# Autodesk User Fusion

## Target Audience

This course is designed for entry-level designers, engineering students, and professionals who want to build foundational skills in 3D design, modeling, assemblies, and documentation using Autodesk Fusion. It is ideal for individuals preparing to enter the job market in mechanical design, product design, or general CAD drafting roles, and for those looking to validate their competency with Autodesk Fusion tools.

## Course Objective

The course aims to provide participants with fundamental knowledge and practical skills in using Autodesk Fusion for designing, modeling, assembling, and documenting mechanical and product design projects. By the end of this course, learners will be able to navigate the software confidently, create detailed parts and assemblies, and generate accurate technical drawings.

## Course Outcome

- **3D Modeling Proficiency** – Gain expertise in creating 2D sketches and transforming them into fully detailed 3D solid and freeform models.
- **Assembly Design and Management –** Learn to build and manage assemblies, apply joints, check interferences, and control motion.
- **Technical Drawing Creation –** Master creating detailed drawing sheets, placing views, and applying precise annotations and dimensions.
- **Workspace Navigation and File Management –** Develop fluency in navigating Fusion's workspaces, using the browser, timeline, and adjusting visual properties.
- **Parametric and Form Modeling Skills** – Understand how to work with parameters, constraints, and advanced freeform features for complex designs.

**Course Outline:** The course comprises **40 hours** of theory and practical labs and is divided into **5 comprehensive chapters**. Each chapter will be followed by hands-on lab exercises to reinforce learning and gauge understanding of the topics covered.

## Chapter 1. Workspace and Navigation

Getting Started
• Navigating the Data panel (file structure, cloud organization, versions, sharing projects)
• Orienting model views (Orbit, Zoom, Pan, Look At, ViewCube, Set Current View options)
Navigating the Workspace and Environment
• Using the Browser (finding and managing components, hiding/showing, renaming timeline elements)
• Navigating the toolbar (moving between workspaces, tabs, panels, tools)
• Setting grid, units, and snaps
• Selecting objects (window/freeform selection, multi-select, filters)
• Using the Timeline (editing past features, rolling forward and backward)
• Adjusting visual properties (Display Settings, Visual Style, Environment, Camera)
Using Work Features
• Creating sketches on origin planes or planar faces
• Creating construction planes, axes, and points (offset, tangent, midplane, angle, points)

## Chapter 2. Sketching and Parametric Design

Creating and Modifying Sketches
• Selecting appropriate sketch tools
• Creating sketches
• Controlling sketch element types and display properties (Sketch Palette options)
Projecting and Editing Sketch Geometry
• Projecting geometry from existing bodies
• Editing sketches (Move, Copy, Trim, Extend, Offset, Mirror, Fillet, Chamfer, Break, patterns, inserting text)
Applying Constraints and Dimensions
• Applying and managing constraints (auto-constraints, adding, removing)
• Applying and editing dimensions to create fully constrained sketches
• Using design parameters to build parametric models

## Chapter 3. 3D Modeling and Form Creation

Creating Solids from Sketches
• Creating primitive shapes (box, sphere, cylinder, etc.)
• Creating 3D shapes from 2D geometry (Extrude, Revolve, Sweep, Loft, Join, Cut, Intersect, New Body, New Component)

• Creating hole features (counterbore, countersink, spot face, threads)
• Creating pattern features (rectangular, circular, pattern on path)
Modifying Solids
• Modifying features (Move, Copy, Align, Scale, Fillet, Chamfer, Shell, Draft, Split, Combine, Press Pull)
• Deleting features
• Altering material properties and appearance
Inspecting and Inserting Tools
• Using Inspect tools (Measure, Center of Mass, Section Analysis)
• Using Insert tools (Canvas, Decal)
Working with Forms
• Creating forms (box, plane, cylinder, quadball)
• Modifying forms (Edit Form tool: manipulating points, faces, edges)

## Chapter 4. Assemblies and Motion

Creating and Managing Assemblies
• Creating and activating components or subassemblies
• Updating components to the latest versions (Get Latest tool)
• Creating components from bodies
Aligning and Positioning Components
• Applying joints (Rigid, Revolute, Slider, understanding degrees of freedom, grounding)
• Manipulating components (move, rotate)
• Driving joints (defining angle or distance of movement)
Checking Assemblies
• Checking for interferences between components

## Chapter 5. Documentation and Drawing Creation

Creating Drawings
• Creating drawing sheets (sheet size, border, title block, multi-sheet drawings)
• Placing and editing drawing views (base, section, detail, break, projected views; setting scale, style, label visibility)
Applying Dimensions and Annotations
• Adding and editing dimensions
• Adding and editing annotations (notes, center marks, center lines, balloons, leader lines)
• Creating parts lists
• Placing views on drawing sheets (base, projected, detail, section)