

Program Description

The Precision Machining program at Lancaster County Career & Technology Center (Lancaster CTC) is a rigorous, industry-aligned technical training program classified under CIP Code 48.0501, Machinist. The program prepares students for entry-level careers in the advanced manufacturing industry by providing hands-on instruction in precision measurement, manual machining, computer-controlled machining, and quality assurance.

This program is primarily designed for 12th-grade (senior) students, with a limited number of 11th-grade (junior) openings available based on program capacity and student readiness. Enrollment priority is given to seniors.

Program Schedule & Attendance

Precision Machining is a full-day program. Students are expected to be present and on task for the entire instructional day.

Daily Schedule:

- Program Hours: 8:00 AM – 2:35 PM
- Students must be in class and ready to work by 8:00 AM
- Early dismissal or late arrival must be communicated in advance through proper school channels

Transportation / Bus Schedule:

Students who bus from their sending school district are responsible for learning and following their district's transportation schedule. Bus arrival times vary by district and route, and buses do not all arrive at the same time. It is the student's responsibility to know their specific bus schedule and ensure they are in class. Tardiness due to bus scheduling is not an automatic excuse and should be addressed proactively with your sending school and transportation department.

Uniform Policy

Full program uniform is required and must be worn properly from the moment you enter the CTC building. There are no exceptions. Uniforms reflect the professionalism expected in an industrial workplace and are a condition of participation in the program.

Uniform Requirements:

- Full uniform must be worn upon entry to the building each day
- Proper safety attire is required in the shop at all times (details provided at orientation)
- Failure to comply with the uniform policy will result in daily score point deductions
- Repeated violations may result in further disciplinary action per CTC policy

Students are expected to take pride in their appearance and conduct themselves as professionals-in-training. The uniform standard mirrors the expectations you will encounter in the workforce.

Curriculum & Skills Development

The Precision Machining curriculum is structured to take students from the foundational principles of the trade through advanced computer-controlled machining operations. Instruction is delivered in a sequential, skill-building format aligned with industry standards and NIMS (National Institute for Metalworking Skills) competencies.

Foundational Skills:

- Shop safety, housekeeping, and professional conduct in the machine shop environment
- Hand tools and hand filing - developing feel for material, surface finish, and tolerances
- Blueprint reading and technical drawing interpretation
- Precision measurement using micrometers, calipers, dial indicators, and gauges
- Layout and workholding techniques
- Introduction to metals, material properties, and speeds/feeds

Manual Machining:

- Engine lathe operations: turning, facing, threading, knurling, boring, and taper turning
- Vertical milling machine operations: squaring stock, slotting, drilling, and profile milling
- Drill press operations and hole-making processes
- Surface grinding and abrasive processes
- Sawing and cutoff operations

CNC & Advanced Machining:

- Introduction to Computer Numerical Control (CNC) concepts and machine components
- CNC lathe and CNC milling machine operation and setup
- G-code and M-code programming - reading, writing, and editing
- CAM (Computer-Aided Manufacturing) software programming and toolpath generation
- Program editing, verification, and troubleshooting
- Work offset and tool offset setup
- Introduction to multi-axis machining concepts

Quality Control & Inspection:

- Dimensional inspection techniques and documentation
- Understanding tolerances, fits, and geometric dimensioning & tolerancing (GD&T) basics
- Statistical process control (SPC) concepts
- Workpiece quality assessment and non-conformance identification

Industry & Professional Skills:

- Workplace safety regulations including OSHA standards
- Job planning and process documentation
- Career readiness: resume writing, employability skills, and interview preparation
- Introduction to manufacturing industry career pathways and post-secondary options

Industry Certifications — NIMS

Students in this program have the opportunity to earn industry-recognized credentials through the National Institute for Metalworking Skills (NIMS). NIMS certifications are valued by employers across the manufacturing sector and validate the skills students develop during their training.

Certifications students may pursue include areas such as: Measurement, Materials & Safety; Turning Operations; Milling Operations; CNC Turning; CNC Milling; and CAM Programming. The specific certifications offered are determined by instructional progress and student readiness.

Co-Operative Education (Co-Op) Opportunities

Qualified students may be eligible to participate in a Co-Operative Education (Co-Op) placement with a local manufacturing employer. Co-Op allows students to gain real-world, paid work experience in a precision machining environment while earning program credit.

Co-Op Eligibility Requirements:

- Maintain a satisfactory grade average as defined by program and CTC policy
- Meet minimum attendance requirements - excessive absences will disqualify a student from Co-Op
- Demonstrate consistent professional conduct and uniform compliance
- Instructor and administration approval

Co-Op placements are available throughout the program year, subject to employer availability and student qualifications. Co-Op is a privilege, not a guarantee, and students must maintain eligibility to continue participation.

Career Outcomes & Pathways

Upon successful completion of the Precision Machining program, graduates will possess the skills and credentials necessary to pursue entry-level employment in the manufacturing industry. Employers in Lancaster County and the surrounding region actively recruit CTC Precision Machining graduates.

Entry-Level Career Titles May Include:

- CNC Machine Operator
- Manual Machinist Apprentice
- Machine Shop Technician
- Quality Control Inspector
- Production Machinist
- Manufacturing Technician

Post-Secondary Pathways:

- Apprenticeship programs through local unions or manufacturers
- Associate degree programs in Manufacturing Technology or Mechatronics
- Advanced NIMS certifications and continued skill development
- Military manufacturing and technical occupational specialties

Program Expectations Summary

Success in Precision Machining requires commitment, discipline, and a strong work ethic - the same qualities demanded by industry employers. Students are expected to:

- Arrive on time, in full uniform, every day
- Follow all safety rules without exception - machining is a safety-critical trade
- Actively participate in both classroom and hands-on lab activities
- Maintain passing grades and satisfactory attendance to remain in good standing
- Treat equipment, tools, and fellow students with care and respect
- Always conduct themselves as professionals while on CTC property