CNC Machining and Machine Shop Management Course: Programming, Tooling, Setup and Inspection

6 – 10 December 2026
Dammam - Eastern Province five-star



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Introduction:

CNC machining and machine shop management is a 1-week course for teams who programme, set, run, inspect and plan work on CNC lathes and machining centres, ending with a Machine Shop Improvement and Costing Plan for a case workshop. Workshops lose spindle hours when programs are proved on the machine, tools are run at guessed speeds and feeds, setups take longer than cutting and jobs are quoted without a machine-hour rate. Nominees already operate, supervise or plan CNC work and build numeric models from setup studies, tool data and job records. CoreConcept Training Center delivers this CNC machining course.

Course Objectives:

- Read and edit G-code and M-code programs and prove CAM toolpaths before the first cut
- Calculate spindle speed, feed rate and chip load and predict tool life for turning and milling jobs
- Select workholding, fixtures and zero-point locating that cut part flips and setup time
- Run a SMED study on a CNC changeover and convert internal setup tasks to external ones
- Plan in-process gauging and CMM inspection routines that release machined parts to drawing
- Build machine-hour rates, job routings and a loaded schedule to quote and sequence shop work

Target Audience:

- Machine shop supervisors responsible for daily output, setups and first-off approval on CNC lathes and mills
- CNC programmers and setters responsible for part programs, tool lists and offsets
- Central maintenance workshop leads responsible for machining replacement components and repair parts
- Precision-parts production planners responsible for job routing, machine loading and delivery dates
- Machined-part inspectors responsible for gauging, CMM programs and nonconforming part decisions
- Workshop cost and estimating staff responsible for quoting machining jobs and tracking actual hours

Course Outline:

Day 1: CNC Machine Shop Baseline and Spindle-Hour Losses

- CNC Lathe and Machining Centre Axis Configuration Review
- Spindle Utilisation Log Separating Cutting, Setup and Idle Hours
- Job Mix Analysis by Batch Size, Material and Tolerance
- Machine Shop Value Stream Map From Drawing to Dispatch
- Current-State Loss Sheet for a Case Workshop

Day 2: G-Code Programming, CAM Toolpaths and Program Proving

- G00, G01, G02 and G03 Motion Block Structure
- M-Code Spindle, Coolant and Tool Change Sequences
- G54 Work Offsets and Tool Length Offset Setting
- CAM Toolpath Strategy and Post-Processor Output Checks
- Dry Run, Single Block and Simulation Program Proving

Day 3: Cutting Tools, Speeds and Feeds and Workholding

- Carbide Insert Grade and Geometry Selection by Material
- Spindle Speed and Feed Rate Calculation From Surface Speed
- Chip Load and Feed per Tooth for Milling Cutters
- Taylor Tool Life Equation for Tool Change Intervals
- Vices, Chucks, Soft Jaws and Modular Fixture Selection

Day 4: Setup Reduction, Machining Defects and CMM Inspection

- SMED Internal and External Setup Task Separation
- Zero-Point Clamping and Tool Presetting for Faster Changeovers
- Chatter, Burrs and Dimensional Drift Root Cause Checks
- In-Process Gauging and First-Off Approval Routine Design
- CMM Probing Strategy and ISO 10360 Performance Verification

Day 5: Modelling Build of the Machine Shop Improvement and Costing Plan

- Machine-Hour Rate Model From Depreciation, Labour and Overheads
- Job Routing and Cycle Time Estimate for Case Parts
- Finite Capacity Loading and Job Sequencing Schedule Build
- Setup Reduction and Tool Life Savings Calculation
- Machine Shop Improvement and Costing Plan Panel Review

Skills You Will Gain:

- CNC Program Editing
- CAM Output Verification
- Cutting Data Calculation
- Fixture and Workholding Design
- Changeover Time Reduction
- Machined Part Inspection Planning
- Machine-Hour Costing
- Machine Shop Capacity Scheduling

Why Attend This Course:

- Deliver a Machine Shop Improvement and Costing Plan to the workshop manager and the maintenance or production head for approval
- Decide which jobs to machine in-house, which setups to standardise and what price to quote using a tested machine-hour rate
- Avoid scrapped first-offs, broken tools, crashed programs and late deliveries caused by unproved code and guessed cutting data
- Share the setup study sheet, cutting data calculator, first-off checklist and costing model with setters, programmers and planners

Conclusion:

Back at work, the participant presents the Machine Shop Improvement and Costing Plan to the workshop manager, the maintenance or production head and the finance lead. The plan supports decisions on which changeovers to rework first, which tooling and fixtures to buy, how to load each CNC machine and what rate to charge internal and external customers for machining. After the first month under the plan, the workshop should compare setup times, tool consumption, first-off rejections and quoted against actual hours, then revise the rate and the schedule assumptions.

Frequently Asked Questions FAQ:

What should participants know before the CNC machining and machine shop management course?

Participants should already operate, set, programme, inspect or plan work on CNC lathes or machining centres and be able to read an engineering drawing. A laptop with a spreadsheet application is used for the cutting data, setup and costing models.

How does CNC machining and machine shop management differ from a manufacturing processes or GD&T course?

This course runs an existing CNC shop better: programs, tools, setups, inspection, scheduling and costing. A manufacturing processes course compares casting, forming, machining and additive routes, while a GD&T course teaches how tolerances are specified and interpreted on drawings.

Why does CNC machining and machine shop management focus on setup reduction?

In job shops and maintenance workshops batches are small, so setup often takes longer than cutting. Separating internal from external setup tasks, presetting tools and using repeatable clamping returns spindle hours without buying new machines.

What do participants take back from the CNC machining and machine shop management course?

Participants take back a Machine Shop Improvement and Costing Plan for a case workshop, with a spindle-hour loss sheet, cutting data calculator, setup reduction study, inspection routine, machine-hour rate and loaded schedule they can adapt to their own shop.