

DEPARTMENT OF CIVIL ENGINEERING

COURSE MODULES OF THE SUBJECT TAUGHT FOR THE SESSION SEP- JAN 2026-27 (ODD SEM)

Course Syllabus with CO's

Faculty Name: Likhit M L				Academic Year: 2026-2027			
Department: Civil Engineering							
Course Code	Course Title	Core/Elective	Pre-requisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
1BCVL306	BUILDING CAD AND 3D MODELLING LAB					3	30
Course Objectives	The objectives of this course are to: 1. Familiarize students with CAD tools and drafting techniques used for preparing architectural and building drawings, including interface setup, units, layers, snaps, drawing and modification commands. 2. Develop students' skills in preparing detailed 2D building drawings, including plans, elevations, sections, dimensions, annotations, hatching, doors, windows, stairs, and other architectural elements. 3. Enable students to create and visualize 3D building models from 2D drawings using suitable CAD/BIM software, incorporating floors, roofs, doors, windows, materials, views, and basic rendering. 4. Develop the ability to organize and manage complex building drawings using blocks, dynamic blocks, XREFs, layouts, title blocks, and standard plotting practices for collaborative design work. 5. Introduce students to practical applications of CAD and BIM in civil engineering, including quantity take-off, model-based estimation, BIM/IFC export, presentation drawings, and basic sustainable building						
Topics Covered as per Syllabus							
PART – A							
FIXED SET OF EXPERIMENTS							
Students shall perform practical exercises related to:							
1. CAD basics: Interface setup, units (metric), limits, layers (walls, doors, dimensions), OSNAPs, modify commands; draw simple room shapes, annotate.							
2. Residential plan: Detailed plan with rooms, doors/windows (standard sizes: doors 900x2100mm, windows 1200x1200mm), furniture blocks, dimensions 1:100 scale.							
3. Residential elevation/section: Matching elevation, cross-section with hatching (walls 230mm brick, slab 150mm), stairs, roof.							
4. School building plan: Ground +1 floor plan (classrooms 7x8m, staff room, hall 20x10m, toilets, corridors), doors/windows, ramps for accessibility, grid lines, 1:100 scale.							
5. School elevation/sections: Front/side elevations, longitudinal section showing plinth (750mm), parapet, solar panels; hatches for materials.							
6. Office building plan: G+2 commercial office (reception, cabins 4x4m, open workstations, conference 10x6m, parking layout), lifts, services ducts, 1:100.							
7. Office elevations/sections: Multi-level elevations, sections with column grids (6x6m bay), beam details, glazing.							
8. Primary health center (PHC) plan: OPD rooms, waiting area, lab, pharmacy, wards (4 beds), admin, generator backup, circulation for patients, 1:100 scale.							
9. PHC elevations/sections: Elevations with ramps (1:12), sections showing ventilation, septic tank stub, green features.							
PART – B							
OPEN ENDED EXPERIMENTS							
Open-ended experiments are a type of laboratory activity where the outcome is not predetermined and students are given the freedom to explore, design, and conduct the experiment based on the problem							

DEPARTMENT OF CIVIL ENGINEERING

statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and

inquiry-based learning. Students may be assigned any one of the open-ended problem statements during assessment. The sample open-ended problems are provided as reference. Course coordinators are encouraged to design and assign context-specific open-ended problem statements aligned with the defined Course Outcomes (COs), ensuring relevance to contemporary practices and learner needs.

1. Complete working drawings (plan, 2 elevations, 2 sections) for school/office/PHC variant; advanced layers, dynamic blocks, title block with BOM.
2. 3D modeling: Extrude school/office/PHC plans to full model (floors, roof, doors/windows), UCS views, section planes, basic materials/rendering (Revit/AutoCAD 3D).
3. Collaborative set: XREF plans/elevations/3D from peers, assemble layout sheets, plot PDFs; BIM export intro (IFC format).
4. Quantity takeoff: Area/volume from 3D model (floors, walls), Excel link; sustainability check (green area >20%)

Text books:

1. MG Shah, CM Kale, SY Patki, "Building Drawing with an Integrated Approach to Built Environment Drawing", Tata McGraw Hill Publishing Co. Ltd., New Delhi.
2. S.S. Bhavikatti and M.V. Chitawadagi, "Building Planning and Drawing", I K International Publishing House Pvt. Ltd., New Delhi.
3. Gurucharan Singh, "Building Construction", Standard Publishers & Distributors, New Delhi.
4. RS Malik and GS Meo, "Civil Engineering Drawing", Asian Publishers / Computech Publications Pvt. Ltd., New Delhi.
5. Sham Tickoo. AutoCAD 2024 for Engineers and Designers (or latest edition) – 2D drafting and 3D modelling with civil/architectural examples.
6. Munir Hamad. AutoCAD for Architectural Drawing and Design – building plans, elevations and basic 3D for buildings.
7. Elise Moss. Introducing AutoCAD Civil 3D – site, road and basic infrastructure modelling using Civil 3D.

Reference books / Manuals:

1. Dodge F.W., "Time Saver Standards for Building Types", F.W. Dodge Corp., New York.
2. IS: 962 – 1989 – "Code of Practice for Architectural and Building Drawing", BIS, New Delhi.
3. "National Building Code of India", BIS, New Delhi.
4. Prof. Anil A. Patil. Computer Aided Building Drawing
5. Louisa Jahn, Dustin Manning. Mastering Autodesk Civil 3D – advanced corridor, grading and infrastructure workflows.

DEPARTMENT OF CIVIL ENGINEERING

Web links and Video Lectures (e-Resources):

1. NPTEL: Computer Aided Design – Introductory CAD concepts and 3D modelling (lecture series by IIT Delhi / IITs).
2. NPTEL / IIT Hyderabad: Computer Aided Engineering Drawing and Design – 2D/3D CAD, drafting standards, projections useful before AutoCAD practice.
3. NPTEL / BIM-related courses: Building Information Modeling (BIM) – conceptual and workflow understanding for 3D model-based building/infrastructure projects (IITM Pravartak / similar)

Course Outcomes	After the completion of course, students are able to	RBT Level
	CO1: Describe CAD interface, units, layers, snaps, and aids for building drafting. (L2)	L2
	CO2: Create detailed 2D plans, elevations, sections of institutional buildings using layers, hatches, dimensions. (L3)	L3
	CO3: Develop 3D models of buildings, generate multi-views, and apply basic rendering. (L3)	L3
	CO4 : Organize complex drawings with blocks, XREFs, layouts for collaboration and standards compliance. (L4)	L4
	CO5: Export models for estimation, BIM intro, presentations; reflect on civil applications. (L3)	L3

Internal Assessment Marks: 25 + 25 (3 Session Tests are conducted during the semester and marks allotted based on average of 2 test and assignment performances).

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

List of Course Outcomes (RBT)	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	Total	PSO1	PSO2
CO-1 (L2)	1	-	-	-	-	1	1	1	-	-	1	4	1	-
CO-2 (L2)	1	-	1	-	-	1	1	1	-	-	1	4	1	-
CO-3 (L4)	3	1	1	-	-	1	-	-	-	-	1	5	1	-
CO-4 (L4)	3	1	1	-	-	1	-	-	-	-	1	0	1	-

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution