BLACKBIRD FOR TRAINING

Mastercam CNC Programming & Machining Training Course



Mastercam CNC Programming & Machining Training Course

Introduction:

This Mastercam CNC Programming & Machining Training Course equips you to program, simulate, and post-process complex manufacturing parts across one week. You will construct a Mastercam CNC Machining Program and Verification Package containing coordinate system definitions, tool catalogues, Dynamic Motion toolpaths, simulation collision reports, and post-processed G-code files. You need foundational understanding of machining operations and engineering blueprints, as this practitioner-level course develops rigorous computer-aided manufacturing execution skills. You will practise through hands-on software lab exercises, importing CAD geometry, defining cutting assemblies, tuning toolpaths, and verifying kinematic clearance on digital machine twins.

Course Objectives:

- Draft solid model geometry and coordinate systems using Mastercam WCS tools for production workpiece setups.
- Build standardized digital cutting tool assemblies using ISO 13399 parameters for shop floor tooling libraries.
- Map high-efficiency material removal routines using Mastercam Dynamic Motion toolpaths for cycle time reduction.
- Run rigorous kinematic clearance checks using Mastercam Simulator to detect collisions on machine components.
- Generate verified controller-ready numerical control files using Mastercam post processors according to ISO 6983 standards.

Target Audience:

- You prepare computer-aided manufacturing toolpaths and configure coordinate systems for multi-axis computer numerical control machine tools.
- You configure cutting tools, toolholders, and machining parameters to optimise component cycle times and cutting tool life.
- You verify machine toolpath trajectories and kinematic envelopes using computer-aided manufacturing simulation software to avoid physical crashes.
- You modify post-processor outputs and validate computer numerical control code to ensure compatibility with workshop machine controllers.



Course Outline:

Day 1: Establishing Machine Coordinates and CAD Geometry Structures

- Importing neutral CAD solid models using Mastercam file converters
- Creating 2D wireframe boundary profiles using Mastercam drafting geometry
- Aligning part work coordinate systems using Mastercam WCS manager
- Organising production drawing layers using Mastercam level management tools
- Build: Part Geometry and Work Coordinate System Setup Template

Day 2: Configuring Tool Assemblies and Stock Boundary Definitions

- Structuring digital cutting tool assemblies using ISO 13399 parameters
- Calibrating material engagement values using dynamic feed rate charts
- Generating raw billet boundaries using Mastercam stock setup utilities
- Populating custom shop tool libraries using Mastercam Tool Manager
- Build: Standard Tool Assembly and Stock Model Definition Sheet

Day 3: Generating Dynamic Roughing and Precision Finishing Toolpaths

- Programming high-speed pocketing passes using Mastercam Dynamic Motion technology
- Defining multi-pass perimeter boundaries using Mastercam 2D contour routines
- Programming automated hole cycles using ISO 6983 canned cycles
- Applying constant scallop surfacing passes using Mastercam 3D finishing
- Build: Dynamic Motion 2D and 3D Roughing Toolpath Schedule

Day 4: Detecting Machining Collisions and Configuring Post Processors

- Simulating full machine kinematics using Mastercam machine digital twins
- Detecting cutter shank gouges using Mastercam Simulator verification tools
- Programming fourth-axis rotary positioning using Mastercam multi-axis indexing tools
- Modifying controller specific syntax using Mastercam post processor files
- Build: Machine Simulation Collision Detection and Post-Processing Checklist

Day 5: Executing Machine Simulation Labs and Finalising NC Packages

- Verifying toolpath clearance envelopes using integrated machine simulation labs
- Generating controller compliant G-code using Mastercam post processor utilities
- Auditing numerical control blocks using ISO 6983 syntax rules
- Compiling machine setup documentation using Mastercam active reports templates
- Build: Mastercam CNC Machining Program and Verification Package



Skills You Will Gain:

- Mastercam WCS Alignment
- ISO 13399 Tool Assembly Modelling
- Dynamic Motion Milling Programming
- 3D Surface Roughing and Finishing
- Mastercam Simulator Gouge Analysis
- Rotary Multi-Axis Indexing
- ISO 6983 G-Code Post-Processing

Why Attend This Course:

- Import and prepare complex three-dimensional part geometries directly into Mastercam to establish accurate manufacturing datum references.
- Program high-efficiency Dynamic Motion roughing passes that decrease workshop cycle times and extend cutting tool longevity.
- Eliminate costly workshop machine tool collisions by identifying gouges and clamp interference within digital simulation environments.
- Construct a Mastercam CNC Machining Program and Verification Package to standardise part programming and post-processing across your workshop.

Conclusion:

Returning to your workshop, you will immediately use your Mastercam CNC Machining Program and Verification Package to set up your next production milling job. You will present the toolpath verification reports, kinematic simulation recordings, and digital tool assembly data to your shop floor supervisor and lead manufacturing engineer for machining sign-off. After executing the initial component run on the machine tool, you will check finished part dimensions against the engineering drawing tolerances and review controller feed performance to confirm toolpath efficiency.

Frequently Asked Questions FAQ:

What will you be able to do after the Mastercam CNC Programming & Machining Training Course?

You will be able to import solid CAD models, configure workpiece coordinate systems, apply high-speed Dynamic Motion toolpaths, and run collision simulations. You will also post-process verified ISO 6983 numerical control code for diverse CNC machine controllers across your manufacturing workshop.



What do you need to know before starting the Mastercam CNC Programming & Machining Training Course?

You need foundational familiarity with conventional or CNC machining operations, basic blueprint reading, and general cutting tool terminology. Basic experience navigating Windows desktop software helps you follow the lab exercises smoothly, but prior Mastercam experience is not required.

What deliverable do you build during the Mastercam CNC Programming & Machining Training Course?

You build a Mastercam CNC Machining Program and Verification Package. This deliverable includes fully programmed 2D and 3D toolpaths, ISO 13399 cutting tool assemblies, stock boundary definitions, digital twin simulation collision checks, and controller-specific post-processed G-code files.

How does the Mastercam CNC Programming & Machining Training Course differ from a basic CNC manual programming course?

This course develops automated computer-aided manufacturing programming and digital twin simulation inside Mastercam rather than manual hand-coding of G-code lines at the machine console. You learn Dynamic Motion toolpaths, 3D surface machining, and automated tool library management that manual programming cannot achieve.

