# Diploma Semester-III

# **CVE 140: Building Construction**

#### **Course Objectives**

- To Identify and describe the different building components and materials used in construction.
- To Explain the construction techniques used in building substructures.
- To Describe the construction techniques used in building superstructures.
- To Analyze the different types of finishes used in building construction as well as the importance of maintenance and safety considerations.
- To Demonstrate knowledge of safety precautions to be taken during construction.

#### **Course Outcomes (COs)**

- 1. Understanding of building components and materials, construction techniques, and maintenance and safety considerations related to building construction.
- 2. Analyze the function of building components and materials, evaluate the suitability of different types of structures and foundation, and identify causes and types of cracks and settlement in building structures.
- 3. Apply the knowledge of different types of structures, foundation, and substructure to construct a building as per the given specifications, and apply different techniques for building finishes, such as flooring, roofing, wall finishes, plastering, and painting.
- 4. Evaluate the quality and safety of building components, materials, and techniques used in construction, and assess the environmental impact of building construction and maintenance.
- 5. Design and plan a building construction project by selecting appropriate building components and materials, developing a construction plan, and implementing the plan while ensuring safety, quality, and environmental considerations.

CO/PO/ PSO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3	PS O4	PS 05	PS 06	PS 07
CO1	2	1	2	2	3	-	2	2	1	1	-	2	2	-	1	3	-	-	-
CO2	2	2	2	2	3	2	2	2	1	-	1	3	2	2	1	2	-	-	-
CO3	2	3	1	2	3	2	2	2	1	1	-	2	2	3	1	3	-	-	-
CO4	3	2	2	1	3	2	2	2	1	-	-	2	3	3	2	3	-	-	-
CO5	2	1	1	1	3	2	2	2	1	1	1	2	3	3	1	3	-	-	-

High-3 Medium-2 Low-1

#### **UNIT I: Building Components and materials**

Building components, Function of building components. Substructure - Foundation, Plinth, Plinth Filling. Superstructure – walls, Partition wall, Cavity wall, Sill, Lintel, Doors and Windows, Floor, Roof, Parapet, Beams, Columns. Types of structures – Load Bearing Structures, Framed Structures, Composite Structures.

#### **UNIT II: Construction of sub structure**

Job layout – Necessity, Site Clearance, Preparing Job Layout, Layout for Load Bearing Structure and Framed Structure by Center Line and Face Line Method, Precautions. Earthwork - Excavation for Foundation, Timbering and Strutting, Earthwork for Embankment, Material for Plinth Filling. Tools and plants used for Earthwork. Foundation - Importance and Necessity, Types of foundation. Selection of Foundation. Pumping Method of Dewatering, Cofferdams. Bearing Capacity of Foundation Soil.

#### **UNIT III: Construction of super structure**

Stone Masonry: Terms used in stone masonry, Types of Stone Masonry, Joints in Stone Masonry and Their Purpose and Procedure, Precautions to be observed in stone masonry Construction. Brick masonry: Terms

#### nuctures.

**12 Hours** 

# 12 Hours

used in brick masonry, Requirements of good brick masonry, Bonds in brick masonry, Striking and Raking of joints, lead and lift, Precautions to be observed in Brick Masonry, Tools and plants used in Brick Masonry. Comparison between brick and stone masonry. Hollow concrete block masonry and composite masonry. Types of Doors and Windows, Size of Door & Window recommended by BIS. Protective treatment for doors and windows, Fixtures and fastenings for doors and window. Selection of doors and windows. Vertical Communication – Stair Case, Lift, Elevators, Escalators etc. Terms used in stair case, Characteristics of good staircase, Types of staircase. Scaffolding: Necessity, Component parts, Types of Scaffolding, Process of Erection and Dismantling, Purpose and types of shoring, underpinning, Safety Precautions.

# **UNIT IV: IV Building finishes**

Floors and Roofs – Types of Floor Finishes and its suitability, brick flooring, flag stone, Shahabad, Kota, marble, granite, Kadappa, ceramic tiles, vitrified, mosaic tiles, Chequerred tiles, glazed tiles, pavement blocks, concrete floors, Tremix floor, skirting and dado. Process of Laying- Process of laying and construction, Finishing and Polishing of Floors. Roofing Materials – AC sheets, GI sheets, Plastic and fiber sheets. Types of Roof: Flat roof, Pitched Roof-King Post truss, Queen post trusses and Lean to roof. Wall Finishes - Necessity of Plastering, Procedure of Plastering, Single Coat Plaster, Double Coat Plaster, POP. Special plasters - Stucco Plaster, Plaster Board and Wall Claddings. Precaution to be taken while plastering. Defects in plaster. Pointing – Necessity, Types of Pointing and Procedure of Pointing, Difference between Plastering and Pointing. Painting – Necessity, Surface Preparation, Method of Application, Selecting Suitable Painting Material, white Wash and colour wash.

# UNIT V: Building maintenance and safety

Cracks - Causes and Types of Cracks, Identification and Repair of Cracks. Guniting and Grouting, Use of Epoxy and Crack Fills. Settlement of Foundation: Types, Causes and Remedial measures. Demolition - Necessity, Method of Demolition - Hand Demolition, Machine Demolition, Controlled Blasting Demolition, Precautions During Demolition. Re-baring techniques - necessity and equipment for re-baring techniques. Safety precautions to be observed during the construction viz. Trenching, digging pits for foundation using machineries, masonry works, erection, scaffolding, centering etc. Environmental consideration to be observed during construction of a building e.g. Laying out of Drainage Line and Water Supply Line, Soak Pit, Septic Tank.

# Total: 60 Hours

# Reference(s)

1. S. P. Arora and Bindra; Building Construction; Dhanpat Rai Publication, Delhi Edition 2013, ISBN: 9788189928803

2. S. C. Rangawala; Building Construction; Charotar Publication, Dist.-Anand, ISBN-13: 978-8185594859

3. B. C. Punmia and A. K. Jain; Building Construction; Firewall Media, 2005; ISBN-9788170080534

4. S. K. Sharma; Building Construction; S. Chand and Co. Pvt. Ltd., New Delhi (ISBN:978-81-219-0479-7)

5. S. S. Bhavikatti; Building Construction; Vikas Publication House Pvt. Ltd., New Delhi (ISBN:978-9325-6079-4)

# List of e-Learning Resources:

1. https://nptel.ac.in/

2. https://www.coursera.org/

# 12 Hours

# Diploma ( Civil Engineering ) Semester-III

L-2 T-1 P-2 C-4

# SUBJECT: MATERIAL TECHNOLOGY (CVE150)

#### **Course Objectives**

- To familiarize the student with the various engineering materials that may use for various types of constructions in civil engineering.
- The course will define basic concepts of material technology and for providing proper knowledge about materials properties and their uses.
- To familiarize the student with testing of various material used in construction industries.

# **Course Outcomes (COs)**

- 1. Apply the procedures for quality control of stones, Bricks & timber.
- 2. Apply the cementitious materials.
- 3. Analyze the fine and coarse aggregates.
- 4. Apply the provisions of IS 456- 2000 to various special materials and their applications.
- 5. Understand in detail of materials including supplementary cementitious materials

#### **Articulation** Matrix

CO/PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO1 2	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	1	3	2	2		1						2	1			3		2	1
CO2	1	2	2	3								2	1			3		2	
CO3	2	2	2	3								2	1			3		2	1
CO4	2	2	2	3		2						2	2		2	3		2	2
CO5	1	1	1	2								3	1			3		2	

High-3 Medium-2 Low-1

#### **UNIT I: INTRODUCTION MATERIALS**

#### **10 Hours**

**MASONARY MATERIALS:** a) Building stones- classification of rocks, requirement of good building stone, dressing of stones, quarrying of stones, b) Bricks – properties of good building bricks, conventional bricks, standard bricks, composition of clay brick, method of preparation of bricks, strength of bricks, testing of bricks, special bricks, hollow blocks, fly ash bricks.

**TIMBER** : Difference between wood and timber. Timber based material: use of timber, characteristics of good timber, defects in timber, plywood, particle board, veneer, sun mica, fore mica.

#### **UNIT II: BINDING MATERIALS**

Mandsaur University , Mandsaur **08 Hours** 

**M**urrum, Properties of Murum for Road work. Lime - Types and properties of lime, Cement - Different ingredients used for manufacturing cement with their percentage. Physical properties of ordinary Portland cement (OPC), hydration of cement. Physical properties of cement – fineness, standard consistency, initial and final setting time, compressive strength and soundness, different grades of OPC, 33, 43, 53 and their specification of physical properties as per relevant IS codes, field test of cement, storing cement at site, Types of cement and their functional uses.

#### **UNIT III: FINE AND COARSE AGGREGATES**

Properties of fine aggregates - Concept of size, shape, surface texture, strength, specific gravity, bulk density, water absorption, surface moisture, soundness, bulking impurities. Determination of fineness modulus & grading zone of sand by sieve analysis, determination of silt content in sand & their specification as per IS 383, Bulking of sand, phenomenon of bulking, its effect on concrete mix proportion. Properties of coarse aggregates - Concept of size, shape, surface texture, water absorption, soundness, specific gravity & bulk density, Determination of fineness modulus of coarse aggregate by sieve analysis, grading of Coarse Aggregates. Various test on coarse aggregate.

#### **UNIT IV: MORTARS**

Classifications, Functions, proportions, properties and tests for mortar.

**CONCRETE:** Definition of concrete, necessity of supervision for concreting operation, different grades of concrete (as per provisions of IS 456- 2000), minimum grade of concrete for different exposure conditions, minimum grade of concrete for R.C.C., Water retaining structure & in sea water construction, durability of concrete. Water cement (w/c) ratio, Significance of w/c ratio, maximum w/c ratio for different grades of concrete for different exposure conditions. Properties of fresh concrete, workability, factors affecting workability of concrete. Slump cone test, compaction factor test, vee bee consistometer. Range values of workability requirement for different types of concrete works, cohesiveness, segregation, bleeding, creep of concrete. Curing of concrete. Testing of concrete for strength and workability. Admixtures in concrete.

#### **UNIT V: PAINTS, VARNISHES & COLOURS**

Different ingradients used in manufacturing/ preparation of paints, Primers, Use of paint. VARNISH : Method of preparation of varnish, component materials used in varnish. COLOURS : For decorative purpose and finished purpose use of colour as water base, colour as oil base, Distempers and cement paints

MISCELLANEOUS: Concepts about the other materials which can be used as Engineering Materials like Glass, Rubber, Tar, Emulsion, Bitumen, Glass wool, Use of J bolts, U hooks, Stoneware pipes, Galvanized iron pipes, aluminum, steel, galvanized iron, micro silica, PVC,

# **10 Hours**

#### **10 Hours**

Mandsaur University, Mandsaur

CPVC, PPF. Waterproofing and termite proofing materials, epoxy resins, Polishing materials etc. readymade concrete cover. Readymade ornamental material (wall papers, carpets, radium prints, blocks etc.)

# PRACTICAL LIST OF EXPERIMENTS:

- 1. Determination of fineness modulus of fine aggregate.
- 2. Determination of fineness modulus of coarse aggregate.
- 3. Determination of flakiness index and elongation index
- 4. Determination of aggregate crushing value.
- 5. Determination of aggregate impact value.
- 6. Determination of water absorption of brick.
- 7. Determination of compressive strength of bricks.
- 8. To perform effloresce test on brick.
- 9. Determination of fineness of cement.
- 10. Determination of normal consistency of cement.
- 11. Determination of initial and final setting time of cement.
- 12. Determination of specific gravity of cement.
- 13. To perform slump cone test on fresh concrete.
- 14. Determination of compressive strength of concrete cubes (7 days, 28 days).
- 15. Determination of compressive strength of concrete by rebound hammer.
- 16. To perform compaction factor test on fresh concrete.
- 17. Determination of silt content of fine aggregate.
- 18. Determination of tensile strength of M.S. bar.

#### **REFERENCE BOOKS:**

- 1. Engineering Materials By Rangwala
- 2. Engineering Materials By Deshpande
- 3. Engineering Materials By Ojha
- 4. Engineering Materials By Surendra Singh
- 5. Civil Engineering Materials By T.T.T.I., Madras.
- 6. Building Materials By S.K. Duggal
- 7. Construction Materials By D.N. Ghose

#### LIST OF e-LEARNING RESOURCES:

1) https://archive.nptel.ac.in/courses/105/102/105102012/

2) <u>https://onlinecourses.swayam2.ac.in/nou20\_cs14/preview</u>

**Total: 50 Hours** 



# Diploma Civil Engineering Semester-III

L-2 T-1 P-2 C-4

# **CVE-160:** Surveying

# **Course Objectives**

- To develop skills of computation of areas, volumes and levels.
- To develop capability of dealing with various field problems of surveying.
- To determine the relative position of any objects or points of the earth.
- To determine the distance and angle between different objects.

# **Course Outcomes (COs)**

After completion of course, students will be able to: -

- 1. Evaluate the errors in chain surveying & understand the basic principles, equipment, and conventions of surveying.
- 2. Analyze the causes of local attraction in compass surveying, and apply correction methods for bearings affected by local attraction.
- 3. Evaluate the reduced the level by rise fall and HI method and analyze cross section and L-section.
- 4. Evaluate the reservoir capacity using contour maps and find limitations of different contouring methods, including locating contours.
- 5. Evaluate the area and volume by various methods and calculate the amount of cutting and filling required for a given area.

# **Articulation Matrix**

CO/PO/P	Р	Р	Р	Р	Р	Р	Р	Р	Р	PO	PO	PO	PSO						
SO	01	02	03	04	05	06	07	08	09	10	11	12	1	2	3	4	5	6	7
CO1	3	2	2	2	2	2	-	-	1	-	-	1	1	2	1	1	2	2	-
CO2	3	2	2	2	2	2	-	-	1	-	-	1	-	-	-	-	-	2	-
CO3	3	2	2	2	2	2	-	-	1	-	-	1	-	-	-	-	-	2	3
CO4	3	2	2	2	2	2	-	-	1	-	-	1	-	-	3	-	-	2	2
CO5	3	2	2	2	2	2	-	-	1	-	-	1	-	-	-	2	3	2	3

High-3 Medium-2 Low-1

# COURSE CONTENT:

# **Unit I Introduction & Linear Measurement**

#### 8 Hours

8 Hours

Definition, Principles of Surveying, Applications and Classifications of Surveying. Chain Survey: Equipment and Accessories: Chain, Tape, Ranging Rod, Arrows, Pegs, Cross Staff, Optical Square and Line Ranger, Obstacles in Chaining, Errors in Chain Surveying & Applying Corrections for Chain & Tape, Numerical Problems, Chaining at Plain and Sloping Grounds, Chain Triangulation. Direct and Indirect Ranging, Survey Station and Their Selections, Survey Lines, Check Lines, Tie Lines, Base Line, Offsets: Long and Short Offset, Degree of Offset, Conventional Signs Related to Survey.

# Unit II Compass Survey

Principle of Compass Survey, Meridian and True Magnetic, Bearing, System of Bearing, Finding Included Angles From Bearings. Prismatic Compass: Component, Construction and Use. Local Attraction, Causes, Precautions to avoid local attraction, Correction of Bearings affected due to Local Attraction, Calculation of Included Angles. Traversing by Chain and Compass, Open and Closed Traverse, Graphical Adjustment for Closing Error, Numerical Problems on Calculation of Bearings, Angles and Local Attraction.



# Unit III Leveling

Definitions, Meaning of Various Terms used in Leveling, Level Surface, Level Line, Horizontal Line, Vertical Line, Datum Surface, Reduced Level, Benchmark and its types, Line of Sight, Line of Collimation, Leveling Staff, Foresight, Back Sight, Intermediate Sight, Change Point, Recording in Level Book. Temporary Adjustments of Dumpy Level, Dumpy Level and Auto level, their Components, H.I. Method, Rise and Fall Method, Classifications of Leveling, Sources and Errors in Leveling, Precautions and Difficulties Faced in Leveling, Cross section and L- section.

# Unit IV Contouring

Definitions, Contour, Contour Interval, Horizontal Equivalent, Characteristics of Contours, Method of Locating Contours, Interpolation of Contours, Establishing Grade Contours, Uses of Contour Maps, Calculation of Reservoir Capacity with the help of Contour Map, Interpretation of typical Contour Sheets.

# Unit V Area and Volume Measurement

# Application of Planimeter for Measurement of Area and Simple Numerical Problems, Computation of Volume by Trapezoidal and Prismoidal Formula, Average Ordinate Rule, Mid Ordinate Rule. Calculate the amount of cutting and filling.

# Practical

- 1. Understanding the components of Theodolite and their functions.
- 2. To survey a small piece of land by closed traverse technique using plane table.
- 3. To measure the horizontal angle by Repetition method with the use of Theodolite.
- 4. To measure the horizontal angle by Reiteration method with the use of Theodolite.
- 5. To measure the vertical angle between two objects with the use of Theodolite.
- 6. To find reduced levels and horizontal distances using theodolite as a Tachometer.
- 7. To form a closed traverse using total station.
- 8. To find the height of a remote point using total station.
- 9. To Study of Electronic Distance Measurement.

# **Total: 60 Hours**

# **Text Books:**

- 1. Surveying And Levelling N.N.Basak- Tata Mc Graw-Hill
- 2. Surveying And Levelling, Part I And II- T .P. Kanetkar &S. V.Kulkarni- Pune Vidyarthi Griha Prakashan.
- 3. Surveying And Levelling, Vol. I And II, Dr. B. C. Punmia Laxmi Publication.
- 4. Surveying And Levelling, Vol. I And II S. K. Duggal,- Tata Mc Graw-Hill.

# List of e-Learning Resources:

- 1. https://nptel.ac.in/
- 2. https://www.coursera.org/

# 8 Hours

8 Hours

# **Diploma** Semester-III

# **CVE 170: Hydraulics**

#### **Course Objectives**

- Understand the properties of fluids and their behavior compared to solids. •
- Learn about pressure, hydrostatic forces, and different types of pressure measuring instruments. •
- Gain knowledge of fluid flow and the different forms of energy involved.
- Understand the flow of liquid through pipes, including major and minor losses. •
- Learn about open channel flow and hydraulic machines, including turbines and pumps. •

#### **Course Outcomes (COs)**

- 1. Understand the fundamental principles of fluid mechanics and hydraulics, including the behavior of fluids, physical properties of fluids, and types of fluids.
- 2. Analyze the pressure and hydrostatic forces of fluids, including fluid pressure at a point, pressure variation in a static fluid, and types of pressure measuring instruments.
- 3. Apply knowledge of fluid flow fundamentals, including the types of fluid flow, discharge and its units, continuity equation for fluid flow, and various forms of energy present in fluid flow.
- 4. Evaluate the flow of liquid through pipes, including viscous flow and turbulent flow, types of losses in pipe, and hydraulic gradient line and energy gradient line.
- 5. Apply knowledge of hydraulic machines, including the different types of turbines and pumps, their component parts and functions, and the principle of their workings.

CO/PO/	PO	PS																	
PSO	1	2	3	4	5	6	7	8	9	10	11	12	01	02	03	04	05	06	07
CO1	2	1	-	-	-	-	1	-	-	-	-	1	2	2	-	1	-	-	-
CO2	2	1	-	-	-	-	1	-	1	-	-	-	2	2	-	1	-	-	-
CO3	1	1	1	-	1	-	1	-	-	-	1	-	2	3	-	2	-	-	-
CO4	2	1	-	1	-	-	1	1	-	-	-	-	3	3	-	2	-	-	-
CO5	2	1	-	-	1	-	1	-	-	1	-	-	3	3	-	2	-	-	-

#### High-3 Medium-2 Low-1

#### **UNIT I: INTRODUCTION & PROPERTIES OF FLUID**

Introduction to fluid mechanics and hydraulics, Units & conversions Definition of fluid, Difference in behavior of fluid with respect to solids, Physical properties of fluid (Mass density, Weight density, Specific volume, Specific gravity, Surface tension and capillarity, Compressibility, Viscosity, Newton's law of viscosity - Dynamic and kinematics viscosity). Types of fluids, Numerical Problems

#### **UNIT II: PRESSURE & HYDROSTATIC FORCES**

Fluid Pressure at a point, Pascal's law, Pressure variation in a static fluid, Types of pressure (Absolute, Atmospheric, Guage and Vaccum Pressure), Different types of pressure measuring instruments, Numerical Problems Total Pressure, Centre of Pressure on vertical, horizontal, inclined and curved surfaces, Numerical Problem.

#### UNIT III: FUNDAMENTALS OF FLUID FLOW

Introduction to Fluid Kinematics and fluid dynamics, Types of fluid flow, Discharge and its units, Continuity equation for fluid flow. Various forms of energies present in fluid flow -potential, kinetic, & pressure energy. Datum head, pressure head, velocity head and total head, Bernoulli's theorem, its assumptions and limitations. Flow measuring devices (Venturimeter, Orificemeter, Pitot-tube)..

#### **UNIT IV: FLOW OF LIQUID THROUGH PIPE**

Viscous flow and turbulent flow, Renold number, Types of losses in pipe, Major and minor losses, Darcy

# **10 Hours**

**10 Hours** 

# **10 Hours**

Weisbach equation Pipes in series and parallel, Equivalent pipe – Dupuit's equation. Hydraulic gradient line and Energy gradient line, Water hammer in pipes – cause effects and remedial measures, Simple Numerical on head loss.

# **UNIT V: FLOW THROUGH OPEN CHANNEL**

Introduction, Difference between pipe flow and open channel flow, Types of flow in open channel, Geometrical properties of channel section - wetted area, wetted Perimeter, hydraulics radius. Chezy's equation and Manning's equation for calculation of discharge, Most economical channel section, conditions for most economical channel sections, specific energy, critical depth, critical velocity, Hydraulic jump.

# **UNIT VI: HYDRAULIC MACHINES**

Introduction to hydraulic machines, Difference between turbines and pumps, General layout of hydroelectric power plant, Classification of turbines, Pelton Turbine, Francis turbine, Kaplan turbine, components parts and their functions

Pumps ¬ Definition and types. Suction head, delivery head, static head and manometric head. Centrifugal pump component parts and their functions, principle of working, priming. Reciprocating pump  $\neg$  component parts and working

# **Total: 60 Hours**

# **Reference**(s)

- 1. Hydraulics & Fluids Mechanics, Dr. P.N.Modi & Dr. S.M.Seth, Standard Book House, Dehli.
- 2. Hydraulics & Fluids Mechanics, S.Ramamrutham, Dhanpat Rai & Sons, Delhi.
- 3. A Text Book of Hydraulics, R.S.Khurmi.
- 4. Fluids Mechanics & Hydraulics Machines, S.Chand & Company Ltd. New, Delhi.
- 5. A Text Book of Fluids Mechanics Hydraulics Machines, R.K.Rajput, S.Chand & Company Ltd. New Delhi.
- 6. Fluids Mechanics & Hydraulics Machines R.K.Bansal

# List of e-Learning Resources:

- 1. https://nptel.ac.in/
- 2. https://www.coursera.org/

#### **10 Hours**

# Diploma (Civil) Semester-III

# SUBJECT: BUILDING DESIGN & DRAWING (CVE-180)

# **Course Objective :**

1. To develop an appreciation for understanding the essence of Building Design and Drawing, and its importance in Civil Engineering.

2. To apply basic skills acquired in Civil Engineering in the design of building components as part of Building Design and Drawing.

3. To develop capabilities for design of structural plans for the benefit of the community.

4. To develop capabilities for generating various types of building plans using AutoCAD.

Course Outcomes : Upon successful completion of the course, the student will be able to-

**CO1**: Understand the conventions as per IS:962-1989 for various types of lines used in engineering drawings.

**CO2:** Understand the rules and bye-laws of local governing authorities for construction work.

**CO3**: Create line plans for residential and public buildings.

**CO4**: Create drawings of steel trusses and lean-to roofs. layout plans for water supply lines with accessories. layout of sanitary lines, including the positioning of inspection chambers, septic tanks, and sanitary fittings. **CO5**: Create two-point perspective views of small objects like pedestals, step blocks, and small single-storied buildings with flat roofs.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	РО 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3	2	-	3	-	-	-	-	-	-	-	2	2	-	2	-	1	1	2
CO 2	2	3	-	3	-	-	-	-	-	-	-	2	1	-	1	-	1	1	2
CO 3	2	3	-	3	-	-	-	-	-	-	-	2	2	-	1	-	-	1	2
CO 4	1	2	-	3	-	-	-	-	-	-	-	3	1	-	3	-	-	1	2
CO 5	2	3	-	2	-	-	-	-	-	-	-	2	2	-	3	-	1	2	2

High-3 Medium-2 Low-1

**UNIT- I CONVENTIONS:** Conventions as per IS:962-1989, Types of Lines – Visible line, Center line, Hidden line, Section line, Dimension line, Extension line, Pointers, Arrow heads or dots. Dimensioning systems. Symbols – Graphical symbols for door and window, symbols for sanitary and electrical installations. Symbols for different materials. building components. Reading of ammonia prints of residential buildings. **6 hours** 

**Unit- II PLANNING OF BUILDING:** Principles of planning of Residential and Public building. Space requirements and norms for minimum dimension of Residential and Public building. Rules and bye-laws of local governing authorities for construction work. Drawing of line plans for Residential and Public building **8 hours** 

Unit- III BUILDING DRAWING: Development of plan from line plan of a residential building, Elevation, Section, Site plan, Location Plan, Foundation plan, Area statement and other details. Submission Drawing and Working Drawing. 6 hours

**Unit- IV DETAILED DRAWING:** Drawing of staircase, drawing of steel truss& lean to roof, drawing of layout plan of water supply line with accessories. Layout plan of sanitary line - position of inspection chamber, septic tank, sanitary fittings. Position of wash basin, sink etc. . **8 hours** 

Unit- V PERSPECTIVE DRAWING: Definition, Necessity, Types of perspective, Principles of Perspective Drawing, Terms used in perspective drawing, Two-point perspective view of a small object like pedestal, step block, small single storied building with flat roof etc. . **8 hours** 

**Drawing using AutoCAD:** - Setting up a drawing starting from scratch, Using and creating a template file, opening an existing drawing, Screen layout, Screen icons, Command line, status bar, Dialogue boxes, Drawing Commands, Lines, Ray, Construction Line, Multiline and polylines, Rectangles, Arc, Circle and Ellipse, Polygon, Spline.

Co-ordinate input methods (directive, absolute, relative and polar), Starting a New Drawing/Opening an existing drawing, Drawing Commands, Hatching Command Text (multi-line & single line) and Formatting Text Styles, View Commands & Drawing Settings and Aids, Dimension Command Formatting Dimension Style and Multi-leader Style, Saving and Plotting

#### Total: 36 Hours

#### **Reference Books:**

- 1. Shah. M. G. Kale, CM, Patki, S.Y.; Building Drawing; McGraw Hill Publication company Ltd. New Delhi 2002, ISBN: 9780074638767.
- 2. Malik and Mayo; Civil Engineering Drawing; Computech Publication Ltd. New Asian Publishers, 2009, New Delhi, ISBN: 978-8173180026.
- 3. M. G. Shah and C. M. Kale; Principles of Perspective Drawing; McGraw Hill Publication company Ltd. New Delhi 2002.
- 4. Swamy, Kumara; Rao, N, Kamehwara, A.; Building Planning and Drawing; Charotar Publication, ANAND; ISBN; 978-93-85039-12-6 (Ed.2015).
- 5. Sane, Y. S.; Planning and design of Building; Allied Publishers, New Delhi, ASIN: B0007JVH92.

#### LIST OF EXPERIMENTS

- 1. Draw various types of lines, lettering and symbols of materials, doors and windows etc. Used in construction on Full Imperial size drawing sheet.
- 2. Drawing the lines plans of following buildings on Full Imperial size graph paper.
- 3. Residential Building (Min. three rooms)
- 4. Public Building School building, Primary health center / Hospital building, Bank, Post Office, Hostel building etc. (At least four)
- 5. Measured Drawing of an existing residential Building (Load bearing/Framed structure Type), showing Plan, Elevation, Sections, Construction notes, Schedule of openings, Site Plan, Area statement etc.
- 6. Submission Drawing of two storied residential building (Framed structure type) showing Plans, Elevation, Sections, Foundation Plan, construction notes, Schedule of openings, Site Plan, Area statement etc.
- 7. Working drawing of above drawing sheet preferably one plan, section through stair case to scale 1:50