Autodesk Associate in CAM for Turning

Target Audience

This course is intended for aspiring CNC machinists, manufacturing students, and entry-level professionals who want to build foundational skills in computer-aided manufacturing (CAM) for turning operations using Autodesk Fusion 360. It is ideal for individuals entering the fields of precision machining, aerospace, automotive, and general manufacturing.

Course Objective

This course aims to equip learners with the essential knowledge and practical skills needed to plan and execute turning operations using Autodesk Fusion 360. Participants will learn how to manage tools and workholding, define CAM setups, create accurate turning toolpaths, simulate machining processes, and generate production-ready NC code. The course content is aligned with the competencies required for the Autodesk Certified Associate in CAM for Turning certification, providing a solid foundation for both real-world applications and certification success.

Course Outcome

• **CAM Setup & Work Planning Skills** – Learn to interpret engineering drawings, define stock and workholding, and configure tool libraries.

• **Turning Toolpath Creation** – Gain practical experience in roughing, finishing, drilling, threading, grooving, and parting operations.

• **Simulation & Collision Checking** – Develop proficiency in verifying toolpaths, identifying tool collisions, and refining setup parameters.

• **NC Code Generation & Documentation –** Understand how to create NC programs, configure output options, and review G-code for validation.

• **Fusion 360 CAM Confidence –** Build job-ready CAM capabilities for 2-axis turning in a modern, industry-standard CAD/CAM environment.

Course Outline: The course comprises **40 hours** of advanced **theory and practical** labs and is divided into **5** structured chapters. Each chapter includes guided exercises to ensure learners apply concepts in practical Fusion 360 environments.

Chapter 1. Work Planning and Model Preparation

Create and manage tool libraries
- Using Fusion Team cloud libraries
- Configuring cutting data presets
- Setting tool compensation points
- Working with live tooling options

Workholding setup
- Identifying appropriate chucks and fixtures

Drawing and blueprint interpretation
- Extracting critical manufacturing data from drawings

Model preparation
- Using model repair and simplification tools

Chapter 2. CAM Setup, Machine, and Stock Definition

Defining chuck and model orientation
- Positioning models for turning setup
- Establishing safe Z-plane

WCS and spun profile definition
- Assigning correct coordinate systems for turning

Stock configuration
- Selecting bar stock or blank options
- Defining bounding box parameters

Chapter 3. Toolpath Creation and Optimization

Toolpath strategy selection
- Choosing roughing, finishing, and grooving strategies

Parting operation
- Setting up safe parting toolpaths

Toolpath parameter adjustment
- Modifying stepover, depths, and entry/exit parameters

Threading
- Defining pitch, depth, and profile type
- Configuring threading cycles

Center drilling and tapping
• Setting drill depths and peck cycles
• Creating tapping cycles
Groove operations
• Setting groove width and depth
• Controlling radial/axial passes
Profile roughing and finishing
• Controlling approach, clearance, and finishing cuts
Chamfering
• Applying chamfer tools with approach safety

Chapter 4. Simulation and Verification

Toolpath simulation
• Previewing material removal
• Identifying collisions and overcuts
Toolpath refinement
• Adjusting tool geometry, path, or setup values
Collision analysis
• Validating toolpaths using simulation results
Toolpath statistics
• Reviewing estimated cycle time and feedrate usage

Chapter 5. Documentation and NC Output

NC program generation
• Configuring post processor settings
• Generating G-code
Setup sheet creation
• Including tool lists and process instructions
G-code interpretation
• Reviewing WCS, spindle speeds, and tool changes