

Autodesk AutoCAD 2D & 3D essentials with GD&T

Target Audience

This course is designed for students, engineers, architects, drafters, designers, and technical professionals who want to develop a strong foundation in 2D drafting and basic CAD workflows using Autodesk AutoCAD 2027. It is ideal for beginners with little or no prior CAD experience as well as professionals transitioning from manual drafting or earlier CAD versions. The course provides practical knowledge required for creating technical drawings, annotations, layouts, reusable components, and plotting standards used in engineering, manufacturing, architecture, and construction industries.

Course Outcomes

- Understand the AutoCAD 2027 interface and drafting environment.
- Create accurate 2D technical drawings using precision tools.
- Apply coordinate systems and drawing aids effectively.
- Design and modify geometry using editing commands.
- Implement layers, object properties, and annotation standards.
- Analyze and organize complex drawing data efficiently.
- Create reusable blocks, templates, and external references.
- Prepare professional layouts and plotted drawing sheets.
- Troubleshoot common drafting and plotting issues.
- Optimize drafting workflows using productivity features.

Course Objectives

- Introduce learners to the fundamentals of computer-aided drafting using AutoCAD 2027.
- Develop proficiency in creating and editing precise engineering drawings.
- Build competency in drawing setup, annotation, dimensioning, and plotting.
- Reinforce CAD standards and drafting best practices through practical exercises.
- Provide hands-on experience with layers, blocks, templates, and layouts.
- Prepare participants for industry-ready drafting and documentation tasks.

Course Outline

The course comprises approximately **40 hours** of theory and hands-on labs and is divided into **15** different chapters. Each chapter will be followed by **hands-on lab exercises** to reinforce learning and gauge understanding of the topics covered.



Table of Contents (TOC)

Chapter 1: Introduction to AutoCAD

- Understanding CAD concepts and applications
 - Exploring the AutoCAD 2027 interface
 - Navigating ribbons, menus, and toolbars
 - Using the command line efficiently
 - Understanding workspaces and customization
 - Managing drawing files and templates
 - Understanding DWG file compatibility
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Chapter 2: Setting Up Drawings

- Creating new drawings
 - Setting units and precision
 - Configuring drawing limits
 - Understanding coordinate systems
 - Using absolute, relative, and polar coordinates
 - Configuring grid and snap settings
 - Organizing project files
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Chapter 3: Basic Drawing Commands

- Creating lines and polylines
 - Drawing circles, arcs, and rectangles
 - Using polygons and ellipses
 - Creating splines and construction lines
 - Applying object snaps
 - Using dynamic input tools
 - Creating accurate geometry
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Chapter 4: Drawing Aids and Precision Tools



- Object Snap (OSNAP)
- Polar Tracking
- Object Snap Tracking
- Dynamic Input
- Grid and Snap modes
- Selection methods
- Precision drafting techniques

Chapter 5: Editing Commands

- Move and Copy commands
- Rotate and Scale operations
- Mirror and Offset commands
- Trim and Extend tools
- Stretch and Lengthen tools
- Array creation techniques
- Editing complex geometry

Chapter 6: Advanced Editing Tools

- Fillet and Chamfer
- Polyline editing
- Grip editing
- Join and Break commands
- Match Properties tool
- Working with undo and redo
- Editing workflows and efficiency

Chapter 7: Layers and Object Properties

- Understanding layers
- Creating and managing layers
- Layer visibility and controls
- Layer filters and states
- Managing object properties



- Using ByLayer standards
 - Organizing drawings professionally
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Chapter 8: Technical Drafting Fundamentals

- Engineering drawing principles
 - Orthographic projection concepts
 - Understanding scales and units
 - Types of lines and line conventions
 - Sectional and auxiliary views
 - Reading and interpreting technical drawings
 - Drafting standards and best practices
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Chapter 9: Geometric Dimensioning & Tolerancing (GD&T) Basics

- Introduction to GD&T concepts
 - Understanding feature control frames
 - Datum features and datum references
 - Form tolerances and orientation tolerances
 - Position and profile tolerances
 - Reading GD&T symbols in engineering drawings
 - Applying GD&T standards in AutoCAD
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Chapter 10: Annotation and Text

- Single-line text creation
 - Multiline text editing
 - Text styles and formatting
 - Annotation scaling
 - Leaders and multileaders
 - Symbols and special characters
 - Annotation standards
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Chapter 11: Dimensioning

- Linear and aligned dimensions



- Angular and radial dimensions
 - Baseline and continued dimensions
 - Dimension styles
 - Tolerances and precision
 - Annotative dimensions
 - Editing dimensions
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Chapter 12: Hatching and Drafting Standards

- Creating hatch patterns
 - Editing hatch boundaries
 - Associative hatching
 - Gradient fills
 - Boundary detection
 - Drafting standards implementation
 - Maintaining drawing consistency
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Chapter 13: Blocks and Reusable Components

- Creating blocks
 - Inserting and editing blocks
 - Dynamic blocks
 - Using the Block Editor
 - Reusable symbols and components
 - Block libraries
 - Standardization using blocks
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Chapter 14: External References and Drawing Management

- Understanding Xrefs
- Attaching and overlaying Xrefs
- Managing referenced drawings
- Relative and full paths
- Binding and unloading Xrefs
- Managing project dependencies



- File organization methods
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Chapter 15: Layouts and Plotting

- Model space vs paper space
 - Creating layouts and viewports
 - Configuring page setups
 - Plot scales and plotting styles
 - Creating title blocks
 - Plotting to printers and PDF
 - Sheet organization and management
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Chapter 16: Introduction to 3D Modeling

- Understanding the 3D workspace
 - 3D navigation and viewpoints
 - UCS in 3D environments
 - Visual styles and shading
 - Creating primitive 3D objects
 - Working with viewpoints and cameras
 - Introduction to solid and surface modeling
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Chapter 17: 3D Solid Modeling Basics

- Extrude command
 - Revolve command
 - Sweep and Loft tools
 - Boolean operations
 - Editing solid objects
 - Converting 2D geometry into 3D models
 - Solid modeling workflows
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Chapter 18: Surface Modeling and Visualization

- Surface modeling concepts
- Creating and editing surfaces



- Applying materials and textures
 - Lighting and shadows
 - Rendering fundamentals
 - Visual presentation techniques
 - Visualization workflows
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Chapter 19: Productivity and Customization

- Using DesignCenter
 - Tool Palettes and customization
 - Keyboard shortcuts and aliases
 - Workspace customization
 - Drawing recovery tools
 - CAD standards management
 - Productivity enhancement techniques
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Chapter 20: Final Drafting and 3D Projects

- Mechanical drafting project
- Architectural drafting project
- GD&T application exercises
- 2D to 3D conversion project
- Layout and plotting project
- Drawing review and validation
- Industry workflow practices

