

Mill Design and Toolpaths

Course Description

The Mastercam University® Mill Design & Toolpaths course takes Mastercam students from square one to successfully programming parts to be machined on a CNC mill. Each of the five modules build on the last and offer a module review to help you advance. The first module introduces the Mastercam environment and basic general functions. In the second Design module, wireframe and solid modeling functions are taught and then applied through a series of specific applications-based exercises. The third and fourth modules focus on part setup and demonstrate fundamental Mastercam toolpaths, including 2D high speed machining. The final module introduces Feature Based Machining (FBM) used to automatically detect and generate all milling and drilling operations for solid model features.

Course Objectives

Upon completion, you should be able to demonstrate:

Geometry

- Using levels, colors
- Create and apply multiple Work Coordinate Systems (WCS) and construction planes
- Using 2D and 3D construction methods
- 3D wireframe creation
- Geometry selection (pre/post selection)
- Modifying current geometry (Trim, Fillet, Color, Level, Group, and Attributes)
- Diameter/Radius part creation
- Geometry transformation (Scale, Rotate, etc.)

Solids

- Extrude, Extrude Cut, Solids Manager, and creation of curves on solids

Toolpath

- Efficient toolpath creation
- Example parts that reflect holding
- Define a new tool definition from scratch
- Depth of cut and feed rate based on tool and materials
- Appropriate toolpath operation for cutting application
- Saving custom tools to a level
- Setup sheets that communicate what the program is cutting, with order of cuts
- Set common and individual operation defaults

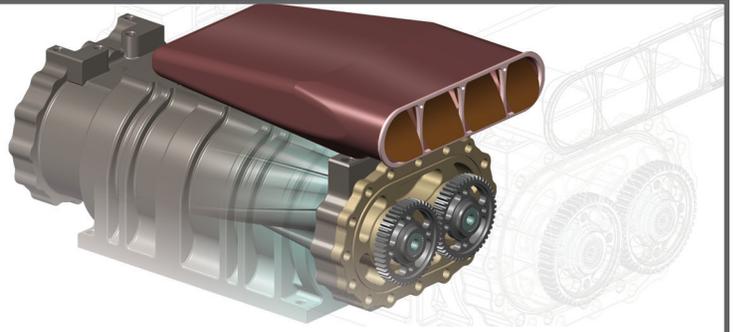
- Multiple Pocketing depths, Island, Face, Island facing
- Slot milling
- Contour toolpath, Ramp, and Multiple depth
- Importing and exporting operations
- Creating toolpath groups and machine groups
- Backplot, Quick Verify
- STL file creation and STL compare
- Stock setup
- Setting Machine and Control Definition
- Material library applied in Control Definition
- Drill toolpaths
- Posting G-Code
- Circle mill, Thread mill, and Slot mill toolpaths

2D High Speed Toolpaths (HST) and Feature Based Machining (FBM)

- Core mill, Peel mill, Blend mill, Area mill, Rest mill, and Dynamic mill techniques
- 2D HST applications
- FBM Mill and Drill
- Feature detection

Operations Manager

- Configuration
- Cut and paste geometry
- Display settings
- Tool offset registry settings
- Maximum RPM and feed rate
- Renumber tools



Mill Design and Toolpaths

Materials

The Mill Design & Toolpaths course requires:

- High speed internet connection.
- Computer that meets the Mastercam System Requirements.
- Mastercam Demo/Home Learning Edition, which you can download at Mastercam U.

Course Schedule

Because this course is available online, it can be taken at any time and at your own pace. At an educational institution, this course would typically require approximately 40 hours . This includes lab time to complete all examples. To get the most out of this class, plan to spend three hours per session and allow two and a half hours to take the final practical test.

Multiple Choice Test Overview

There are multiple choice assessments for both the beginning and end of the design and toolpath sections of the course. You will receive a Certificate of Completion (PDF format) upon completion of the posttest, which will display the posttest grade. Students should have at least 30-45 minutes to complete the multiple choice question tests. These are supplied in advance to review.

Course Policies

- This course is designed for one student, but allows the lectures to be viewed by others.
- The Certificate of Completion will be stored at Mastercam University under your unique student ID number. It remains available for you to use as proof of work completed and grades received.
- You must also register at participating colleges to receive college credit for the successful completion of this course.