# GUJARAT TECHNOLOGICAL UNIVERSITY

**Program Name: Diploma in Engineering**

**Level: Diploma**

**Branch: Environmental Engineering**

**Course / Subject Code: DI02013011**

**Course / Subject Name: Basic Civil Engineering Drawing**

| | |
|---|---|
| w. e. f. Academic Year: | 2024-25 |
| Semester: | 2nd |
| Category of the Course: | ESC |

| | |
|---|---|
| **Prerequisite:** | Student must be passed class 10th examination from a UGC-recognized board of education. Also, student has interest in technical drawings, building drawings, etc. |
| **Rationale:** | Engineering drawing is considered as a language of engineering communication. For a Diploma holder of civil engineering, it became essential to interpret the civil engineering drawing and also to prepare the working drawing and/ or submission drawing as and when required. Therefore, this course has been designed in such a way that a diploma holder can easily produce detailed civil engineering drawing related to construction of residential/ public/ any other simple civil engineering structures giving due respect to building regulation and bye-laws as per local authorities. So, that plan gets approval by local civic authorities. |

**Course Outcome:**

After Completion of the Course, Student will able to:

| No | Course Outcomes | RBT Level |
|---|---|---|
| 01 | Interpret given Civil engineering drawing- symbols, conventions, abbreviations and scale. | R & U |
| 02 | Plan buildings as per principles of planning, building byelaws and regulation considering green building aspects. | R, U & A |
| 03 | Prepare working drawings for the given requirements of Load bearing structures and Framed structures of simple Residential buildings (single and double storied). | R, U & A |
| 04 | Draw two-point perspective drawing for given small objects. | R, U & A |
| 05 | Propose appropriate building component as per its scope. | R & U |

**Revised Bloom's Taxonomy (RBT), Where, R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create*

**Teaching and Examination Scheme:**

| Teaching Scheme (in Hours) | | | Total Credits L+T+ (PR/2) | Assessment Pattern and Marks | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| | | | | Theory | | Tutorial / Practical | | |
| L | T | PR | C | ESE (E) | PA/CA (M) | PA/CA (I) | ESE (V) | |
| 02 | 00 | 02 | 3 | 70 | 30 | 20 | 30 | 150 |

**Course Content:**

| Unit No. | Content | No. of Hours | % of Weightage |
|---|---|---|---|
| I | **introduction to Civil Engineering Drawing**<br>1.1 Various types of drawings with their importance and uses.<br>1.2 Types of projections adopted<br>1.2.1 First angle projection<br>1.2.2 Third angle projection<br>1.2.3 Combinations of first and third angle projection<br>1.2.4 Advantages and dis-advantages of each type of projection<br>1.2.5 Situations where each of the above projection is used<br>1.3 Symbols, Conventions and Abbreviations<br>1.3.1 Commonly used symbols and conventions for Material of construction, Electric fittings, Water supply and Sanitary, Furniture, Graphical symbols for doors and windows, etc.<br>1.3.2 Abbreviations used for the above<br>1.4 Types of lines- visible lines, center line, hidden line, section line, dimension line, extension line, pointers, arrow head or dots.<br>1.5 Scale<br>1.5.1 Definition<br>1.5.2 Scales used for various types of drawings<br>1.5.3 Sizes of various standard papers. | 3 | 20% |
| II | **Planning of Building**<br>2.1 Types of Residential Buildings. | 8 | 20% |

| | | | |
|---|---|---|---|
| | 2.2 Site Selection for Residential Building.<br>2.3 Principles of planning for Residential and Public building- Aspect, Prospect, Orientation, Grouping, Privacy, Elegance, Flexibility, Circulation, Furniture requirements, Sanitation, Economy.<br>2.4 Building bye-law of sanctioning authorities for residential buildings.<br>2.4.1 Importance of Building bye-laws<br>2.4.2 Minimum dimensions for Plot area, built up area, super built- up area, plinth area, carpet area, floor area and FSI, FAR, size of rooms, margins, height, passages, ventilation, circulation and others<br>2.4.3 Colour code in Civil Engineering drawing.<br>2.4.4 Approval procedure with respect to bye-laws.<br>2.5 Green Building<br>2.5.1 Concept and components of green building.<br>2.5.2 Evaluation system of various authorities (GRIHA,IGBC)<br>2.6 Line plans for Single storey Residential Building as per principles of planning. | | |
| **III** | **Drawings for Residential Building Planning**<br><br>3.1 Drawing of Load Bearing Structure<br>3.1.1 Drawing of Single storey Load Bearing residential building (2 BHK) with staircase.<br>Data drawing –detailed plan, elevation, section, site plan, schedule of openings, construction notes with specifications, area statement, Planning and design of stair case- Rise and Tread for residential building.<br>3.1.2 Foundation plan of Load bearing structure.<br>3.2 Drawing of Framed Structure<br>3.2.1 Drawing of Two storey Framed Structure (G+1), residential building (2 BHK) with stair- case.<br>Data drawing – detailed plan, elevation, section, site plan, schedule of openings, construction notes with specifications, area statement. Planning and design of staircase-Rise and Tread for residential and public building.<br>3.2.2 Foundation plan of Framed Structure. | 10 | 30% |

| | | | |
|---|---|---|---|
| | 3.2.3 Details of RCC footing, Column, Beam, Chajjas, Lintel, Staircase and slab. | | |
| **IV** | **Perspective Drawing**<br><br>4.1 Introduction of perspective view and terms used in perspective drawing.<br>4.2 Types of perspective<br>4.2.1 Two Point Perspective of small objects only such as steps, monuments, pedestals.<br>4.2.2 Two Point Perspective view of single room residential building. | 5 | 15% |
| **V** | **Building components**<br><br>5.1 Draw sketches different building components:<br>Wall and column footing, floors and floorings, roofs and roof coverings, false ceiling, doors, windows, ventilators, beam and slab reinforcement, etc. | 4 | 15% |
| | **Total** | **30** | **100%** |

**Suggested Specification Table with Marks (Theory):**

| Unit No. | Unit Title | Distribution of Theory Marks (in %) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | R Level | U Level | A Level | N Level | E Level | C Level | Total |
| I | **Introduction to Civil Engineering Drawing** | 10 | 10 | 00 | 00 | 00 | 00 | 20 |
| II | **Planning of Building** | 5 | 10 | 05 | 00 | 00 | 00 | 20 |
| III | **Drawings for Residential Building Planning** | 5 | 5 | 20 | 00 | 00 | 00 | 30 |
| IV | **Perspective Drawing** | 2 | 3 | 10 | 00 | 00 | 00 | 15 |
| V | **Building components** | 5 | 10 | 00 | 00 | 00 | 00 | 15 |
| | **Total** | 27 | 38 | 35 | 00 | 00 | 00 | 100% |

*Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)*

**References/Suggested Learning Resources:**

**(a) Books:**

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|---|---|---|---|
| 1 | Civil engineering Drawing | V.B. Sikka | B.D. Kataria Sons, Ludhiana |
| 2 | Civil Engineering Drawing | Gurcharansingh, Subash chander | Standard Publishers Distributors, Delhi |
| 3 | Civil Engineering Drawing | R.S.Malek G.S.Meo | New Asian Delhi |
| 4 | Civil Engineering Drawing | B.H. Shukla | Atul Prakashan Ahmedabad |
| 5 | Building Byelaws | Urban Development Authority | Local Authority e.g. AUDA, GUDA, RUDA, etc. |
| 6 | Understanding Construction Drawings | Mark W. Huth Delmar, | Cengage Publishers |
| 7 | National Building Code of India | Bureau of Indian Standards | Bureau of Indian Standards, Govt. Of India |
| 8 | I.S962:1989-code of practice for Architectural and building drawings | Bureau of Indian Standards | Bureau of Indian Standards, Govt. Of India |
| 9 | Green Rating for Integrated Habitat Assessment(GRIHA ) Manual | Ministry of New and Renewable Energy, GOI & The Energy and Resources Institute New Delhi | Ministry of New and Renewable Energy, Government of India and The Energy and Resources Institute New Delhi |
| 10 | A text book on Green Building | Guttila Yugantha Jaysinghe Shehani Sharadha Maheepala | LAP Lamberd Academic Publishing ISBN13-9786138389187 |
| 11 | Green building Guidance :The ultimate guide for IGBC | Karthik Karuppu | NotionPress.com ISBN-13978-1684667291 |

**(b) Open source software and website:**

- www.nptel.iitm.ac.in
- Auto CAD, Zwcad, civil Architect, draw plus X5
- www.Autodesk.com
- www.drawingnow.com
- www.learn-to–draw.com
- www.igbc.in

**Suggested Course Practical List:**

The exercises/practical should be properly designed and implemented with an attempt to develop different types of skills so that students are able to acquire the competencies mentioned above.

| Sr. No. | Unit No. | Practical/Exercises | Approx. Hours. Required |
|---|---|---|---|
| 1 | I | Interpretation of building drawings approved under local Authority and Draw symbols, conventions and Abbreviations in $A_3$ sizes ketch book. | 02 |
| 2 | II | Study of building bye-laws act and national building code(NBC) | 02 |
| 3 | V | Draw Building Components in $A_3$ size sketchbook:<br>(1) 200mm and 300mm Thick wall foundation<br>(2) Components of Building<br>(3) Components of Staircase<br>(4) Draw different types of staircases<br>(5) RCC Lintel with chajja<br>(6) Column footing<br>(7) Types of Roof<br>(8) Types of doors(any two)<br>(9) Types of window(any two) | 08 |
| 4 | III | Draw detail plan on drawing sheet–1 ($A_1$ Size) Line plan, detailed plan, elevation and section of existing building (actual Measurement Drawing). | 08 |
| 5 | IV | Draw detail of foundation plan of one room building/two Room building in sketchbook. | 04 |
| 6 | V | Develop perspective view of steps by two-point perspective Method. Drawingssheet-4 ($A_2$-size) | 04 |
| | | TOTAL | **28** |

**List of Laboratory/Learning Resources Required:**

Following Laboratory and learning resource required

1. Drawing hall with drawing tables
2. Drawing board, mini drafter/T- square/Parallel, and other manual drawing instruments.

**Suggested Project List:**

A suggestive list of projects is given here. This has to match the competency and the COs. Similar projects could be added by the concerned course teacher:

a) Housing Colony: Prepare a scaled layout plan of a housing colony within a plot of 3000 sq.mt to 5000 sq.mt having the variety of bungalows and/or tenements and/or raw houses considering bye-laws.

b) Prepare a suggestive report on upgrading existing building into green building as per IGBC/GRIHA standards.

c) Apartments: Prepare the detailed plan for apartments.

d) Model: Prepare a scaled model of a simple building using card board.

e) Prepare Perspective view of your house.

**Suggested Activities for Students:**

Following is the list of proposed student activities like: course/topic based seminars, internet based assignments, teacher guided self-learning activities, course/library/internet/lab based mini-projects etc. These could be individual or group-based.

| Sr. No. | Unit No. | Student Activities |
|---|---|---|
| 1 | III | Visit a construction site and collect drawings for the interpretation of drawings. |
| 2 | II | Visit an urban development authority office and purchase a Development control regulations (by-laws) of local Body. |
| 3 | III | Draw proportionate line sketch, front elevation of any two storey residential building without using any drawing instruments. |
| 4 | III | Visit any Residential building (preferable Bungalow) and take measurements of building and draw detailed plan and elevation. |

* * * * * * *