

INSTITUTE	DIPLOMA STUDIES
PROGRAM	DIPLOMA ENGINEERING (CIVIL ENGINEERING)
SEMESTER	4
COURSE TITLE	ADVANCE COMPUTER AIDED DRAWING
COURSE CODE	09CI0408
COURSE CREDITS	1

Objective:

- 1 To introduce students to the concepts and tools of 3D modeling in AutoCAD, and Sketchup with a focus on civil engineering planning applications.
- 2 To understand the AutoCAD and Sketchup 3D Software and its application in Planning for buildings.
- 3 To study about different Software commands.
- 4 To introduce students to the concepts and tools of 3D modelling in AutoCAD, and Sketchup with a focus on civil engineering planning applications.

Course Outcomes: After completion of this course, student will be able to:

- 1 Students will be able to create and modify 3D models of civil engineering projects using AutoCAD 3D software, including topographical maps, terrain models, and assemblies.
- 2 Students will learn how to work collaboratively on 3D models with other users, manage project files and standards, annotate 3D models, and generate 2D documentation and reports.
- 3 Students will gain a deeper understanding of advanced editing techniques for 3D objects, creating custom objects using surfaces, meshes, and solids, and using Boolean operations to combine or subtract 3D objects, among other advanced techniques.
- 4 Students will gain basic knowledge about Sketchup 3D design software.
- 5 Students will be able to visualize, render, and present 3D models using AutoCAD and SketchUp tools, including applying materials, lighting, and walkthrough animations for effective project communication.

Pre-requisite of course: Building planning and Digital Drafting

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	2	0	0	0	50	50

Contents : Unit	Topics	Contact Hours
1	Introduction to Autodesk AutoCAD Software Introduction to Autodesk AutoCAD and its applications in civil engineering, Importance of AutoCAD in drafting and design work, Understanding AutoCAD user interface (Application menu, Ribbon, Command line, Drawing area), Navigating drawing area using Zoom, Pan, and ViewCube, Use of basic drawing commands: Line, Circle, Arc, Rectangle, Polyline, Use of editing commands: Move, Copy, Rotate, Scale, Trim, Extend, Understanding object snaps (Endpoint, Midpoint, Center, Intersection), Use of snap settings (Grid snap, Polar tracking, Object snap tracking) Saving, opening, and managing drawing files (.dwg, .dxf)	0
2	Overview of AutoCAD 3D Introduction to 3D modeling concepts (X, Y, Z coordinates), Types of 3D modeling: Wireframe, Surface, Solid modeling Switching to 3D workspace in AutoCAD, Creating 3D objects using Box, Sphere, Cylinder, Cone, Torus Understanding World Coordinate System (WCS) and User Coordinate System (UCS), Viewing 3D models using ViewCube and preset views Navigating models using Orbit, Pan, and Zoom tools	0
3	Creating 3D Civil Engineering Models Creating basic 3D shapes using Extrude, Revolve, Sweep, and Loft, Modeling civil engineering components such as columns, beams, slabs, and footings, Modifying 3D objects using Union, Subtract, and Intersect commands, Interpreting and applying 3D command parameters, Developing models for buildings, road sections, and drainage systems, Maintaining precision using UCS and accurate dimensions	0
4	Converting 2D AutoCAD Drawings to 3D Models Importing and opening 2D AutoCAD drawings, Preparing 2D drawings by cleaning and joining entities, Converting 2D shapes into 3D using Extrude command, Applying materials, lights, and rendering settings	0
Total Hours		0

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Experiment–1 Study of workspace: Ribbon, Application menu, Command line, Drawing area; Navigation using Zoom, Pan, ViewCube	2
2	Experiment–2 Practice Line, Circle, Arc, Rectangle, Polyline using coordinate inputs	2
3	Experiment–3 Move, Copy, Rotate, Scale, Trim, Extend operations	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
4	Experiment-4 Object snaps (Endpoint, Midpoint, Center, Intersection); Grid snap, Polar tracking; Save/Open (.dwg, .dxf)	2
5	Experiment-5 Switching workspace; Understanding X, Y, Z coordinates	2
6	Experiment-6 Creating Basic 3D Objects Box, Sphere, Cylinder, Cone, Torus	2
7	Experiment-7 Coordinate Systems & Navigation WCS, UCS; Orbit, Pan, Zo	2
8	Experiment-8 3D Modeling using Extrude & Revolve Convert 2D shapes into 3D solids	4
9	Experiment-9 3D Object Modification Union, Subtract, Intersect operations	2
10	Experiment-10 Civil Engineering Components Modeling : column, beam, slab, footing	2
11	Experiment-11 Conversion of 2D to 3D, Use of Extrude for 3D model development	4
12	Experiment-12 Rendering and Visualization: Materials, lighting, rendering settings	2
Total Hours		28

Textbook :

- 1 AutoCAD Civil 3D 202, Udemy, Udemy,, 2021
- 2 Introduction to Drafting and AutoCAD 2D, IKurt Steffens, IKurt Steffens, 2021

References:

- 1 Introduction to autocad 2024 for civil engineering application, Introduction to autocad 2024 for civil engineering application, Nighat yasmin, SDC, 2024
- 2 A Power Guide for Beginners and Intermediate Users, A Power Guide for Beginners and Intermediate Users, andeep Dogra, CADArtifex, 2020

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
20.00	30.00	40.00	10.00	0.00	0.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory
- 4 Students will use supplementary resources such as online videos, videos, e-courses

Supplementary Resources:

- 1 <https://www.autodesk.com>
- 2 <https://www.learnvern.com/course/autocad>
- 3 <https://vdc.edu/courses/sketchup-course>