TITLE OF THE COURSE: ENGINEERING MATHEMATICS – III
B.E., III Semester, Civil Engineering
[As per Choice Based Credit System (CBCS) scheme]

Subject Code: 21MAT31	**CIE:** 50
Number of Lecture Hours/Week: 03	**SEE:** 50
Total Number of Lecture Hours: 40	**Exam Hours:** 03

Credits-03

Course Learning Objectives:

This course will enable students to:

- Introduce most commonly used analytical and numerical methods in the different engineering fields.
- Learn Laplace transform and Z-transforms to solve ODE and PDE's.
- Understanding the statistical methods, numerical methods.
- Solve the problem related to Interpolation.
- To discuss the random variable and associated probability distributions.
- Understand the vector space and associated results.
- Understand the basic concepts of set theory, relations, functions and mathematical logic.

Course Outcomes(COs):

After completion of course, the student will able to

CO#	Course Outcomes	POs	PSOs
CO1	Apply the knowledge of Laplace transform from time domain to frequency domain. Knowing the property of Laplace transform and solving the problems on Signal and image processing which transforms differential equation into algebraic equation form and solving the problems also in inverse Laplace transform.	1, 2, 3	
CO2	Knowing the random variable both discrete and continuous and their probability distribution, Mass density function and solving the problems on various engineering problems.	1, 2, 3	
CO3	Apply the concept of correlation and regression lines for solving the problems and numerical techniquesto solve engineering problems and fit a least squares curve to the given data.	1, 2, 3	
CO4	Studying the Forward and Backward Finite differences and solve the problems on interpolation and Finding the numerical integration by different methods.	1, 2, 3	
CO5	Apply the knowledge of Z-transforms in solving the difference equation arising in the continuous and discrete time signals and digital processing, Apply the knowledge of vector space in digital communication/ Apply sampling distribution to solve engineering problems./ Apply the operations like union and intersection on discrete structures such as sets, relations and functions and construct mathematical arguments using logical connectives.	1, 2, 3	

Bloom's level of the course outcomes:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1	√	√	√			
CO2	√	√	√			
CO3	√	√	√			
CO4	√	√	√			
CO5	√	√	√			

Course Articulation Matrix / Course mapping :

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2		1				1			1			
CO2	3	2	2		1				1			1			
CO3	3	2	2		1				1			1			
CO4	3	2	2		1				1			1			
CO5	3	2	2		1				1			1			

Note: 1-Low, 2-Medium, 3-High

MODULE-1: LAPLACE TRANSFORMS

Laplace Transforms: Definition, Laplace transforms of Elementary functions, properties(without proof) periodic function, Unit step function, Unit impulse function.

Inverse Laplace Transforms: Definition, Convolution Theorem (without proof)and Finding Inverse Laplace transform by convolution Theorem. Solution of Linear Differential equations using Laplace Transforms and Applications (5 Assignment Problem).

Self Study : Solution of first order simultaneous differential equation

(RBT Levels: L1, L2 and L3) 8 Hours

Teaching – Learning Process	Chalk and talk method / Power Point Presentation

MODULE-2: PROBABILITY DISTRIBUTION-1

Probability Distribution: Random variables (discrete and continuous) probability mass/density functions. Binomial distribution, Poisson distribution. Exponential and Normal distributions. Problems. (5 Assignment Problem).

Self Study : Definition of probability , addition and multiplication rule, Bay's theorem.

(RBT Levels: L1, L2 and L3) 8 Hours

Teaching – Learning Process	Chalk and talk method / Power Point Presentation

MODULE-3: STATISTICAL METHODS

Statistical Methods: Correlation-karl Pearson's co-efficient of correlation problems. Regression analysis lines of regression, Rank correlation (without proof)-problems.

Curve Fitting: Curve fitting by the method of least square. Fitting of the curves of the form $y = ax +$

$b, y = ax^2 + bx + c$ & $y = ae^{bx}$.

Numerical Methods: Numerical solution of algebraic and transcendental equations by Regula-Falsi Method and Newton-Raphson method. (5 Assignment Problem).

Self Study :Secent method, mean, mode, median, variance and standard deviation.

(RBT Levels: L1, L2 and L3) **8 Hours**

Teaching – Learning Process	Chalk and talk method / Power Point Presentation

MODULE-4: FINITE DIFFERENCES

Finite Difference: Forward and Backward differences, Newton's forward and backward interpolation formulae. Divided difference-Newton's divided difference formulae. Lagrange's-interpolation formula and inverse interpolation formula (all formula without proof) problems.

Numerical Integration: Simpsons$\left(\frac{1}{3}\right)^{rd}$, $\left(\frac{3}{8}\right)^{t\square}$ rules, Weddle's rule (without proof) problems.

(5 Assignment Problem).

Self Study : Numerical differentiation, Trapezoidal rule

(RBT Levels: L1, L2 and L3) **8 Hours**

MODULE-5

Department of ECE and EEE : Z-Transforms and Linear Algebra

Z- Transforms: Difference Equations, Basic definitions, Damping rule, Shifting rule, Initial and Final Value theorems (without proof) and problems.

Inverse Z-transforms. Applications of Z-transforms to solve difference equation.

Linear Algebra: Introduction to Vector space and sub space, definitions, illustrative examples and simple problems, Basis and dimensions, Linear independent and linear dependent vectors(5 Assignment Problem).

Self Study : Two dimensional and three dimensional vectors, convergent and divergent series

(RBT Levels: L1, L2 and L3) **8 Hours**

Teaching – Learning Process	Chalk and talk method / Power Point Presentation

Department of Civil , Mech and Energy Engg : Sampling theory and Tracing of curves

Sampling theory : Sampling, Sampling distributions, standard error, test of hypothesis for means and proportions, Type I and Type II errors, Level of significance, confidence limits for means, one tailed and two tailed tests, student's t-distribution, Chi - square distribution as a test of goodness of fit.

Tracing of curves: Cartesian form - Strophoid, Leminscate, Parametric form - Cycloid, Astroid, Polar form - Cardioid, Leminscate.

Self Study : Types of samplings, Cartesian equations and their geometrical representation

(RBT Levels: L1, L2 and L3) **8 Hours**

Teaching – Learning Process	Chalk and talk method / Power Point Presentation

Department of CSE : Relations, Functions and Logic

Functions: Cartesian Products and Relations, Functions – into, many one One-to-One, Onto, Bijective Functions. The Pigeon-hole Principle, Function Composition and Inverse functions.

Relations: Definition and different types of relations

Introduction to logic: Basic Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference.

Self Study : Different types of sets and operations on sets

(RBT Levels: L1, L2 and L3) **8 Hours**

Teaching – Learning Process	Chalk and talk method / Power Point Presentation

Question Paper Pattern:

• The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.

• The question paper will have ten full questions carrying equal marks.

• Each full question carries 20 marks.

• There will be two full questions (with a maximum of four sub questions) from each module.

• Each full question will have sub questions covering all the topics under a module.

• The students will have to answer five full questions, selecting one full question from each module.

CIE + Assignments: 15+35=50 Marks

There will be a 3 CIE's, the average of best of 2 CIE's will be considered and there will be a 35 marks for Assignments

Text Books:

1. B.S. Grewal : Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig : Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed.(Reprint), 2016.

Reference books:

1. C.Ray Wylie, Louis C.Barrett : "Advanced Engineering Mathematics", 6th Edition,
2. McGraw-Hill Book Co., New York, 1995.
2. James Stewart : "Calculus –Early Transcendentals", Cengage Learning India Private Ltd., 2017.
3. B.V.Ramana : "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. Srimanta Pal &Subobh C Bhunia:"Engineering Mathematics", Oxford University Press,3rd Reprint,2016.
5. Gupta C.B., Singh S.R. and Mukesh Kumar : "Engineering Mathematics for Semester I & II", Mc-Graw Hill Education (India) Pvt.Ltd., 2015.

Web links and Video Lectures:

1. http://nptel.ac.in/courses.php?disciplineID=111
2. http://www.class-central.com/subject/math
3. http://academicearth.org.

TITLE OF THE COURSE: MECHANICS OF MATERIALS B.E., III Semester, Civil Engineering [As per Choice Based Credit System (CBCS) scheme]	
Subject Code: 21CV32	**CIE:** 50
Number of Lecture Hours/Week: 04	**SEE:** 50
Total Number of Lecture Hours: 52	**Exam Hours:** 03
CREDITS – 04	

Course Objectives: This course will enable students;

1. To understand the basic concepts of the stresses and strains for different materials and strength of structural elements.
2. To know the development of internal forces and resistance mechanism for one dimensional and two dimensional structural elements.
3. To analyse and understand different internal forces and stresses induced due to representative loads on structural elements.
4. To analyse and understand principal stresses due to the combination of two dimensional stresses on an element and failure mechanisms in materials.
5. To evaluate the behavior of Bending stresses in beams, Thin & Thick Cylinder.

Modules	RBT LEVEL/ HRS
Module -1 **Centroids** Introduction to the concept, centroid of line and area, centroid of basic geometrical figures, computing centroid for– T, L, I, C, Z and full/quadrant circular sections and their built up sections. Numerical problems **Moment of Inertia** Introduction to the concept, Radius of gyration, Parallel axis theorem, Perpendicular axis theorem, Moment of Inertia of basic planar figures, computing moment of Inertia for – T, L, I,C, Z and full/quadrant circular sections and their built up sections. Numerical problems	**L1,L2,L4** **10 HRS**
Module -2 **Simple Stresses and Strains:** Introduction, Properties of Materials, Stress, Strain, Hook's	**L2,L3,L5** **11 HRS**

law, Poisson's Ratio, Stress – Strain Diagram for structural steel, Principles of superposition, Total elongation of tapering bars of circular and rectangular cross sections. Composite section, Volumetric strain, expression for volumetric strain, Elastic constants, relationship among elastic constants (No Numerical), Thermal stress and strains **Compound stresses:** Introduction, Stress components on inclined planes, General two dimensional stress system, Principal planes and stresses, maximum shear stresses and their planes (shear planes). Compound stress using Mohr's circle method.	
Module -3 **Bending moment and shear force diagrams in beams:** Definition of shear force and bending moment, Sign convention, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, development of Shear Force Diagram(SFD) and Bending Moment Diagram (BMD) with salient values for cantilever, simply supported and overhanging beams for point loads, UDL(Uniformly Distributed Load), UVL(Uniformly Varying Load) and Couple.	**L2,L4** **10 HRS**
Module -4 **Bending stress in beams:** Introduction – Bending stress in beam, Pure bending, Assumptions in simple bending theory, derivation of Simple bending equation (Bernoulli's equation), modulus of rupture, section modulus, Flexural rigidity, Problems **Shear stress in beams:** Derivation of Shear stress intensity equations, Derivation of Expressions of the shear stress intensity for rectangular, triangular and circular cross sections of the beams. Problems on calculation of the shear stress intensities at various critical levels of T, I and Hollow rectangular cross sections of the beam	**L2,L4,L5** **10 HRS**
Module -5 **Torsion:** Twisting moment in shafts, simple torque theory, derivation of torsion equation, tensional rigidity, polar modulus, shear stress variation across solid circular and hollow circular sections, Problems **Thin cylinders:** Introduction: Longitudinal, circumferential (hoop) stress in thin cylinders. Expressions for longitudinal and circumferential stresses. Efficiency of longitudinal and circumferential joints. Problems on estimation of change in length, diameter and volume when the thin cylinder subjected to internal fluid pressure. **Thick cylinders:** Concept of Thick cylinders Lame's equations applicable to thick cylinders with usual notations, calculation of longitudinal, circumferential and radial stresses – simple numerical examples. Sketching the variation of radial stress (pressure) and circumferential stress across the wall of thick cylinder	**L1,L2,L4** **11 HRS**
Course outcomes: After studying this course, students will be able; 1. To evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion. 2. To suggest suitable material from among the available in the field of construction and manufacturing. 3. To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts and evaluate the forces in determinate trusses. 4. To understand the basic concept of analysis and design of members subjected to torsion. 5. To understand the basic concept of analysis thin and thick cylinder.	
Question Paper Pattern: • The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50. • The question paper will have ten full questions carrying equal marks.	

• Each full question carries 20 marks.
• There will be two full questions (with a maximum of four sub questions) from each module.
• Each full question will have sub questions covering all the topics under a module.
• The students will have to answer five full questions, selecting one full question from each module.

CIE + Assignments: 15+35=50 Marks

There will be a 3 CIE's, the average of best of 2 CIE's will be considered and there will be a 35 marks for Assignments

TEXT BOOKS:

1. SS Bhavikatti" Strength of Materials",3rd Eddition ,Vikas Publishing House PVT LTD,2013
2. Bansal, "A Textbook of Strength of Materials", 4th Edition, Laxmi Publications, 2010

REFERENCE BOOKS:

1. D.H. Young, S.P. Timoshenko " Elements of Strength of Materials" East West Press Pvt. Ltd., 5th Edition (Reprint 2014)
2. R K Bansal, "A Textbook of Strength of Materials", 4th Edition, Laxmi Publications, 2010
3. S.S. Rattan " Strength of Materials" McGraw Hill Education (India) Pvt. Ltd., 2nd Edition (Sixth reprint 2013)
4. Vazirani, V N, Ratwani M M. and S K Duggal "Analysis of Structures Vol. I", 17th Edition, Khanna Publishers, New Delhi.
5. B.S. Basavarajaiah, P.Mahadevappa "Strength of Materials" in SI Units, University Press (India) Pvt. Ltd., 3rd Edition, 2010
6. Ferdinand P. Beer, E. Russell Johnston and Jr.John T. DeWolf "Mechanics of Materials", Tata McGraw-Hill, Third Edition, SI Units

TITLE OF THE COURSE: FLUID MECHANICS B.E., III Semester, Civil Engineering [As per Choice Based Credit System (CBCS) scheme]	
Subject Code: 21CV33	**CIE:** 50
Number of Lecture Hours/Week: 03	**SEE:** 50
Total Number of Lecture Hours: 40	**Exam Hours:** 03
CREDITS – 03	

Course Objectives: The objectives of this course is to make students to learn:

1. The Fundamental properties of fluids and its applications.
2. Hydrostatic laws and application to practical problem solving
3. Principles of Kinematics and Hydro-Dynamics for practical applications
4. Basic design of pipes and pipe networks considering flow, pressure and its losses.
5. The basic flow rate measurements

Modules	RBT LEVEL/ HRS
Module-1 **Fluids & Their Properties:** Concept of fluid, Systems of units. Properties of fluid; Mass density, Specific weight, Specific gravity, Specific volume, Viscosity, Cohesion, Adhesion, Surface tension& Capillarity. Fluid as a continuum, Newton's law of viscosity (theory & problems).Capillary rise in a vertical tube and between two plane surfaces (theory & problems). Vapor pressure of liquid, capillarity, surface tension, pressure inside a water droplet, pressure inside a soap bubble and liquid jet. Numerical problems. **Fluid Pressure and Its Measurements:** Definition of pressure, Pressure at a point, Pascal's law, Hydrostatic law. Types of pressure. Measurement of pressure using simple, differential & inclined manometers (theory & problems).	**L1,L2,L3, L4 12HRS**
Module-2 **Hydrostatic forces on Surfaces:** Definition, Total pressure, centre of pressure, total pressure on horizontal, vertical and inclined plane surface, total pressure on curved surfaces. Numerical Problems. **Fundamentals of fluid flow (Kinematics):** Introduction. Methods of describing fluid motion. Velocity and Total acceleration of a fluid particle. Types of fluid flow, Description of flow pattern. Basic principles of fluid flow, three dimensional continuity equation in Cartesian coordinate system. Potential function, stream function, orthogonality of streamlines and equipotential lines. Numerical problems on Stream function and velocity potential.	**L1,L2,L3, L4 10HRS**
Module-3 **Fluid Dynamics:** Introduction. Forces acting on fluid in motion. Euler's equation of motion along a streamline and Bernoulli's equation. Assumptions and limitations of Bernoulli's equation. Modified Bernoulli's equation. Problems on applications of Bernoulli's equation (with and without losses). Problems Momentum equation.	**L1,L2,L3, L4** **10HRS**

Problems on pipe bends.	
Module-4 **Applications of Bernoulli's equation:** Introduction. Venturimeter, Orifice meter, Pitot tube. Numerical Problems. **Orifice and Mouthpiece:** Introduction, classification, flow through orifice, hydraulic coefficients, Numerical problems. Mouthpiece, classification, Borda's Mouthpiece (No problems).L1,L2 **Notches and Weirs:** Introduction. Classification, discharge over rectangular, triangular, trapezoidal notches, Cippoletti notch, broad crested weirs. Numerical problems. Ventilation of weirs, submerged weirs.	**L1,L2,L3, L4 10HRS**
Module-5 **Flow through Pipes:** Pipes in series, pipes in parallel, equivalent pipe-problems Pipe Networks, Hardy Cross method, Numerical problems. **Losses in pipes:** Introduction. Major and minor losses in pipe flow. Darcy- Weisbach equation for head loss due to friction in a pipe. Minor losses in pipe flow, equation for head loss due to sudden expansion. Numerical problems.	**L1,L2,L3, L4,L5 10HRS**
Course outcomes: After successful completion of the course, the student will be able to: 1. Measurement of fluid pressure using manometers. 2. Compute and solve problems on hydrostatics, including practical applications 3. Apply principles of mathematics to represent kinematic concepts related to fluid flow 4. Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications 5. Compute the discharge through pipes and over notches and weirs. 6. Calculate the major and minor losses in pipe flow.	
Question Paper Pattern: • The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50. • The question paper will have ten full questions carrying equal marks. • Each full question carries 20 marks. • There will be two full questions (with a maximum of four sub questions) from each module. • Each full question will have sub questions covering all the topics under a module. • The students will have to answer five full questions, selecting one full question from each module.	
CIE + Assignments: 15+35=50 Marks **There will be a 3 CIE's, the average of best of 2 CIE's will be considered and there will be a 35 marks for Assignments**	

Text Books:

1. P N Modi and S M Seth, “Hydraulics and Fluid Mechanics, including Hydraulic Machines”, 20th edition, 2015, Standard Book House, New Delhi

2. R.K. Bansal, “A Text book of Fluid Mechanics and Hydraulic Machines”, Laxmi Publications, New Delhi

3. S K SOM and G Biswas, “Introduction to Fluid Mechanics and Fluid Machines”, Tata McGraw Hill,
New Delhi

Reference Books:

1. Victor L Streeter, Benjamin Wylie E and Keith W Bedford, “Fluid Mechanics”, Tata McGraw Hill Publishing Co Ltd., New Delhi, 2008(Ed)
2. K Subramanya, “Fluid Mechanics and Hydraulic Machines”, Tata McGraw Hill Publishing Co. Ltd.
3. K Subramanya, “Fluid Mechanics and Hydraulic Machines-problems and solutions”, Tata McGraw Hill Publishing Co. Ltd.
4. J. F. Douglas, J. M. Gasoriek, John Swaffield, Lynne Jack, “Fluid Mechanics”, Pearson, Fifth Edition.
5. Mohd.Kaleem Khan, “Fluid Mechanics and Machinery”, Oxford University Press

TITLE OF THE COURSE: BASIC SURVEYING B.E., III Semester, Civil Engineering [As per Choice Based Credit System (CBCS) scheme]	
Course Code :21CV34	CIE Marks:50
Number of Lecture Hours/Week :03	SEE Marks :50
Total Number of Lecture Hours:40 Hours	Exam Hours :03
Credits – 03	

Course Objectives: This course will enable students to;

1. Understand the basic principles of Surveying
2. Learn Linear and Angular measurements to arrive at solutions to basic surveying problems.
3. Employ conventional surveying data capturing techniques and process the data for computations.
4. Analyze the obtained spatial data to compute areas and volumes.
5. Draw contours to represent 3D data on plane figures.

MODULE	RBT LEVEL/ HRS
Module-1 **Introduction:** Definition of surveying, Objectives and importance of surveying. Classification of surveys. Principles of surveying. Units of measurements. Surveying measurements and errors, types of errors, precision and accuracy. Classification of maps, map scale, conventional symbols, topographic maps, map layout, Survey of India Map numbering systems. **Measurement of Horizontal Distances:** Different Instruments used for measurement**,** Measuring tape & chain and types, ranging of lines, direct and indirect methods of ranging, Electronic distance measurement. Field book and types, entries, Conventional symbols.	**L1,L2 10 HRS**
Module-2 **Measurement of Directions and Angles: Compass survey:** Basic definitions; meridians, bearings, magnetic and True bearings. Prismatic and surveyor's compasses, temporary adjustments, declination. Quadrantal bearings, Whole Circle Bearings, Local attraction and related problems **Theodolite Survey:** Theodolite and types, Fundamental axe sand desired relationship between them, parts of Transit theodolite, uses of theodolite, Temporary adjustments of transit theodolite, measurement of horizontal and vertical angles. error elimination by reptation and reiteration method.	**L2,L3 11HRS**
Module-3 **Leveling:** Basic terms and definitions, fundamental lines and their relationship, Methods of leveling, Dumpy level, auto level. Curvature and refraction corrections. Booking and reduction of levels. Differential leveling, profile leveling& cross sectioning, fly leveling& check **trigonometric leveling** (heights and distances-single plane and double plane methods).	**L1,L2 11HRS**

Module-4 **Traversing:** Types of Traverse**,** Traverse Survey and Computations: Latitudes and departures, rectangular coordinates, Traverse adjustments, Bowditch rule and transit rule, Numerical Problems **Tacheometry:** basic principle, types of tacheometry, methods of measuring constants of tacheometer distance equation for horizontal and inclined line of sight in fixed hair method (staff held vertical and normal).	**L3,L4 10HRS**
Module-5 **Curves: types of curves** Simple Curve-necessity-designation-Numericals on elements of simple curve, methods of setting out curve-linear method (offsets from long chord method & offsets from chord produced),angular method-Rankine's deflection method, Compound Curve: Defination, elements ,relation between various elements of compound curve(case I),Transition curve: :Definition, elements . **Contouring:** Contours, Methods of contouring. Contour interval, characteristics of contour. **Total Station:** Defination, Parts, Uses, theory of Total Station, uses, Advantages and disadvantages.	**L2,L3 ,L5 10HRS**
Course outcomes: After a successful completion of the course, the student will be able to: 1. Posses a sound knowledge of fundamental principles of surveying. 2. Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems. 3. Capture geodetic data to process and perform analysis for survey problems] 4. Analyse the obtained spatial data and compute areas and volumes. 5. Represent 3D data on plane figures as contours	
Question Paper Pattern: • The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50. • The question paper will have ten full questions carrying equal marks. • Each full question carries 20 marks. • There will be two full questions (with a maximum of four sub questions) from each module. • Each full question will have sub questions covering all the topics under a module. • The students will have to answer five full questions, selecting one full question from each module.	
CIE + Assignments: 15+35=50 Marks **There will be a 3 CIE's, the average of best of 2 CIE's will be considered and there will be a 35 marks for Assignments**	
Text Books: 1. B.C. Punmia, "Surveying Vol.1& Vol . 2", Laxmi Publications pvt. Ltd., New Delhi – 2009. 2. Kanetkar T P and S V Kulkarni , Surveying and Leveling Part I& II, Pune Vidyarthi Griha Prakashan, 1988	

Reference Books:

1. S.K. Duggal, “Surveying Vol.1& Vol .2”, Tata McGraw Hill Publishing Co. Ltd. New Delhi.2009.
2. K.R. Arora, “Surveying Vol. 1& vol .2” Standard Book House, New Delhi. – 2010
3. R Subramanian, Surveying and Leveling, Second edition, Oxford University Press, New Delhi

TITLE OF THE COURSE: Building Materials and Construction Technology

B.E.,III Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Course Code:21CV35	CIE Marks: 50
Number of Lecture Hours/Week: 02	SEE Marks: 50
Total Number of Lecture Hours: 30	Exam Hours:03

Credits – 02	
Course Objectives: This course will develop a student; 1. In recognizing the good materials to be used for the construction work 2. In investigation of soil condition, Deciding and design of suitable foundation for different structures 3. In supervision of different types of masonry 4. In selection of materials, design and supervision of suitable type of floor and roof. To gain knowledge about doors, windows, plastering, painting, damp proofing, scaffolding, shoring, underpinning and to take suitable engineering measures.	
MODULE	**RBT LEVELS/ HRS**
Module-1 **Building Materials**: **Stone** as building material; Requirement of good building stones, Dressing of stones, Deterioration and Preservation of stone work. **Bricks;** Classification, Manufacturing of clay bricks, Types of Kilns and Clamps. Field and laboratory tests on bricks; compressive strength, water absorption, efflorescence, dimension and war page. **Blocks:** Cement Concrete blocks, Stabilized Mud Blocks, Sizes, requirement of good blocks. **Mortar:** types and requirements. **Timber** as construction material **Advanced construction material:** Autoclaved Aerated block (AAC) manufacturing process and uses, Laminates , types and its application.	**L1,L2 10HRS**
Module-2 **Foundation:** Preliminary investigation of soil, safe bearing capacity of soil Function and requirements of good foundation , types of foundation , introduction to spread, combined , strap, mat and pile foundation **Masonry:** Definition and terms used in masonry. Brick masonry, characteristics and requirements of good brick masonry, Bonds in brick work, Header, Stretcher, English, Flemish bond, Stone masonry, Requirements of good stone masonry, Classification, characteristics of different stone masonry, Joints in stone masonry. Types of walls; load bearing, partition walls, cavity walls. **Lintels and Arches**: Definition, function and classification of lintels, Balconies, chejja and canopy. Arches; Elements and Stability of an Arch.	**L1,L2,L3 10HRS**
Module-3 **Doors, Windows and Ventilators**: Location of doors and windows, technical terms, Materials for doors and windows, Paneled door, Flush door, Collapsible door, Rolling shutter, PVC Door, Paneled and glazed Window, Bay Window, French window. Ventilators. Sizes as per IS recommendations **Roofs:** Requirement of good roof, Types of roof, Elements of a pitched roof, Trussed roof, King post Truss, Queen Post Truss, Steel Truss, Different roofing materials,	**L2,L3,L5 10HRS**

R.C.C.Roof.	
Module-4 **Floors:** Floors; Requirement of good floor, Components of ground floor, Selection of flooring material, Laying of Concrete, Mosaic, Marble, Granite, Tile flooring, Cladding of tiles. **Stairs:** Definitions, technical terms and types of stairs, Requirements of good stairs. Geometrical design of RCC doglegged and open-well stairs. **Formwork:** Introduction to form work, scaffolding, shoring, under pinning. **Plastering and Pointing** : purpose, materials and methods of plastering and pointing, defects in plastering-Stucco plastering, lathe plastering	**L2,L3,L4,L5 10HRS**
Module-5 **Plumbing:** Introduction-plumbing services, water meter, valves, Storage Tanks, general principles of house drainage, pipes and traps, sanitary fittings, system of plumbing **Damp proofing**- causes, Effects and methods. **Paints**- Purpose, types, ingredients and defects, Preparation and applications of paints to new and old plastered surfaces, wooden and steel surfaces.	**L1,L2 10HRS**
Course outcomes: After a successful completion of the course, the student will be able to: 1. Selectsuitablematerialsforbuildingsandadoptsuitableconstructiontechniques. 2. Adoptsuitablerepairandmaintenanceworktoenhancedurabilityofbuildings. 3. Adopt suitable Doors, Windows and Roofs materials to give good aesthetic looks of the buildings. 4. Select suitable stairs for suitable building, and even flooring materials along with plastering. Select advanced plumbing, Damp proofing and Paints materials to reduce maintenance cost.	
Question Paper Pattern: • The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50. • The question paper will have ten full questions carrying equal marks. • Each full question carries 20 marks. • There will be two full questions (with a maximum of four sub questions) from each module. • Each full question will have sub questions covering all the topics under a module. • The students will have to answer five full questions, selecting one full question from each module.	
CIE + Assignments: 15+35=50 Marks **There will be a 3 CIE's, the average of best of 2 CIE's will be considered and there will be a 35 marks for Assignments**	

Text Books:

1. Sushil Kumar "Building Materials and construction", 20th edition, reprint 2015,StandardPublishers
2. Dr. B.C.Punmia, Ashok kumar Jain, Arun Kumar Jain, "Building Construction, Laxmi Publications (P) ltd., NewDelhi.
3. Rangawala S. C. "Engineering Materials", Charter Publishing House, Anand, India.

Reference Books:

1. S.K.Duggal,"BuildingMaterials",(FourthEdition)NewAgeInternational(P) Limited, 2016 National Building Code(NBC) of India
2. P C Vergese, "Buliding Materials", PHI Learning Pvt. Ltd
3. Building Materials and Components, CBRI, 1990,India
4. Jagadish.K.S, "Alternative Building Materials Technology", NewAge International,2007.
5. M.S.Shetty, "Concrete Technology" , S.Chand & Co. NewDelhi.

TITLE OF THE COURSE: BUILDING MATERIAL TESTING LAB
[As per Choice Based Credit System (CBCS) scheme]
III SEMESTER

Subject Code: 21CVL36	**CIE:** 50
Number of Lecture Hours/Week:03	**SEE:** 50
Total Number of Lecture Hours:20	**Exam Hours:03**

CREDITS – 01

Course Objectives: The objectives of this course is to make students to learn:

1. Ability to apply knowledge of mathematics and engineering in calculating the mechanical properties of structural materials.
2. Ability to function on multi-disciplinary teams in the area of materials testing.
3. Ability to use the techniques, skills and modern engineering tools necessary for engineering.
4. Understanding of professional and ethical responsibility in the areas of material testing.
5. Ability to communicate effectively the mechanical properties of materials.

SL.NO	EXPERIMENT NAME
1	Tension test on mild steel and HYSD bars**L2,L3,L5**
2	Compression test on mild steel and wood.**L1,L2,L3,L5**
3	Bending Test on Wood Under single and two point loading.**L1,L2,L3,L5**
4	Shear Test on Mild steel- single and double shear.**L1,L2,L3,L5**
5	Impact test on Mild Steel (Charpy & Izod).**L1,L2,L3,L5**
6	Hardness tests on ferrous and non-ferrous metals- Brinell's, Rockwell and Vicker's**. L1,L2,L3**,L5
7	Compression and water absorption tests on Bricks and Tiles.**L1,L2,L3,L5**
8	Tests on Fine aggregates-Moisture content, Specific gravity, Bulk density, Sieve analysis and Bulking.**L1,L2,L3,L5**
9	Tests on Coarse aggregates-Absorption, Moisture content, specific gravity, Bulk density and Sieve analysis. **L1,L2,L3,L5**
10	Torsion test on Mild Steel and HYSD bar. **L1,L2,L3,L5**
11	Demonstration of Strain gauges and Strain indicators. **L1,L2,L3,L5**

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

Course outcomes: After successful completion of the course, the students will be able to:

1. Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion.
2. Identify, formulate and solve engineering problems of structural elements subjected to flexure.
3. Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.

Question paper pattern:

- Group experiments - Tension test, compression test and bending test.
- Individual Experiments - Remaining tests.
- Two questions are to be set - One from group experiments and the other as individual experiment.
- Instructions as printed on the cover page of answer script for split up of marks to be strictly followed.

Reference Books:

1. Davis, Troxell and Hawk, "Testing of Engineering Materials", International Student Edition – McGraw Hill Book Co. New Delhi.
2. M L Gambhir and NehaJamwal, "Building and construction materials-Testing and quality control", McGraw Hill education(India)Pvt. Ltd., 2014
3. Fenner, " Mechanical Testing of Materials", George Newnes Ltd. London.
4. Holes K A, "Experimental Strength of Materials", English Universities Press Ltd. London.
5. Suryanarayana A K, "Testing of Metallic Materials", Prentice Hall of India Pvt. Ltd.New Delhi.
6. Kukreja C B, Kishore K. and Ravi Chawla "Material Testing Laboratory Manual",Standard Publishers & Distributors 1996.
7. Relevant **latest IS Codes**

TITLE OF THE COURSE: Surveying Practice-I Lab
B.E., III Semester, Civil Engineering
[As per Choice Based Credit System (CBCS) scheme]

Course Code: 21CVL37	CIE Marks :50
Number of Lecture Hours/Week :03	SEE Marks: 50
Total Number of Hours: 20	Exam Hours: 03

Credits – 01

Course Objectives: The objectives of this course is to make students to:

1. Apply the basic principles of engineering surveying and measurements
2. Follow effectively field procedures required for a professional surveyor
3. Use techniques, skills and conventional surveying instruments necessary for engineering practice.

Experiments:

1. Measurements of distances using chain & tape by direct ranging. **L3,L4**
2. Setting out perpendiculars using cross staff, chain and tape. **L3,L4**
3. Setting out of geometrical figures using prismatic compass. **L3**
4. Measurement of bearings of sides of a closed traverse and adjustment of closing error by Bowditch method. **L3**
5. Measurement of horizontal angle by repetation and reiterartion method. **L4**
6. To determine reduced levels of points using dumpy level/auto level (simple leveling). **L4**
7. To determine reduced levels of points using dumpy level/auto level (differential leveling and inverted leveling). **L4**
8. Determination of horizontal distance and elevation when the base is inaccessible (single plane method).
9. Determination of horizontal distance and elevation when the base is inaccessible (double plane method).
10. To determine the tachometric constants using horizontal line of sight
11. Fly levelling and check levelling
12. Profile levelling and cross sectioning. **L4**
13. Demonstration on planimeter.**L3**

Course outcomes: After a successful completion of the course, the student will be able to:

1. Apply the basic principles of engineering surveying for linear and angular measurements.
2. Comprehend effectively field procedures required for a professional surveyor.
3. Use techniques, skills and conventional surveying instruments necessary for engineering practice.

Question paper pattern:

- All are individual experiments.
- Instructions as printed on the cover page of answer script for split up of marks to be strictly followed.
- All exercises are to be included for practical examination.

Reference Books:

1. B.C. Punmia, **"Surveying Vol.1"**, Laxmi Publications pvt. Ltd., New Delhi 2009.
2. Kanetkar T P and S V Kulkarni ,**Surveying and Levelling Part I**, Pune Vidyarthi Griha Prakashan, 1988
3. S.K. Duggal, **"Surveying Vol.1"**, Tata McGraw Hill Publishing Co. Ltd. New Delhi.-2009.
4. K.R. Arora, **"Surveying Vol. 1"** Standard Book House, New Delhi. – 2010 & Distributors

TITLE OF THE COURSE: APPLIED ENGINEERING GEOLOGY LAB

B.E., III Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Subject Code:21CVL38	**CIE: 50**
Number of Lecture Hours/Week: 03	**SEE; 50**
Total Number of Lecture Hours: 20	**Exam Hours: 03**

CREDITS –01

Course Objectives: The objectives of this course is to enable students:

1. To identify the minerals and rocks based on their inherent properties and uses in civil engineering.
2. To interpret the geological maps related to civil engineering project.

3. To learn the dip and strike , bore hole problem, thickness of geological formation related to foundation, tunnels, reservoirs and mining.
4. To understand subsurface geological condition through a geophysical technique and watershed management.
5. To visit civil engineering projects like dams, reservoirs, tunnels and quarry sites.

EXPERIMENTS

1.Physical properties of minerals: Identification of
i. Rock Forming minerals - Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Asbestos, Calcite, Gypsum, etc
ii. Ore forming minerals- Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc**L1,L2**
2.Engineering Properties of Rocks: Identification of
i. Igneous rocks- Types of Granites, Dolerite, Granite Porphyry, Basalt, Pumice etc
ii. Sedimentary rocks- Sandstone, Lime stone, Shale, Laterite, Breccia etc
iii. Metamorphic rocks- Gneiss, Slate, Schist, Marble, Quartzite etc**L2,L3**
3.Borehole problems: Determination of subsurface behavior of rocks, their attitude related to foundation, tunnels, reservoirs and mining. Triangular and Square methods. (2methods) **L3,L4,L5**
4.Dip and Strike problems. Determine Apparent dip and True dip. (2 methods) **L4**
5.Calculation of Vertical, True thickness and width of the outcrops. (3 methods) **L4,L5**
6.Study of Topo sheets and Interpretation, Extraction of Drainage Basin and its Morphometric Analysis. (3Toposheets) **L5,L6**
7.Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc. (10 Maps) **L3,L4**

Course outcomes: During this course, students will develop expertise in;

1. The students able to identify the minerals, rocks and utilize them effectively in civil engineering practices.
2. The students will interpret and understand the geological conditions of the area for implementation of civil engineering projects.
3. The students will interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods.
4. The students will be able to identify the different structures in the field.

Question paper pattern:

1. All experiments are individual experiments.
2. Instruction as printed on the cover page of answer script for split up of marks to be strictly fallowed.
3. All exercises are to be included for practical examination.

Reference Books:

1. MP Billings, Structural Geology, CBS Publishers and Distributors, New Delhi.
2. B.S. Satyanarayana Swamy, Engineering Geology Laboratory Manual, Dhanpat Rai Sons, New Delhi.
3. LRA Narayan, remote sensing and its applications, UniversityPress.
4. P.K.MUKERJEE, Textbook of Geology, WorldPress Pvt. Ltd., Kolkatta
5. JohnIPlattand John Challinor, Simple Geological Structures,Thomas Murthy & Co, London.

TITLE OF THE COURSE: MS Office

B.E., III Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Course Code: 21ACV3111	**Course name:Microsoft office**
Number of Lecture **Hours/Week :01**	**Number of Lecture** **Hours/Week :01**
Total Number of Hours: 16	**Total Number of Hours: 16**

Credits – 01

Course Objectives: The objectives of this course is to make students to:

Basic to Advanced topics of MS Word, MS Excel, MS PowerPoint and Internet and Emailing.

Modules	**RBT LEVEL/ HRS**
Module -1 **Introduction** Introduction to MS Windows, Computer Basics, MS Word, MS Excel, MS Power point, Internet and Emailing	**L1,L2** **02 HRS**
Module -2 **MS Word** Text Basics, Text Formatting and saving file, Working with Objects, Header & Footers, Working with bullets and numbered lists, Tables, Styles and Content, Merging documents ,Sharing and Maintaining Document ,Proofing the document ,Printing	**L1,L2** **04 HRS**

Module -3 **MS Excel** Introduction to Excel, Formatting excel work book, Perform Calculations with Functions, Sort and Filter Data with Excel, Create Effective Charts to Present Data Visually, Analyze Data Using PivotTables and Pivot Charts, Protecting and Sharing the work book, Use Macros to Automate Tasks, Proofing and Printing	**L2,L3** **03 HRS**
Module -4 **MS Power point** Setting Up PowerPoint Environment, Creating slides and applying themes, Working with bullets and numbering, Working with Objects, Hyperlinks and Action Buttons Working With Movies and Sounds, Using SmartArt and Tables, Animation and Slide Transition, Using slide Master , Slide show option ,Proofing and Printing	**L2,L3** **04 HRS**
Module -5 **INTERNET & E-MAIL** What is Internet?, Receiving Incoming Messages, Sending Outgoing Messages, Email addressing, Email attachments, Browsing, Search engines, Text chatting, Job Searching, Downloading video and Music, Uploading Video or Music, Voice chatting, Webcam Chatting etc.	**L2,L3** **03 HRS**

Question paper pattern:

- The question paper will have ten questions.
- Each full question consists of 10 marks.
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module.

`REFERENCE BOOKS:

1. Mastering MS OFFICE by Bittu Kumar, Publisher: V&S Publishers
2. MS Office Skill Enhancement Course By MEPL Classes Dipak Agarwal