Government of Karnataka

DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

Programme	Civil Engineering	**Semester**	III
Course Code	20CE34P	**Type of Course**	Programme Core
Course Name	Building Drawing using CADD	**Contact Hours**	8 hours/week 104 hours/semester
Teaching Scheme	L:T:P :: 3:1:4	**Credits**	6
CIE Marks	60	**SEE Marks**	40

1. Rationale: Drawing is the language of Civil Engineers. Drawing is fundamentally the pictorial and written form of representation of any construction including every bit of detail such as wall colour, furniture, floor space, material details, outlets, lighting, equipment etc. Drawings are important because they are used to communicate the technical details of a project in a common format. It is used as a final drawing on the basis of which engineers proceed to further development. It is expected the students should know the basics of the same to apply it in the field. Through this course students will develop the desired skills and competencies which are expected from them for drawing related works.

2. **Course Outcomes/Skill Sets:** At the end of the semester student will be able to:

CO-01	Prepare a site plan by using concepts of building planning, climatic parameters and building bye laws applicable to that type of building for a given location.
CO-02	Prepare a single line diagram, building drawing including plan, elevation and section for a given type of building for a given location.
CO-03	Prepare plumbing drawing using standard symbols and legends along with recommending the location, type of pipe material, fittings and fixtures for a given building.
CO-04	Prepare electrical drawing and fire fighting layout appropriate for a given building.

1. Course Content

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week (2 hours/batch twice in a week)

1	1	1,4, 5,7	1.Building Bye Laws: Introduction, objects, Importance and Important terms used in building bye laws 2.Function of Local Authority, Responsibility of owner, Applicability and Principles underlying building bye laws, Setbacks or building line, light plane, Floor Space Index 3.Building bye laws to be practiced: Off street Parking, Fire Protection, Minimum Plot sizes, Thickness of walls, Plinth, Cellar, Height of floors, Stairs, Lifts, Lobbies and Corridors, Sanitary accommodation	1.Study and compare the building bye laws for different typologies of buildings and location of building	1.Symbols and sign conventions used in building drawings as per IS standards 2.Introduction to basic BIM softwares like AutoCAD, ARCHICAD, REVIT ARCHITECTURE, 3DSMAX, SKETCHUP
2	1	1,4, 5,7	1.Building bye laws to be practiced: Fenestration, Ventilation, Sills of openings, Staircases, Ramps, Roofs, Parapets and Terraces, Water tank, Refuse area/ Disposal of Solid waste, Discharge of Rainwater, Provision of Letter box. 2. Margin and Maximum Built up area, Plinth areas, for different types of buildings, Permissible Built-up area in margins, Projections in margins, Margins from Common plot, Open spaces, floor area ratio, carpet area key plan (layout plan), Site plan, building plan, working plan. 3. Building Planning- Factors, Shape, size and topography of site, Climatic conditions of the site, Safety precautions to be followed at site during building construction as per National Building Code (NBC).	1.Practice drawing of Site plan with setbacks and orientations for different dimensions. 2.Study the elements of Sustainable Planning as per NBC 2016.	1.Drawing of site plan showing setbacks for residential building using CADD software. 2.Mark the site plan on the field giving setbacks.
3	2	1,4, 7	Given the floor area or carpet areas of rooms, plan the building and draw a Single line diagram of the building. 1. Residential building 2. Commercial Buildings 3. Industrial Building.	1.Prepare Manual Drawing of Single line diagrams for different typology of buildings. Considering building bye laws	1.Execute the single line diagram using CADD software. 2.Mark the single line diagram and foundation layout for load bearing and Framed structures on the field using centre line marking method.
4	2	1,4, 7	1. Given the floor area or carpet areas of rooms, plan the building and draw a Single line diagram of the building. 1. Residential building 2. Commercial Buildings 3. Industrial Building	1.Prepare Manual Drawing of Single line diagrams for different typology of buildings	1.Execute the single line diagram using CADD software. 2.Mark the single line diagram and footing layout for load bearing and Framed structures

				considering building bye laws.	on the field using centre line marking method.
5	2	1,4, 7	Draw the following views for Residential buildings 1. Plan 2. Elevation 3. Section	1.Create 3-D model of residential buildings using software's like ARCHICAD, REVIT ARCHITECTURE, SKETCH UP, 3DS MAX	1.Execute the building drawing (Plan, Elevation and section) using CADD software for residential building 2.Preparation of Footing layout and Centre line/ grid line marking of residential building on the field
6	2	1,4, 7	Draw the following views for Commercial Buildings 1. Plan 2. Elevation 3. Section	1.Create 3-D model of commercial buildings using software's like ARCHICAD, REVIT ARCHITECTURE, SKETCH UP, 3DS MAX.	1.Execute the building drawing (Plan, Elevation and section) using CADD software for commercial building. 2.Preparation of Footing layout and Centre line/ grid line marking of commercial building on the field.
7	2	1,4, 7	Draw the following views for Industrial Building having pitched roof. 1. Plan 2. Elevation 3. Section	1.Create 3-D model of industrial buildings using software's like ARCHICAD, REVIT ARCHITECTURE, SKETCH UP, 3DS MAX.	1. Execute the building drawing (Plan, Elevation and section) using CADD software for industrial building 2.Preparation of Footing layout and Centre line/ grid line of industrial building on the field
8	3	1,4, 7	1. Introduction to plumbing: Pipe Materials used in building construction works for water supply work - Plastic Pipes, High Density Polyethylene Pipes, Densified cast iron pipes, GI pipes, Stoneware pipes, Asbestos Cement pipes, and Concrete pipes, Hot water pipes with insulation. 2.Water supply fittings, their description and uses, water main, service pipes, supply pipe,	1.Conduct Market analysis on water supply fittings, fixtures, accessories, tools and equipment	1. Signs, Symbols and conventions of Water supply fittings and fixtures used for building service drawing. 2. Demonstrate the water supply fittings,

			distribution pipe, domestic storage tank, stop cock, ferrule, gooseneck, water tap, aerators, water meter. 3. Merits and Demerits. Connections from water main to buildings. Factors affecting the suitability of plumbing material and accessories for Water supply work, Water pressure test for leakage during installation of pipes.	and prepare report.	fixtures, accessories, tools and equipment.
9	3	1,4, 7	1. Importance of Sanitary work for building. Different types of Sanitary pipes and pipe materials used in building construction works for drainage and waste disposal. 2. Sanitary Fittings- Water Closets, Flushing Cisterns, Urinals, Inspection Chambers, Traps, Anti-syphonage. Connections from building to sewer main. 3. Inspection, Testing and Maintenance of sanitary line in building. Factors affecting the suitability of sanitary material and accessories for Sanitary work.	1.Conduct Market analysis on Sanitary fittings, fixtures, accessories, tools and equipment and present a report.	1.Signs, symbols and conventions of Sanitary fittings and fixtures in building service drawing. 2.Demonstrate the Sanitary fittings, fixtures, accessories, tools and equipment.
10	3,4	1,4, 7	1.Wiring accessories: SP (single pole switch), DP (double pole switch), ICDP (Iron Clad Double Pole main switch), ICTP (Iron Clad Triple Pole switch), change over switch, modular switches, 2 pin socket ,3 pin socket, 2 pin plug top, 3 pin plug top, ceiling rose, round block, switch boards, switch plates, modular switch enclosures, blank insert gang box, junction box, fan box. 2. Safety devices: Types of fuse units and Materials for fuse wire, Glass cartridge fuse, types of HRC fuse, Kit kat fuse. Types of MCB, MCCB, RCCB, ELCB Types of Earthing- Pipe earthing, Plate earthing, Lightning arrestors. 3.Types of wiring systems and their applications: Surface conduit, concealed conduit, PVC casing capping. Types of wires, cables used for different current and voltage rating, Connection from Electric source to building based on electricity load.	1.Conduct Market analysis on Electrical wiring, fittings, fixtures, accessories, tools and equipment and present a report. 2.Study on energy saving using Solar Panel installations with accessories in buildings.	1. Signs, symbols and conventions of Electrical wiring, fittings and fixtures in building service drawing. 2.Conduct field visit to study plumbing and electrical installations in ongoing building constructions.
11	3,4	1,4, 7	Building Basic Services 1. Preparation of water supply Layout for residential building. 2. Preparation of Sanitary Layout for residential building.	1.Prepare basic service layouts like Water	1&2. Prepare basic service layouts like Water supply, Sanitary, Electrical layouts for

			3. Preparation of Electrical Layout for residential building.	supply, Sanitary, Electrical layout for your college building using any Application software and demonstrate.	residential building using AUTOCAD with layers.
12	3,4	1,4, 7	1 Fire classifications, Importance of providing Fire fighting system and fire safety requirements in Commercial and Industrial Building. 2.Components of the fire fighting system and its applications in Commercial and Industrial Building. 3. Location of fire fighting system, installations and Code of Practice for fire safety in different typologies of Buildings. Fire ratings.	1.Conduct Field visit and study the firefighting system installations, fire safety measures and demonstrate.	1 & 2 Prepare basic service layouts like Water supply, Sanitary, Electrical and Fire fighting system layouts for Multi-storeyed building using AUTOCAD using layers.
13	3,4	1,4, 7	1. Importance of conservation of rain water by Rain water harvesting unit in buildings. Components of the rainwater harvesting system. 2.Methods of Rainwater harvesting, Benefits of rainwater harvesting unit in buildings 3. Purpose of using Soak pit with Septic tank and Manhole and its sizing based on the requirement for different typologies of building.	1.Prepare Rain water harvesting unit layout for your college building using any Application software and demonstrate.	1. Prepare rainwater harvesting unit layout for residential building drawings in CADD 2. Execute septic tank with soak pit and manhole drawings for building drawings in CADD
Total in hours			**39**	**13**	**52**

NOTE 1: The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits.

NOTE 2: The TUTORIAL (Activity criteria) shall be conducted / executed by the student (Minimum ONE suggested activity from each week) and to be submitted in portfolio evaluation of activities through rubrics to the faculty.

NOTE 3: The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty.

4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill test reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Tutorial sessions through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
Total Marks					**100**

5. Format for CIE written Test

Course Name	BUILDING DRAWING USING CADD	Test	I/II/III	Sem	III/IV
Course Code	20CE34P	Duration	80 Min	Marks	30
Note: Answer any one full question from each section. Each full question carries 10 marks.					

Section	Assessment Questions	Cognitive Levels	Course Outcome	Marks
I	1			
	2			
II	3			
	4			
III	5			
	6			

Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.

6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2

4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
	Average Marks= (8+6+2+2)/4=4.5						5

Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

7. Reference:

Sl. No.	Description
1	Building Planning and Drawing- **S.S. Bhavikatti, M.V. Chitawadagi,** I. K International Publishing House Pvt.Ltd
2	Civil Engineering Drawing and design – **D.N. Ghose (CBS Publishers)**
3	A textbook of Draughtsman Civil (Theory and Practical) – **R.S. Mallik and G.S. Meo(Asian publishers, New Delhi)**
4	CAD in Civil Engineering a Laboratory Referral- **Dr M.A. Jayaram, D.S.Rajendra Prasad, Sapna Book House**
5	Making a simple floor plan using AUTOCAD https://www.youtube.com/watch?v=hO865EIE0p0&t=384s

8. a. CIE Skill Test 1 - Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Skill of using CADD commands	10
3	Preparation of 2D Building drawings (Residential/ commercial/industrial) using CADD Plan - 20 marks Elevation - 10 marks Section - 20 marks	50
4	Dimensioning and Detailing of the given drawing	20
5	Viva-Voce	10
	Total Marks	100

8. b. CIE Skill Test 2 - SEE Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Skill of using CADD commands	10
3	a) Preparation of service layout for the 2D building PLAN - 20 marks b) (i) Water supply layout - 15 marks **OR** (ii) Sanitary layout - 15 marks c) (i) Electrical layout - 15 marks **OR** (ii)Fire fighting layout - 15 marks	50
4	Dimensioning and Detailing of the drawing -10 Tabulation of Symbols and sign conventions-10	20
5	Viva-Voce	10
	Total Marks	100

Note for the Examiner:

1. The choice between the questions 3b and 3c shall be done by the examiner.

8. c. SEE - Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Preparation of 2D Building drawings (Residential/ commercial/industrial) using CADD and Dimensioning and Detailing of the given drawing (Single line diagram). Plan - 20 marks Elevation - 10 marks Section - 20 marks	50
2	a) Preparation of service layout for the 2D building PLAN drawn in SI.NO. 1 b) (i) Water supply layout - 15 marks **OR** (ii) Sanitary layout - 15 marks c) (i) Electrical layout - 15 marks **OR**	30

	(ii)Firefighting layout - 15 marks	
3	Viva-Voce	20
	Total Marks	100

Note for the External Examiner:

1. The choice between the questions 2b and 2c shall be done by the external examiner.

9. Equipment/software list with Specification for a batch of 20 students

Sl. No.	Particulars	Specification	Quantity
1	Computers with Latest Configuration	8 GB RAM, 512GB HARD DRIVE, i5 and above 2.5 GHz PROCESSOR	1/ student
2.	Any latest licensed Computer Aided Drafting Software	Ver.2020	1/ computer
3	Building Information Modelling softwares- ARCHICAD / REVIT ARCHITECTURE / 3DSMAX / SKETCHUP	Ver.2010 & above	1/ computer
4	Plotter of size A0	24 INCH LARGE FORMAT, THERMAL INKJET PLOTTER	1
5	LCD Projector	1800 Lumen | Large 120-inch Display Projection with HDMI + VGA + Aux + USB Connectivity	1
6	Power Backup	BATTERY + INVERTER	1
7	Stylus for drawing	Pen Deco01 V2 Digital Graphics Drawing Pen Tablet (10" x 6.25", 8192 Levels of Pressure Sensitivity, Battery-Free Passive Stylus	
8	Construction practice tool kit, Pegs, thread, trisquare, arrows, plumbing tool kit		5 set