsum, magnetite and Kaolinite; economic minerals and their uses. Rocks- definition, threefold division of rocks, Rock cycle, distinguishing features of igneous, sedimentary and metamorphic rocks; Characteristics and identification factors of rocks- textures and structures.  8 Hrs

UNIT - III
Petrology: Igneous rocks— forms, textures and structures, classification, Tabular classification; varieties- Granite, Gabbro, Dunite, Dolerite, Pegmatite and Basalt, their engineering properties
and uses. Sedimentary rocks – classification, textures and structures, varieties- Sandstone, Limestone, Shale, Breccia, Conglomerate and Laterite, their engineering importance and uses. Metamorphic Rocks-Metamorphism, process, agents, types, textures and structures; varieties- Gneiss, Quartzite, Marble, Slate, Phyllite, Schists, their engineering importance and uses. Qualities of good Building stones, Road Metals, Railway Ballasts and Concrete aggregates. Rocks as building materials for foundation, decorative stones, flooring and roofing with examples.  

UNIT - IV  
Structural Geology: definition, forces, stress, strain; Attitude of beds, Clinometer compass, outcrops, escarpments, outlier and inlier. Folds, Faults, Joints and Unconformomirities- definition, causes, parts, classification, recognition and engineering importance.  8 Hrs

UNIT - V  
Engineering Geology: Groundwater- source, occurrence, zones, aquifers- types and properties; Groundwater investigation- Selection of Well sites, geological, hydrological and geophysical methods (electrical resistivity method); Engineering Geology in Dams and Reservoirs, silting up of reservoirs and its control; Engineering geology in tunneling practice. Mass movements- causes, classification and control.  8 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
BASIC MATERIAL TESTING LAB

Subject Code: 13CV307  
Credits: 02  
Hrs/ Week: 3

1. Tension test on Mild steel and HYSD bars.  
2. Compression test of Mild Steel, Cast iron and Wood.  
3. Torsion test on Mild Shaft.  
4. Bending Test on Wood Under two point loading  
5. Shear Test on Mild steel and Wood  
6. Impact test on Mild Steel (Charpy & Izod)  
7. Hardness tests on ferrous and non-ferrous metals – Brinell’s, Rockwell and Vicker’s  
8. Tests on Fine aggregates – Moisture content, Specific gravity, Bulk density, Sieve analysis and Bulking  
9. Demonstration of Strain gauges and Strain indicators

NOTE: All tests to be carried out as per relevant BIS Codes

REFERENCE BOOKS:
2. Relevant IS Codes

SURVEYING PRACTICE – I

Subject Code: 13CV 308  
Credits: 02  
Hrs/ Week: 3

Exercise -1
a) Direct and indirect ranging  
b) To set out perpendiculars at various points on given line using cross staff, optical square and tape.

Exercise - 2
Measurement of bearing of the sides of a closed traverse & adjustment of closing error by Bowditch method and Transit method
Exercise - 3
To set out rectangles, pentagon, hexagon, using tape /chain and compass.

Exercise - 4
To determine the distance between two inaccessible points using chain/tape & compass.

Exercise - 5
To locate points using radiation and intersection method of plane tabling

Exercise - 6
To determine difference in elevation between two points using fly leveling technique & to conduct fly back leveling. Booking of levels using HI method

Exercise - 7
To determine difference in elevation between two points using fly leveling technique & to conduct fly back leveling. Booking of levels using Rise & Fall method.

Exercise - 8
To determine difference in elevation between two points using reciprocal leveling and to determine the collimation error

Exercise - 9
To conduct profile leveling for water supply /sewage line and to draw the longitudinal section to determine the depth of cut and depth of filling for a given formation level.

Demonstration:
1. Minor instruments – Clinometer, Ceylon ghat tracer, Hand level, Box sextant, Planimeter and Pantagraph.
2. Exposure to use of Total station, Traversing, Longitudinal sections, Block leveling, Usage of relevant software for preparation of the contour drawings.

Scheme of Examination
Any one of the above exercise is to be conducted in the examination by the student.

TEXT BOOKS:
REFERENCE BOOKS:

ENGINEERING MATHEMATICS- IV

Subject code : 13CV401
Credits : 04
Hrs/Week : 4
Total Hours : 52

Course learning Objectives: At the end of the course the student will be able to
1. Understand and appreciate probabilistic models for situations involving chance effect.
2. Learn some probability distributions both discrete and continuous and its applications in real life problems.
3. Apply numerical methods to solve engineering problems where the analytical methods are not possible for solutions of differential equations.

Prerequisites: Set Theory, Calculus, differential equations and finite differences

UNIT – I
Introduction to probability: Finite sample space, conditional probability and independence. Baye’s theorem. One dimensional random variable: discrete and continuous random variable, probability distribution function, cumulative distribution function. Mean and variance. 12 Hrs

UNIT - II
Probability Distributions and Curve filling: Binomial, Poisson, Normal, Uniform and Exponential distributions. Curve fitting: curve fitting by the method of least squares: \( y = a + bx \), \( y = a + bx + cx^2 \), \( y = ab^x \).correlation and regression. 10 Hrs
UNIT - III

Sampling theory: Random samples, sampling distributions, t & F distributions. Moment generating functions, Central limit theorem and its applications.  

UNIT – IV


UNIT – V


TEXT BOOKS: 

REFERENCE BOOKS:
STRUCTURAL ANALYSIS –I

Subject Code : 13CV 402
Credits : 04
Hrs/ Week : 3-2-0
Total Hours : 52

Objective of the course:
To make the students understand the concepts and analysis of different types of structural members.

Expected outcome: At the end of the course students must be able to solve the problems connected with analysis of various structural components.

Pre-requisites of the course: CV103, CV301, CV303, CV401

UNIT - 1
STRUCTURAL SYSTEMS
Forms of structures, Conditions of equilibrium, Degree of freedom, Linear and Non linear structures, one, two, three dimensional structural systems, Determinate and indeterminate structures [Static and Kinematics].

PLANE TRUSSES

UNIT - II
STRAIN ENERGY
Strain energy and complimentary strain energy, Strain energy due to axial load, bending and shear, Theorem of minimum potential energy, Law of conservation of energy, Principle of virtual work, The first theorem of Castigliano- problems on beams, frames and trusses, Betti’s law, Clarke - Maxwell’s theorem of reciprocal deflection. Deflection of beams and trusses using strain energy and unit load Methods.

UNIT - III
DEFLECTION OF BEAMS
Moment area method, Conjugate beam method

UNIT - IV
ANALYSIS OF BEAMS
Consistent deformation method – Propped cantilever and fixed beams, second theorem of castigliano-(minimum Strain Energy method) – Propped cantilever and fixed beams. Clapeyron’s theorem of three moments – continuous beams and fixed beams.
UNIT - V

ARCHES AND CABLES
Three hinged circular and parabolic arches with supports at same levels and different levels, Determination of thrust, shear and bending moment, Analysis of cables under point loads and UDL, length of cables (Supports at same levels and at different levels).
Two hinged parabolic arch, two hinged Circular arch.  

12 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
SURVEYING – II

Subject Code : 13CV403 Credits : 03
Hrs/ Week : 3 Total Hours : 39

Objectives: To make the students familiar with the various surveying and leveling instruments used in civil engineering and their use in the field. At the end of the course student will have the knowledge about the different processes like theodolite surveying, trigonometric leveling, tacheometry, curve setting and computation of areas and volumes which are useful for a civil engineer.

Pre-requisites of the course: CV304, CV308

UNIT - I
THEODOLITE SURVEYING

PERMANENT ADJUSTMENT OF DUMPY LEVEL AND TRANSIT THEODOLITE
Interrelationship between fundamental axes for instrument to be in adjustment, step by step procedure of obtaining permanent adjustments 7 Hrs

UNIT - II
TRIGONOMETRIC LEVELING
Determination of elevation of objects when the base is accessible and inaccessible by single plane and double plane method, Distance and difference in elevation between two inaccessible objects by double plane method.
Remote sensing and GIS Principle and applications 7 Hrs

UNIT - III
TACHEOMETRY
Basic principle, Types of tacheometric surveying, Tacheometric equation for horizontal line of sight and inclined line of sight in fixed hair method, Anallactic lens in external focusing telescopes. Movable hair method and tangential method.

COMPUTATIONS OF AREAS AND VOLUMES
Calculation of area from cross staff surveying method. Planimeter – principle of working and use of planimeter to measure areas, digital planimeter, Computations of volumes by trapezoidal and prismatical rule. 9 Hrs
UNIT - IV
CURVE SETTING
Curves – Necessity and Types, Simple curves and its elements, 
Designation of curves, Setting out simple curves by linear methods 
and Rankine’s deflection angle method. 
Compound curves and its elements and setting out of compound 
curves 8 Hrs

UNIT - V
REVERSE, TRANSITION AND VERTICAL CURVES
Reverse curve between two parallel straights (Equal radius and 
onequal radius), Transition curves and its characteristics, Length of 
Transition curve. Types of vertical curves. 8 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
   Thomson Learning. 

HYDRAULICS & HYDRAULIC MACHINES
Subject Code : 13CV404 Credits : 04 
Hrs/ Week : 4 Total Hours : 52

Objective: At the end of the course each student will have clear 
knowledge in the area of open channel flow and hydraulic machines.

Pre-requisites of the course: CV103, CV301, CV305.

UNIT - I
FLOW IN OPEN CHANNELS
Definition of open channels, classification, difference between pipe 
flow & open channel flow, types of flow, Geometric properties of 
open channels, Uniform flow in open channels, Chezy’s and 
Manning’s formulae, Most economical open channels. Derivation of
conditions for most economical rectangular, triangular and trapezoidal sections, Specific energy, specific energy curve, conditions for minimum specific energy and maximum discharge, Critical flow in rectangular channels, Hydraulic jump in rectangular channels, Froude number concept, Venturi flume and standing wave flume  \(\text{12 Hrs}\)

**UNIT - II**

**DIMENSIONAL ANALYSIS & MODEL SIMILITUDE**

Introduction to Dimensional Analysis, units & dimensions, Dimensional Homogeneity, Methods of Analysis-Raleigh’s & Buckingham’s method, Model Studies, Similitude, Dimensionless parameters, Types of models, Froude’s and Reynolds’s models, Scale effects.  \(\text{8 Hrs}\)

**UNIT - III**

**WATER HAMMER IN PIPES**

Definition, Equations for pressure rise due to gradual and sudden closure of valves in rigid & elastic pipes, Surge tanks, Functions & types.

**IMPACT OF JET ON VANES**

Introduction, Impulse – momentum equation and its applications, Force exerted by a jet on a fixed and moving vanes, Force exerted by a jet on a series of curved vanes, Concept of velocity triangles, Equation for work done & efficiency.  \(\text{12 Hrs}\)

**UNIT - IV**

**HYDRAULIC TURBINES**

Introduction, Types and classifications, Pelton Wheel, Francis Turbine and Kaplan Turbine- Theory, Equation for work done and efficiency, Design parameters, Draft tubes- types, Efficiency, Cavitations and governing of turbines, Specific speed of a turbine, Unit quantities of a turbine, Characteristics curves of a turbine, General layout of an hydroelectric plant.  \(\text{12 Hrs}\)

**UNIT - V**

**CENTRIFUGAL PUMPS AND OTHER COMMERCIAL PUMPS**

Definition of pump, classification, Description & general principle of working, priming, Work done & efficiencies of a centrifugal pump, Minimum starting speed, Cavitation in centrifugal pumps, Multistage pumps, Description and working principle of jet pump and submersible pump.  \(\text{8 Hrs}\)
TEXT BOOKS:

REFERENCE BOOKS:

BUILDING CONSTRUCTION

Subject Code : 13CV405            Credits : 03
Hrs/ Week : 3                    Total Hours : 39

Objective of course:
1) To make the students know about various components of a building from foundation to superstructure.
2) Materials used in foundation, superstructure, roofing are explained in detail.
3) Miscellaneous materials and process used in construction is described.

Expected outcome: Student will have comprehensive knowledge about a building and how it should be constructed using available materials of construction.

Pre-requisites of the course: CV302.

UNIT - 1
Foundations: Preliminary investigation of soil, bearing capacity, safe bearing capacity, allowable bearing capacity, determination of bearing capacity by plate load test and by method of dropping weight. classification of foundations, introduction to different type of
foundations- masonry footings, isolated footings, combined and strap RCC footings, raft footing. Pile foundations (friction and load bearing piles).

UNIT - II

UNIT - III
Floors, Roofs and Stair case: Types of flooring(materials and method of laying), granololitic, mosaic, ceramic, marble, granite, vitrified tile, industrial flooring. Flat roof (R.C.C.), sloped roof (R.C.C and tile roof), lean to roof. wooden truss (king post and queen post trusses), steel trusses, weather proof course for RCC roof, types (classifications) and technical terms in stairs, requirement of a good stair, geometric design of RCC dog legged and open well stairs. (Plan and sectional elevation of stairs).

UNIT - IV

UNIT - V
Introduction to cost effective construction: Necessity, advantages, pre fabrication techniques, pre cast doors and windows (Pre cast frames and shutters). Alternative building materials, hollow concrete blocks, stabilized mud blocks, micro concrete tiles, pre cast roofing elements.
Miscellaneous topics: Form work- form work details for RCC columns, beams, floors. Slip forming. Shoring, underpinning, scaffolding. Damp proof construction. 7 Hrs

**TEXT BOOKS:**

**REFERENCE BOOKS:**

**BUILDING PLANNING AND DRAWING**

Subject Code : 13CV406  
Credits : 04  
Hrs/ Week : 6  
Total Hours : 52

**Objective of the course:** At the end of the course students shall be able to plan residential and public buildings. They shall also be able to prepare detailed drawings.

**Pre-requisites of the course:** Fundamentals of drawing, building construction, materials of construction.

**UNIT - I**
To prepare working drawing of component of buildings: i) Stepped wall footing and isolated RCC column footing, ii) Fully paneled and flush doors, iii) Half paneled and half-glazed window, iv) RCC dog legged and open well stairs, v) Steel truss. 12 Hrs
UNIT - II
Functional design of buildings (Residential, Industrial and Public), positioning of various components of buildings, orientation of buildings, building standards, bye laws, set back distances and calculation of carpet area, plinth area and floor area ratio. 9 Hrs

UNIT - III
Development of plan, elevation, section and schedule of openings from the given line diagram of residential buildings
i) Two bed room building, ii) Two storeyed building. 18 Hrs

UNIT - IV
Functional designs of building using inter connectivity diagrams: i) Primary health centre, ii) Primary school building, iii) College canteen, iv) Office building. 8 Hrs

UNIT - V
For a given single line diagram, preparation of water supply, Sanitary and electrical layout. 5 Hrs

REFERENCE BOOKS

Scheme of Examination:
Section I - Compulsory question from Unit 3
Plan - 25 marks
Elevation - 15 marks
Sectional elevation - 15 marks
Schedule of openings - 05 marks .......... (60 marks)

Section II
Four questions from unit 1, 2, 4 and 5 of 20 marks each and student shall answer any TWO questions.
SURVEYING PRACTICE – II

Subject Code : 13CV407  
Credits : 02  
Hrs/ Week : 3  

Exercise – 1  

Exercise – 2  
To determine the elevation of an object using single plane method when base is accessible and inaccessible.

Exercise – 3  
To determine the distance and difference in elevation between two inaccessible points using double plane method.

Exercise – 4  
To determine the tachemetric constants using horizontal and inclined line of sight.

Exercise – 5  
To set out simple curves using linear methods – perpendicular offsets from long chord and offsets from chords produced.

Exercise – 6  
To set out simple curves using Rankine’s deflection angles method.

Exercise – 7  
To set out compound curve with angular methods using only theodolite.

Exercise – 8  
To set out the center line of a simple rectangular room using offset from base line

Exercise – 9  
To set out center lines of columns of a building using two base lines at right angles

Exercise – 10  
Traversing, Longitudinal sections, Block leveling, using total station

TEXT BOOKS:
REFERENCE BOOKS:

APPLIED ENGINEERING GEOLOGY LABORATORY

Subject Code : 13CV408  Credits : 02
Hrs/Week : 3

Objective of the Course:

i) To equip the students with the skills to identify and distinguish the common minerals and rocks which are of significance in Civil Engineering practices

ii) To make them equip with the skills of understanding and solving geological and structural problems through preparation of geological maps, sections and map reading.

Pre-requisites of the Course: Engineering Geology (CV 306) course.

1. Identification and description of rock forming minerals: Quartz group, Feldspars (orthoclase, microcline and microcline), Micas (biotite & Muscovite), Carbonates (Calcite, dolomite & Magnestie), hornblende and Olivine.

2. Identification and description of economic minerals:, Sulphides (Pyrite, Galena), Sulphates (Gypsum, Barite), Ore Minerals (Magnetite, Hematite, Limonite, Chromite, Bauxite, Chalcopyrite) & Industrial Minerals (Asbestos, Kaolin, Talc, Garnet, Corundum).

3. Igneous rocks: Textures and structures, identification, description, engineering properties and uses of - Granite, Gabbro, Dunite, Porphyries, Dolerite, Pegmatite and Basalt
4. Sedimentary rocks: Textures and structures, identification, description, engineering properties and uses of Sandstone, Limestone, Shale, Breccia, Conglomerate and Laterite

5. Metamorphic Rocks: Textures and structures, identification, description, engineering properties and uses of Gneiss, Quartzite, Marble, Slate, Phyllite and Schists

6. Width of outcrop problems-plane ground (Graphical and Mathematical methods)

7. Dip and Strike Problems I (Graphical, cotangent and Mathematical methods)

8. Dip and Strike Problems II (Graphical, cotangent and Mathematical methods)

9. Bore hole problems

10. Contour Maps – profiling, study and interpretation of topography, map reading


**Demonstration only**


**TEXT BOOKS:**


**REFERENCE BOOKS:**


INDIVIDUAL EFFECTIVENESS LABS (IEL)

Introduction
Entry Edge ($E^2$) is an industry readiness program designed for technology undergraduates to help them enhance important individual behavior & skills, and become productive from the very beginning of their corporate career. The program places a high emphasis on the pedagogy of learning by doing.

As part of the program, students first go through individual behavior & skill labs (Individual Effectiveness Labs) in their II year of engineering curriculum and then participate in “hands on” and “minds on” team activities in a simulated work environment, to accomplish tasks and to solve real-world organizational issues during a week long Immersive Group Workshop (IGW) held in the III year of their engineering course.

This document provides the syllabus and evaluation framework for Individual Effectiveness Labs (IEL).

INDIVIDUAL EFFECTIVENESS LABS (IEL)

Subject Code: 13CV409
Credits: 02
Hrs / Week: 4

Objectives
1. To help the students understand themselves. Identify and analyze personality/behavioral attributes of personal effectiveness – exploratory orientation, self-disclosure, receptivity to feedback and sensitivity to others.
2. To help the students identify their primary and secondary motivators – what drives them for achievement?
   a. Understanding the student’s need for achievement
   b. Understanding how positive expectations lead to positive results.
3. To help the students to develop a goal driven mindset and to take the first steps into individual personal planning, controlling and measuring results.
4. To make the students aware of importance of communication and typical barriers to communication.
5. To help the students develop effective oral communication skills.
6. To help the students develop effective written communication skills.
7. To help the students develop listening skills.
8. To help the students participate in group discussions.
9. To help the students develop effective business presentation skills.
10. To help the students receive feedback with an open mind, respond to feedback and take the action on them.
11. To help the students develop time management and organization skills.

Contents

Module 1: Know Yourself
Self assessment profilers to identify and assess the following – Identify and analyze personality/behavioral attributes of personal effectiveness – exploratory orientation, self disclosure, receptivity to feedback, sensitivity to others. 8 Hrs

Module 2: Achievement Motivation & Goal Setting
- Identifying primary and secondary motivators using a motivational profiler.
- Understanding need for achievement.
- Developing goal driven mindset.
- First steps into career planning. 8 Hrs

Module 3: Communication Skills
- Effective oral communication
- Effective written communication
- Constructing effective messages (memo, letters, e-mails)
- Writing persuasively
- Correspondence etiquettes – letters & email
- Importance of listening responsively
- Handling conversations
- Effective group discussions 15 Hrs

Module 4: Presentation Skills
- Understanding audience, presentation objectives, best practices & tools in preparation of presentation.
- Improving quality of presentation through better use of voice, eyes, gestures, visual aids.
• Presenting to groups
• Presenting one-on-one. 13 Hrs

Module 5: Handling Feedback
• Seeking feedback
• Accepting feedback with an open mind
• Responding to feedback
• Actionizing feedback 6 Hrs

Module 6: Time Management
• Introduction to Time Management and importance of managing self
• Beating procrastination
• Action plans-starting to achieve in a small way
• Scheduling skills 6 Hrs

REFERENCE BOOKS:
2. Online reference materials provided as part of the Entry Edge program.