

Manufacturing Career Pathway CNC Machining



WHAT TECHNOLOGY WILL I BE USING?

- Analytical or scientific software – CNC Consulting Machinists' Calculator; EditCNC software; Kentech Trig Calculator
- Industrial control software – Work inspection software
- For CNC programming: Computer aided design CAD software; Computer aided manufacturing CAM software; G-Code
- Office suite software – Microsoft Office software

ARE THERE OPPORTUNITIES FOR ADVANCEMENT?

There are opportunities to advance in your career. A positive attitude, updated skills, and strong work ethic will help you stand out. Many companies offer tuition reimbursement to employees continuing their education leading to college degrees.

Sources / Resources: [Dream It Do It Ohio.org](#); [Learn.org](#); [Machinist.org](#); [The Manufacturing Institute.org](#); [My Next Move.org](#); [Ohio Means Jobs.com](#); [Onetonline.org](#); [Study.com](#); [U.S. Bureau of Labor Statistics \(bls.gov\)](#).



Cleveland –
Cuyahoga County



MAGNET
Manufacturing Advocacy & Growth Network
AN OHIO MEP AFFILIATE

CAREERS IN MANUFACTURING

Machinist



WHAT IS A CNC MACHINIST?

CNC machinists operate computer numerically controlled (CNC) machine tools such as lathes and milling machines, to perform one or more machine functions on metal or plastic to cut and produce precision parts for machines, instruments and tools. The programs are created by CNC programmers, the machine is loaded with the right cutting tools as indicated by the program, and a specific part is created. A large number of precisely cut parts are developed to fill orders from a variety of industries.

Technology is rapidly evolving, and machinists are continually learning new methods and techniques.

IS THIS FIELD GROWING?

- Ohio is the third largest manufacturing state in the country based on employment with over 682,600 workers.
- Nearly 13% of the state's total employment is in manufacturing and approximately 40% of the state's manufacturing is in Northeast Ohio.
- The average annual total compensation for manufacturing in Ohio far surpasses other sectors.

According to the Bureau of Labor Statistics (BLS.gov), the national outlook from 2012 to 2022 is positive for machinists!

- Projected Growth from 15% to 21%
- Projected Job Openings: 59,600

The BLS predicted growth in employment for machinists in general from 2012-2022 due to improvements in technology and expect **ample job opportunities for entry-level machinists.**



*Source: Bureau of Labor Statistics, Occupational Employment Statistics Program, 2014

WHAT KIND OF TOOLS MIGHT I BE USING?

- Calipers – 0 -1 drop indicators
- Dial indicator or dial gauge
- Height and Hole gauges
- Horizontal turning center – CNC lathes
- Inspection and Hand Tools
- Laser cutting machine
- Microcontrollers – Controllers; Programmable logic controllers PLC
- Micrometers – Slot micrometers
- Milling machines –CNC routers; Manual mills
- Personal computers

WHAT SPECIFIC TASKS MIGHT I BE REQUIRED TO PERFORM?

- Measure dimensions of finished workpieces to ensure conformance to specifications using precision measuring instruments, templates, and fixtures.
- Mount, install, align, and secure tools, attachments, fixtures, and workpieces on machines using hand tools and precision measuring instruments.
- Stop machines to remove finished workpieces or to change tooling, setup, or workpiece placement according to required machining sequences.
- Transfer commands from servers to computer numerical control (CNC) modules
- Monitor machine operation and control panel displays and compare readings to specifications to detect malfunctions.
- Enter commands or load control media, such as tapes, cards, or disks into machine controllers to retrieve programmed instructions.
- Adjust machine feed and speed, change cutting tools, or adjust machine controls when automatic programming is faulty or if machines malfunction.
- Lift workpieces to machines manually or with hoists or cranes.

WHAT EDUCATION IS REQUIRED?

Education Required

- High school diploma minimum.
- Basic courses in blueprint reading, drafting, metal shop
- Math classes such as algebra, geometry are needed to make precise measurements
- Computer courses are critical for Computer Numeric Control (CNC) machine tool operations
- Physics and geometric dimensioning may be necessary for more advanced positions

Short-term training, apprenticeship courses, two-year associate degree programs and industry certifications are available at community and technical colleges. On-the-job training is necessary to become a proficient machinist. The career path can lead to engineering and skilled technical positions. See career pathway (back page).

Key Skills

Math and computer skills, ability to read blueprints, manual dexterity for operating hand tools, inspecting equipment, reading measuring tools, accuracy and attention to detail are critical. In addition:

- Mechanical
- Reading Comprehension
- Judgment and Decision Making
- Locating information, problem-solving
- Time Management
- Troubleshooting
- Production and Processing

National Career Readiness Certification WorkKeys®

ACT WorkKeys® is a job skills assessment system that helps employers select, hire, train, develop, and retain a high-performance workforce. All position openings posted on

Ohio Means Jobs list the preferred WorkKeys® scores associated with that job in math, reading, and locating information.

To learn more about NCRC and these assessments or to take practice tests, go to: ACTWorkKeys.com, OhioMeansJobs.com, TalentNEO.org.

Manufacturing Skill Standards Council

The Manufacturing Skill Standards Council (MSSC) is an industry-led, training, assessment and certification system focused on the core skills and knowledge needed by the nation's front-line production and material handling workers. The MSSC has developed two certification systems:

- Certified Production Technician (CPT)
- Certified Logistics Associate (CLA)

NIMS Certification

National Institute of Metalworking Skills (NIMS) credentials. When you have completed appropriate training and experience, you can become a credentialed worker. The NIMS administers performance-based examinations for metalworkers that consist of written and practical components.

NIMS offers three levels of machining certification from entry-level to mastery. For more information: Nims-skills.org

Apprenticeship

Apprenticeships offer combination of hands-on, work experience and related technical instruction (RTI). Apprenticeships might be available through a manufacturing company or a machinists' union. The RTI is offered by a union, career-technical school or community college.