

## SEMESTER III

**Course Title: Mathematics-III**

**Course Code: CE-321**

**Duration of Exams: 3 hours**

**Max. Marks: 100**

**University Examination: 60**

**Sessional Assessment: 40**

**Objective:** The course is designed to provide basic knowledge of special functions and transform to engineering students.

### Unit-I

**Series Solution and Special Functions-I:** Validity of series solution of the type  $P_0(x)y'' + P_1(x)y' + P_2(x)y = 0$ , Frobenius method, Legendre's differential equation, Legendre's polynomial, Rodrigue's Formula, generating function for  $P_n(x)$ , Recurrence formulae, Orthogonality of Legendre's polynomials, Fourier-Legendre Expansion of  $f(x)$ .

### Unit-II

**Series Solution and Special Functions-II:** Bessel's differential equation and its series solution, Recurrence formula for  $J_n(x)$ , Generating function for  $J_n(x)$ , Orthogonality of Bessel's functions, Fourier-Bessel Expansion of  $f(x)$ , Sturm-Liouville problems, Eigen values and Eigen functions.

### Unit-III

**Integral Transform-I:** Introduction, Laplace transform, Existence theorem, Properties and theorem of Laplace transform, Laplace transform of Unit-step function, impulse function, periodic function and error functions, Inverse Laplace transform, Convolution theorem. Applications of Laplace transform in solving differential and integro-differential equations.

### Unit-IV

**Integral Transform-II:** Fourier integral, Fourier Sine and Cosine integrals, Complex form of Fourier integral, Fourier transform, Inverse Fourier transform, Fourier Sine and Cosine transforms, Properties of Fourier transform, Inverse Fourier transform, Convolution theorem, Parseval's identities for Fourier transforms, Fourier transform of the derivatives of a function, Applications of F-transform to Boundary Value Problems.

### Unit-V

**Probability Theory:** Elementary probability-Random experiments, Events, Conditional Probability, Introduction to Random Variables-Discrete and Continuous random variables, Functions of one and two random variable, Correlation and auto-correlation

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

1. Understand the Frobenius method and apply the same to find series solution. They will also be able to analyze the Legendre's function and its properties.
2. Find the Laplace and the inverse Laplace transform of a function. They will be able to solve basic integro-differential equations using the Laplace transform.
3. Explain the concept of Fourier transform & its properties and apply the same to solve boundary value problems
4. Distinguish between different measure of central tendencies i.e. mean, mode, median and techniques for these measures and understand basic probability concepts.
5. Able to understand theory of probability and function variable

**Text Books:**

1. **B. S. Grewal**, Higher Engineering Mathematics.

**Reference Books:**

1. **Babu Ram**, "Engineering Mathematics" Pearson Publication.
2. **Schaum's Series Publication**, Discrete Mathematics.

## Semester III

**Course Title: Structural Analysis-I**

**Course Code: CE-322**

**Duration of Exams: 3 hours**

**Max. Marks: 100**

**University Examination: 60**

**Sessional Assessment: 40**

**Objective:** The objective of this course is to acquaint the students about some basic concepts like bending moments, shear force, stresses, slopes and deflections and buckling loads employed for the analysis of civil engineering structural forms.

### UNIT-I

**Thin Cylindrical shells:** Longitudinal and hoop stresses, volumetric strains; Thick Cylinders: Lamé's equations, stresses due to internal and external pressure; Torsion: Circular and non-circular shafts, power transmitted by shafts; Concept of strain energy and resilience; Theories of failure.

### UNIT-II

**Shear force & Bending moment:** SF and BM Diagrams for simply supported, over-hanged and cantilever beams subjected to moments and varying loads; SF, BM & Torque Diagrams for inclined beams & brackets subjected to concentrated load, udl, moments and varying loads.

### UNIT-III

**Bending in beams:** Bending theory, bending equation, bending stresses in rolled steel and built up sections; Shear stresses in beams, variation of shear stresses in beam cross-section, principal stress and principal planes for oblique section, Mohr's circle

### UNIT-IV

**Deflection of beams:** Direct integration and Macaulay's methods for simply supported and cantilever beams subjected to concentrated loads, uniformly distributed loads, varying loads and moments

### UNIT-V

**Columns:** Columns and struts subjected to compression and bending, middle third & middle fourth rules, core or kernel of sections, masonry column, dams and retaining walls; Long columns: Euler's, Rankine's and Secant formula.

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

1. Understand about the Longitudinal and hoop stresses, volumetric strains of Thin and Thick Cylinders;
2. Draw SF and BM Diagrams for simply supported, over-hanged and cantilever beams subjected to moments and various types loads;
3. Understand Bending theory, bending equation, bending stresses in rolled steel and built up sections;
4. Find out Slope and Deflection for simply supported and cantilever beams subjected to moment and various type of beam.
5. Understand the different end conditions of Columns and struts subjected to compression and bending, difference of short and long column, core or kernel of sections.

**Text Books:**

1. **Jindal R. L.**, Determinate Structures.
2. **Reddy, C. S.**, Basic Structural Analysis, Tata McGraw Hill, New *Delhi*, 2003.

**Reference Books:**

1. Engineering Mechanics of Solids By E.P.Popov, Pearson Education.
2. Solid Mechanics by S.M.A.Kazimi, TataMcgraw Hill.
3. Strength of materials by S. Ramamrutham& N. Narayan, DhanpatRai Publishing Company
4. Mechanic of Materials by R.C.Hibbeler, Pearsons.
5. Mechanics of Materials by Beer &Jonhston, Dewolf, Mcgraw Hill.
6. Strength of Materials by R. Subramanian, OxfordUniversity Press

**Note for Paper Setter:** The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

## Semester III

**Course Title: Hydraulics-I**  
**Course Code: CE-323**  
**Duration of Exams: 3 hours**

**Max. Marks: 100**  
**University Examination: 60**  
**Sessional Assessment: 40**

**Objective:** The objective of this course is to acquaint the students about the characteristics and behavior of static and flowing fluids.

### Unit-I

**Introduction:** Physical properties of fluids viz, mass density, viscosity, compressibility, Vapour-pressure, surface tension and capillarity, Ideal Fluids and Real Fluids, Newtonian and Non-Newtonian Fluids. Steady and unsteady, uniform and non uniform, laminar and turbulent flows, One, two and three dimensional flows, Streamlines, Streaklines and Pathlines, Continuity equation, Rotation and Circulation, Elementary explanation of Stream function and Velocity potential.

### Unit-II

**Fluid Statics:** Pressure Intensity, Pascal's law, Pressure-density-height relationships, Manometers; Pressure on plane and curved surfaces, Centre of pressure, Buoyancy, Stability of immersed and floating bodies.

### Unit-III

**Dynamics of Fluid Flow:** Euler's equation of motion along a streamline and its integration to yield Bernoulli's equation, Flow measurement, Flow through orifice meter, Venturi-meter, orifices, mouth pieces, Pitot tubes, Sluice gates under free and submerged conditions, Notches and Weirs.

### Unit-IV

**Dimensional Analysis and Similitude:** Dimensional analysis, Rayleigh's method, Buckingham's pi-theorem, Similitude, types of similarities, important dimensionless numbers and their significance. Model analysis.

### Unit-V

**Boundary Layer Analysis:** Boundary layer thicknesses, momentum & energy thickness, Laminar boundary layer, Boundary layer over a flat plate, Turbulent boundary layer, Separation.

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

1. Apply conservation laws to derive governing equations of fluid flows
2. Compute hydro static and hydrodynamic forces
3. Analyze and design simple pipe systems
4. Apply principles of dimensional analysis to design experiment.
5. Understand the important of dimensional numbers and their significance.

### Text Books:

1. **Kumar, D. S.**, Fluid Mechanics. Kataria & Sons Publishers, New Delhi, 1998 Ed.
2. **Streeter V. L., Wylie, E.B. & Bedford K. W.**, Fluid Mechanics, MGH, 2001 Ed.
- 3.

### Books Recommended:

1. **Garde R. J.**, Engineering Fluid Mechanics, New Age Intl. Publications.
2. **Kumar K. L.**, Engineering Fluid Mechanics, Eurasia Publishing House, 1984 Ed.

**Note for Paper Setter:** The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

### Semester III

**Course Title: Surveying-I**  
**Course Code: CE-324**  
**Duration of Exams: 3 hours**

**Max. Marks: 100**  
**University Examination: 60**  
**Sessional Assessment: 40**

**Objective:** The aim of this course is to make the students aware about the art and science of determining relative positions of points by various techniques.

#### UNIT-I

**Introduction:** Importance and Principles of Surveying. Types of surveying. Different classification of surveying.

Chain Surveying: Chain Surveying principle, Field Equipment, Methods of chaining, Offsets, Corrections in chaining, Obstacles in chain surveying; Degree of accuracy. Tape and chain corrections.

#### UNIT-II

**Compass Surveying:** Instruments, Principle, Types of compass, Traversing, Closed traverse, Open traverse, Problems on included angles, Local attraction, Problems on local attraction, Magnetic declination, Adjustment of closing error. Plotting of compass traverse.

#### UNIT-III

**Plane Table Surveying:** Plane Table Surveying principle, Field equipments and accessories, Orientation, Advantages and disadvantages of plane tabling, Methods of plane tabling, Two point and Three point problem, Precautions, Accuracy.

#### UNIT-IV

**Levelling:** Levelling Instruments, Temporary adjustment of level, Types of leveling staffs, Types of leveling, Reciprocal leveling, Bench mark & its types, Field book recording, Methods of reduction of levels(HoI, Rise and fall method) Sensitivity of bubble tube. Corrections applied.

#### UNIT-V

**Contouring and Computation:** Definition, uses and characteristics of contours, Contour interval and horizontal equivalent, Methods of contouring. Interpolation, Computation of area by different methods and their comparison. Computation of volume.

**Course Outcomes:** After the completion of the course the students will be able to:

1. Calculate angles, distances and levels
2. Identify data collection methods and prepare field notes
3. Understand the working principles of survey instruments
4. Estimate measurement errors and apply corrections
5. Interpret survey data and compute areas and volumes

#### TEXT BOOKS

1. Surveying Vols. I & II by Dr. K.R. Arora
2. Duggal, S.K." Surveying" Vols. I & II, Tata McGraw Hill, New Delhi,2004

**BOOKS RECOMMENDED**

1. Basak "Surveying & Levelling" Tata McGraw Hill, New Delhi
2. Kanetkar, T. P. and Kulkarni, S.V."Surveying & Levelling" Vols. I & II PVG .
3. Surveying & Levelling by' P.B. Shahni
4. Punmia, B.C."Surveying" Vol. 1&2, Laxmi Publications Pvt. Ltd, New Delhi, 2002.

**Note for Paper Setter:** The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.



### Semester III

**Course Title: Building Materials & Construction**

**Course Code: CE-325**

**Duration of Exams: 3 hours**

**Max. Marks: 100**

**University Examination: 60**

**Sessional Assessment: 40**

**Objective:** The objective of this course is to make the students aware about the knowledge of the materials used in buildings and constructional forms like partitions, DPC, floors and roofs etc.

#### Unit-I

**Stones, Bricks and Lime:** Stones: Classification, requirements of good materials, Querying of stones Testing of stones. Bricks: Classification of bricks, constituents of a good brick earth, harmful Ingredients, manufacturing of bricks (introduction only), testing of bricks.

#### Unit-II

**Lime and Cement:** Lime: Classification, manufacture of lime (introduction only), artificial hydraulic lime, field-testing of lime. Tiles and Terra-cotta: Manufacturing of tiles and terra-cotta (introduction only), types of terra cotta. Cements: Composition, manufactures of Portland cement, field-testing of cement, special types of cements (Introduction only), storage of cement.

#### Unit-III

**Steel, Timber and Polymers:** Steel: Types of steel (Mild Steel, Hard Steel, Stainless Steel, Heat resistance steel, Manganese steel, Magnet Steel), marketable forms of steel. Timber: Classification, Structure, Seasoning and defects. Paints and Varnishes, Constituents of paints, types of paints (oil paint, enamel paint, emulsion paint cement paint), constituents and characteristics of varnishes, Polymers: Classification, properties and applications in civil engineering of Polymeric materials viz. PVC, Polyester, HDPE, and LDPE.

#### Unit-IV

**General Construction:** Brick and Stone masonry: Various terms used, types and bonds in brick work. Partition and cavity walls: Types of non bearing partition- brick partitions, clay block partitions, timber partitions and glass partitions, construction of masonry cavity walls.

#### Unit-V

**DPC, Floors and Roofs:** Dampness: Sources, effects and prevention of dampness, Materials used in damp proofing course. Floors: Components of floor, brick floors, cement concrete floors, terrazzo flooring, mosaic floorings and tiled flooring. Doors and Windows: Locations, sizes general types of door movement, various types of doors and windows (definition only). Roofs (Single Roof: Lean-to-roof, Couple roof, Couple closed roof, Collar-beam roof) & terms used in sloping roof: king post truss, queen post truss.

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

1. Understand the properties of bricks and stone and lime.
2. Understand the manufacturing process of cement and terra cotta.
3. Understand the types of steel and timber used in civil engineering.
4. Understand the construction of bricks and stone masonry.
5. Understand the damp proof course and general construction of floor and roof.

#### Books Recommended:

1. **Surinder Singh**, Engineering Materials
2. **Sharma and koul**, Building Construction
3. **Kulkarni et.el**, Civil Engineering Materials

4. **B.C. Punmia**, Building Construction

**Note for Paper Setter:** The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

## Semester-III

**Course Title: Entrepreneurship Development & Manage**  
**Course Code: CE-326**  
**Duration of Exams: 3 hours**

**Max. Marks: 100**  
**University Examination: 60**  
**Sessional Assessment: 40**

**Objective:** This course is meant to provide a comprehension about entrepreneurship, project reports, marketing and human resource managements.

### UNIT-I

**Entrepreneurship Development:** Meaning, objectives, type of entrepreneurs, importance of entrepreneurship training, factors affecting entrepreneurship, linkage between entrepreneurship and economic development, problem of increasing unemployment, balanced regional growth, harnessing locally available resources, New Industrial Policy and innovation in enterprises.

### UNIT-II

**Entrepreneurship Support System:** Small Industries Development Bank of India, Small Industries service Institute, State Small Industries and Export Corporation, District Industrial Centers and Other supporting agencies.

### UNIT-III

**Project Report Preparation:** Identifying business opportunities, Project report and its importance, various contents of project report material and entrepreneurial capabilities, socio-economic benefits, Demand analysis, technical feasibility and financial viability.

### UNIT-IV

**Introduction to Marketing Management:** Brief introduction to various types of product strategies, pricing. Strategies, Channel strategies and Promotional strategies. **Introduction to Production Management:** Types of production systems, production planning and control, functions of Production Manager and Materials Management.

### UNIT-V

**Introduction to Human Resource Management:** Manpower Planning, Recruitment, selection, placement and induction, training and development, compensation. **Introduction to Financial Management:** source of finance and Working Capital management.

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

1. Explain the importance of entrepreneurship for an individual and for the nation.
2. Understand the role of supporting agencies in creation and promotion of enterprises.
3. Outline and prioritize various business opportunities in the market and select one best among them
4. Understand the importance of various marketing strategies for a successful business.
5. Evaluate the role of human resource management in developing various training and development strategies for nurturing business skills among the employees.

### Text Books:

1. **Jose Paul and Kumar Ajith N**, Entrepreneurship Development and Management,

Himalaya Publishers, New Delhi (2000).

2. **Hisrich Robert D and Micheal Peters P**, Entrepreneurship, McGraw-Hill (2002).

**Books Recommended:**

1. **Holt David H**, Entrepreneurship: New Venture Creation, Prentice Hall of India (2000).

2. **Saini Jasmer Singh**, Entrepreneurship Development Programmes and Practices,  
Deep and Deep Publications, New Delhi (1997).

3. **Dollinger**, Entrepreneurship Strategies and Resources, Pearson Education (2003).

**Note for Paper Setter:** The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

### Semester-III

**Course Title: Structural Analysis-I Lab.**

**Course Code: CE - 331**

**Duration of Exams: 2 hours**

**Max. Marks: 50**

**University Examination: 25**

**Sessional Assessment: 25**

**Course Objective:** The course is designed to introduce the structural analysis apparatuses and structural models to understand the basic mechanics of structure.

#### **List of Practical's:**

1. To conduct tensile test on a mild steel specimen and to determine limit of proportionality, elastic limit, yield strength, ultimate tensile strength, Young's modulus, percentage elongation and percentage reduction of area. (Plot stress-strain curve).
2. To conduct hardness test on mild steel, brass and aluminum specimens using Rockwell hardness testing machine.
3. To conduct torsion test on a mild steel specimen to determine the modulus of rigidity.
4. To determine the impact strength of notched mild steel test piece by Izod test and Charpy Test.
5. To determine the Tensile and compressive strength of Timber, Parallel to grains and Perpendicular to grains.
6. To measure deflection, ultimate flexural and stiffness factor. Plot load deflection curve.
7. To determine ultimate shear strength and Shear modulus. Plot shear stress strain curve
8. To determine crippling load of columns with different end conditions and compare theoretical values
9. To verify the Principle of Maxwell's theorem.
10. Testing of Bricks and Stones as per IS Specifications.

**Course Outcomes:** After the completion of the experiments the students will able to

1. Understand the elastic behavior of solid material.
2. Determine the compressive and tensile strength of solid material;
3. Measure Deflection, Flexural rigidity, stiffness factor, Ultimate shear strength and Ultimate torsional strength.
4. Get practical idea of Maxwell's principle.
5. Get idea about strength of building materials like brick, stone and wood as per the IS specifications.

### Semester-III

**Course Title: Hydraulics-I Lab.**

**Course Code: CE-332**

**Duration of Exams: 2 hours**

**Max. Marks: 50**

**University Examination: 25**

**Internal Assessment: 25**

**Course Objective:** The course is designed to introduce the hydraulics apparatuses and understand the basic mechanics of fluid.

#### **List of Practical's:**

1. To determine experimentally the Meta-centric height of a ship model.
2. To determine viscosity by capillary tube viscometer.
3. To verify the Bernoulli's equation experimentally.
4. To determine different Reynold's numbers in the range where laminar flow conditions change over to turbulent flow.
5. To determine the coefficient of discharge, coefficient of velocity and coefficient of contraction of an orifice or a mouthpiece of a given shape.
6. To calibrate an orifice meter and to study the variation of coefficient of discharge with Reynold's number.
7. To calibrate a venturi-meter and to study the variation of coefficient of discharge with Reynolds's Number.
8. To study boundary layer formation over a flat plate and to determine boundary layer thickness, displacement thickness and momentum thickness.
9. To calibrate a sharp crested triangular Weir.
10. To study the variation of friction factor for turbulent flow in smooth and rough commercial pipes.

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

1. Apply dimensional analysis for design of experimental procedures
2. Calibrate flow measuring devices used in pipes, channels and tanks
3. Determine fluid and flow properties
4. Characterize laminar and turbulent flows

## Semester-III

**Course Title: Surveying-I Lab.**  
**Course Code: CE-333**  
**Duration of Exams: 2 hours**

**Max. Marks: 50**  
**University Examination: 25**  
**Internal Assessment: 25**

### List of Practical's:

#### A. CHAIN SURVEYING

1. Ranging / Chaining a line and recording the field book.
2. Setting-out Right Angles using Tape.
3. Taking offsets and setting-out Right Angles using:
  - (a) Cross Staff
  - (b) Indian Optical Square
4. Testing and Adjustment of Chain.

#### B. COMPASS SURVEYING

1. Study of Prismatic Compass
2. Field Work in Compass Surveying
3. Measurement of Angles between the lines meeting at a point.
4. Compass Traversing by radiation method.

#### C. PLANE TABLE SURVEYING

1. Study of Equipment
2. Setting-up the plane table- Temp. Adjustments.
3. Marking North Direction and Orientation by:
  - I. Magnetic Needle/Trough Compass
  - II. Back- sighting.
4. Plotting a few points by Radiation Method.
5. Plotting a few points by Intersection Method.
6. Plotting a traverse.
7. Two point and three point problem.

#### D. LEVELLING

1. Study of Equipment and levelling staff.
2. Temporary adjustments of level. Field.
3. Field work using levelling Instrument:
  - I. Taking Staff readings and
  - II. Recording the field book.
4. Longitudinal Section of Road/Railway/Canal/Dam
5. Cross Section of a Road/Railway/Canal/Dam.
6. Taking Staff readings on different stations / finding difference of level between them.

**Course Outcomes:** After the completion of the course the students will be able to:

1. Conduct survey and collect field data

2. Prepare field notes from survey data
3. Interpret survey data and compute areas and volumes