

Autodesk Professional in Design for Manufacturing

Target Audience

This course is designed for experienced design engineers, CAD professionals, and manufacturing specialists who want to develop and validate their advanced skills in design for manufacturing using Autodesk Fusion 360. It is ideal for individuals working in aerospace, automotive, mechanical, industrial design, medical, and general manufacturing sectors who aim to bridge the gap between design and production.

Course Objective

This course offers advanced knowledge and practical skills in designing parts and assemblies tailored for diverse manufacturing methods, including subtractive, additive, sheet metal, and molded processes. Participants will gain expertise in creating complex 3D models, managing assemblies, generating detailed technical documentation, and producing high-quality renderings suitable for manufacturing workflows. The course is aligned with the requirements of the **Autodesk Certified Professional in Design for Manufacturing** certification, enabling learners to validate their capabilities and succeed in real-world design-for-manufacturing environments.

Course Outcome

- **Manufacturing-Aware Design Proficiency** – Gain expertise in designing for subtractive, additive, molded, and sheet metal manufacturing.
- **Advanced 3D Modeling Skills** – Master creating complex solid, surface, freeform, and sheet metal parts with parametric control.
- **Assembly and Component Management** – Learn to create distributed and derived designs, control component behaviours, and manage physical properties.
- **Documentation and Presentation Excellence** – Develop detailed drawings, exploded views, and professional renderings to communicate design intent clearly.

Course Outline: The course comprises **40 hours** of advanced **theory and practical labs**, divided into **6 comprehensive** chapters. Each chapter is followed by hands-on lab exercises to reinforce learning and assess understanding of the topics covered.

Chapter 1. Manufacturing Design Rules

Design for Subtractive Manufacturing

- Applying knowledge of subtractive methods
- Principles of material removal and tool access
- Using software evaluation tools for minimum radius and tool access

Design for Additive Manufacturing

- Types of additive machines
- Support material and design requirements
- Using evaluation and export tools, including section analysis

Design for Drafted Applications

- Design guidelines for injection molding
- Design guidelines for casting
- Using part evaluation tools for draft analysis

Design for Sheet Metal Manufacturing

- Sheet metal tools and processes
- Sheet metal design language

Chapter 2. 3D Component Modeling

Advanced Sketching Techniques

- Creating advanced sketch entities (splines, conic curves)
- Creating patterns, intersection curves, and construction geometry
- User parameters and linking to dimensions and features
- Advanced constraints (symmetry, curvature)
- Creating 3D sketch entities

Construction Planes and Axes

- Creating planes and axes (midplane, along path, at vertex)

Solid Feature Creation and Modification

- Extrudes, advanced holes, threads, ribs, webs, drafts

Surface Feature Creation and Modification

- Extrude, revolve, sweep, patch surfaces
- Thicken and stitch surfaces

Freeform Parts

- Form bodies from primitives and sketches
- Advanced form editing, bridging, smoothing

Sheet Metal Parts

- Defining rules, creating base flanges and bends, modifying parts
- Unfolding/refolding, hole creation, exporting flat patterns or DXF

View Controls

- Creating named views and setting default views

Chapter 3. 3D Assembly Modeling and Management

Distributed and Derived Designs

- Creating and breaking distributed/derived designs

Assembly Motion and Joints

- Joint origins, high-DOF joints, joint limits, rigid groups

Component Control

- Isolate, control opacity, component color cycling and swatches

Physical Materials

- Applying materials, measuring mass properties

Chapter 4. Exploded View Animations

Creating Storyboards

- Creating from current animations or new setups

Component Position Manipulation

- Manual explode and transform components

Chapter 5. Technical Detailed Drawing Creation

Drawing Creation

- Creating new drawings from storyboards, assemblies, or sheet metal

Drawing Templates and Elements

- Creating title block templates
- Inserting parts tables and balloons, renumbering balloons
- Using GD&T symbols and annotations

Chapter 6. Rendered Image Creation

Render Scene Setup

- Scene environment selection, scene and camera settings

Render Appearances

- Applying and modifying appearances (bodies, faces)

Rendering Output

- Creating in-canvas and cloud renderings, turntable renders