Autodesk AutoCAD: 3D Design and Modeling Mastery

Target Audience

This course is ideal for students, designers, and professionals in architecture, civil, and mechanical engineering who already have 2D AutoCAD experience and wish to expand their expertise into 3D modeling, visualization, and rendering.

Course Objective

To equip learners with the skills to create, edit, visualize, and render 3D models in AutoCAD 2026 using solids, surfaces, and meshes. The course focuses on practical 3D modeling workflows, visualization techniques, and preparing models for presentation or 3D printing.

Course Outcome

By the end of this course, participants will be able to confidently create and modify 3D objects, apply materials and lighting, generate realistic renderings, convert 2D drawings into 3D models, and produce ready-to-print 3D files using AutoCAD.

Course Outline: The course comprises **40-hours** of theory and demonstrations and is divided into **10** different chapters. Each chapter is designed with practical examples and guided exercises to reinforce learning and ensure a strong understanding of 3D cable and harness design concepts.

Module 1: 3D Foundations

- Why Use 3D?
  - Types of 3D Models (Wireframe, Surface, Mesh, Solid)
- Introduction to the 3D Modeling Workspace
  - 3D Ribbon Panels and Interface
- Basic 3D Viewing Tools
  - Preset 3D Views, Orbiting, Visual Styles
- 3D Navigation Tools
  - ViewCube, SteeringWheel, Perspective Views
- **Practice:** 3D Navigation Tools
- Introduction to the User Coordinate System (UCS)
  - UCS Command, Dynamic UCS
- **Practice:** Introduction to UCS

Module 2: Simple Solids

- Working with Solid Primitives
- Solid Primitive Types (Box, Wedge, Pyramid, Cylinder, Cone, Sphere, Polysolid)
- **Practices:** Architectural and Mechanical Solids
- Working with Composite Solids (Union, Subtract, Intersect)
- **Practices:** Composite and Project-Based Solids
- Working with Mesh Models (Create, Edit, Convert)
- **Practice:** Mesh Model

Module 3: Working with the User Coordinate System

- UCS Basics
- UCS X, Y, and Z Commands
- UCS Multifunctional Grips
- Saving a UCS by Name
- **Practices:** Using and Managing UCSs

Module 4: Creating Solids and Surfaces from 2D Objects

- Complex 3D Geometry
- Extruded Solids and Surfaces (Presspull, Modify)
- Swept Solids and Surfaces (Paths, Helix, 3D Polylines)
- Revolved Solids and Surfaces
- Lofted Solids and Surfaces
- NURBS Surfaces
- **Practices:** Create and Edit Solids/Surfaces

Module 5: Modifying in 3D Space

- 3D Gizmo Tools
- Aligning Objects in 3D Space (Align, 3D Align)
- 3D Modify Commands (Move, Rotate, Scale, Mirror, Array)
- **Practices:** Modify Tools and Architectural Projects

Module 6: Advanced Solid Editing

- Editing Components of Solids
- Editing Faces of Solids (Extrude, Offset, Move, Taper, Remove, Copy)
- Fillets and Chamfers on Solids
- **Practices:** Advanced Solid Editing and Projects

Module 7: Additional Editing Tools

- Creating a Shell
- Imprinting Edges of Solids
- Slicing Solids Along a Plane
- Interference Checking
- Converting Objects to Surfaces
- Converting Objects to Solids
- **Practices:** Shell, Slice, Convert, and Mechanical Projects

Module 8: Refining the View

- Working with Sections
- Working with Cameras
- Managing Views in 3D
- Animating with ShowMotion
- Creating ShowMotion Shots
- Creating Animations (Walk & Fly Through Models)
- **Practices:** Sections, Cameras, Animations

Module 9: Point Clouds

- Point Clouds (Attach, Contextual Tab, Object Snap, Dynamic UCS)
- **Practices:** Attach and Work with Point Clouds

Module 10: Visualization

- Creating Visual Styles
- Working with Materials (Libraries, Editor, Texture, Layer Attachment)
- Specifying Light Sources (Sunlight, User Lights)
- Rendering Concepts (Exposure, Presets)
- **Practices:** Visual Styles, Materials, Lighting, Rendering

Module 11: Working Drawings from 3D Models

- Creating Multiple Viewports
- 2D Views from 3D Solids
- Creating Technical Drawings with Flatshot
- 3D Model Import
- Automatic Model Documentation (Base and Projected Views)
- 3D Printing and Model Preparation
- **Practices:** Documentation and Printing Projects