MERCURY

Mastercam CNC Programming Course: 2D & 3D Milling and Turning

27 – 31 December 2026
Istanbul (Turkey)



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Mastercam CNC Programming Course: 2D & 3D Milling and Turning

Ref: 29_1082111 **Date:** 27 – 31 December 2026 **Location:** Istanbul (Turkey) **Fees:** 5500 Euro

The Mastercam CNC Programming Course: 2D & 3D Milling and Turning is a one-week professional course for manufacturing engineers, CAM programmers, and machining specialists responsible for producing reliable numerical control code for machine tools. Working through dynamic toolpaths, surface modeling, and multi-axis turning setups, you complete a Mastercam Machining and Toolpath Verification Package. This course is delivered by Mercury Training Center to build shop-floor manufacturing readiness.

About This Course

Inefficient toolpaths, manual coding errors, and unverified post-processors cause tool breakage, spindle collisions, and costly machine downtime on shop floors. To follow this course, you must already interpret technical engineering drawings, determine basic machining speeds and feeds, and operate computer numerical control equipment at work. Through guided exercises, you practice producing collision-free toolpaths and post-processed machine programs.

Who It Is For

- Professionals responsible for generating computer-aided manufacturing toolpaths for two-axis and three-axis milling centers
- Professionals responsible for programming turning operations and multi-tool lathe operations for precision mechanical components
- Professionals responsible for verifying stock removal strategies and eliminating machining collisions before factory deployment
- Professionals responsible for editing post-processor outputs to match machine controller interfaces across the workshop

This course is not for entry-level machine shop helpers seeking introductory hand-tool operation, nor is it for mechanical design drafters who only require basic solid drafting fundamentals without manufacturing production exposure.

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Competencies You Will Build

- Geometry Creation and Management: Preparing clean wireframe models, levels, and solid boundaries for production toolpaths.
- Dynamic Milling Toolpath Generation: Applying high-speed stock removal strategies to reduce machine cycle times and extend cutting tool lifespan.
- Three-Dimensional Surface Machining: Programming high-speed semi-finishing and finishing sequences across complex sculptured part contours.
- Computer Numerical Turning Operations: Toolpathing roughing, grooving, threading, and boring cycles on turning centers.
- Machine Simulation and Verification: Detecting tool assembly collisions and fixture interferences using solid verification tools.
- Post-Processor Configuration: Translating CAM data into compliant numerical code conforming to machine control formatting.

What You Will Be Able to Do

By the end of the course you will be able to:

- From imported solid models, construct wireframe boundary geometry and level structures required for prismatic part machining.
- Given material specifications and machine limits, program high-speed dynamic milling routines following ISO 13399 tool geometry standards.
- Using three-dimensional surface toolpaths, configure finishing passes that achieve target surface finishes without tool gouges.
- From rotational part profiles, sequence turning, facing, grooving, and single-point threading cycles on computer numerical control lathes.
- Given fixture arrangements and raw stock models, verify complete tool assemblies against collisions using full material removal simulation.
- Using controller documentation, post-process toolpaths into standardized numerical control code adhering to ISO 6983 address word formats.

Course Content

Day 1: Mastercam Interface and Two-Dimensional Wireframe Milling

- Mastercam Workspace Configuration, Level Management, and Machine Group Setup
- Wireframe Geometry Creation and Chaining Selection for Prismatic Milling
- Standard Two-Dimensional Contouring, Pocketing, and Helical Ramping Strategies
- Cutting Tool Definitions and Parameter Libraries Aligned with ISO 13399
- Toolpath Backplotting and Basic G-Code Generation Under ISO 6983

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Day 2: Dynamic Motion and Advanced Prismatic Machining

- Dynamic Milling Principles for Constant Radial Engagement and Chip Thinning
- Stock Model Creation and In-Process Material Tracking for Rest Machining
- Face Milling, Thread Milling, and Precision Hole-Making Cycles
- Workpiece Fixture Definitions and Tool Clearance Plane Optimization
- Post-Processor Selection and Machine Control Address Matching

Day 3: Three-Dimensional Surface Modeling and High-Speed Machining

- Surface and Solid Model Preparation for Three-Dimensional Part Machining
- High-Speed Roughing Routines and Boundary Management for Complex Cavities
- Semi-Finishing and Surface Finishing Sequences Using Ball and Bull-Nose Cutters
- Steep and Shallow Surface Toolpath Filtering and Scallop Height Control
- Toolholder Gouge Protection and Collision Checking Against Fixture Clamps

Day 4: Lathe Operations and C-Axis Turning Integration

- Turning Machine Setup, Stock Definitions, and Coordinate System Alignments
- Rough Facing, OD Turning, ID Boring, and Dynamic Motion Lathe Toolpaths
- Standard Threading Calculations and Custom Grooving Cycle Implementation
- Part Cut-Off Cycles and Tailstock Positioning Rules for Slender Components
- Verification of Lathe Tool Clearance and Machine Turret Envelopes

Day 5: Production Machining Simulation and Package Finalization

- Exercise on Two-Dimensional Dynamic Roughing and Rest Machining on Prismatic Blocks
- Exercise on Three-Dimensional Finishing and Gouge Detection on Mold Cavities
- Exercise on Combined Turning and Boring Programs for Threaded Couplings
- Exercise on Machine Simulation and Controller Post-Processing for Machine Controls
- Finalization of the Mastercam Machining and Toolpath Verification Package

Case Studies and Exercises

These suggested activities provide practical application of technical machining workflows across diverse industrial sectors:

- Case study: An industrial valve manufacturer where you program two-dimensional dynamic pocketing and facing routines to machine cast iron bodies within cycle-time targets.
- Case study: An automotive tooling facility where you generate three-dimensional high-speed finishing toolpaths to machine hardened die surfaces without manual hand-finishing.
- Exercise: An aerospace equipment scenario where you configure turning, grooving, and external threading passes on high-strength titanium shaft couplings.
- Exercise: A precision production workshop where you run kinematic machine simulation to diagnose toolholder collisions against modular workholding clamps.

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What You Take Back

The Mastercam Machining and Toolpath Verification Package equips you to program, verify, and document safe machine programs during your first month back at work. You will use it to standardize dynamic milling parameters, prevent spindle crashes, and maintain consistent post-processed numerical code across your facility machine tools.

- Standardized dynamic toolpath template containing vetted feed, speed, and stepover settings for common production alloys
- Three-dimensional surface finishing guide establishing boundary containment and scallop height parameters
- Machine setup sheet template documenting part coordinate origins, toolholder extensions, and clamp clearances
- Program verification checklist specifying gouge checking and solid simulation protocols prior to machine release

Quick Answers FAQ

What background is required before attending the Mastercam CNC Programming Course: 2D & 3D Milling and Turning?

You must know how to read engineering blueprints, identify basic machining tools, and understand physical machine axis configurations. Hands-on exposure to computer numerical control machine setups or conventional machine shop operations ensures you can apply toolpath generation techniques effectively.

How does this course differ from basic manual machine code editing training?

Manual machine code courses focus on typing address lines directly at machine control consoles. The Mastercam CNC Programming Course: 2D & 3D Milling and Turning teaches automated computer-aided manufacturing toolpath creation, solid model geometry machining, dynamic chip-load management, and full kinematic simulation.

Why do machine shops switch to automated Mastercam CNC programming?

Automated Mastercam CNC programming eliminates human transcription mistakes, automates complex three-dimensional surface passes, and optimizes cutting engagement angles. This software workflow shortens cycle times, prolongs cutting tool durability, and prevents catastrophic tool collisions on production machines.

What practical documentation do you complete in the Mastercam CNC Programming Course?

You complete the Mastercam Machining and Toolpath Verification Package. This portfolio contains tested milling and turning files, setup instruction sheets, post-processed machine programs, and simulation sign-off documents that you can adapt directly to your organization machining tasks.

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For Your Manager

This course equips your team member to program, simulate, and optimize milling and turning processes using computer-aided manufacturing software. Returning with the Mastercam Machining and Toolpath Verification Package, the professional can immediately program parts from engineering models, reduce cycle times through dynamic motion toolpaths, and verify setups before loading code onto shop-floor computer numerical control machines.