

Central Ohio Technical College

Newark • Coshocton • Knox • Pataskala

Degrees that *Work*

The mission of Central Ohio Technical College is to meet the technical education and training needs of students and employers in the area.

Advanced Manufacturing Technology Machining Option

The Advanced Manufacturing Technology – Machining Option at Central Ohio Technical College prepares students for careers in machine tool technologies. Students will develop academic, technical, and professional knowledge and skills required for acquisition, retention, and advancement in their career.

Our program is designed to develop your skills in shop mathematics, blueprint reading, machining processes, precision layout and measurement, organization, communication, teamwork, and programming and operating CNC machines.

The first year focuses on developing a strong foundation in conventional machining, followed by a second year in computer applications, team building, production, and business practices relating to the manufacturing industry. Though the program is structured as a two-year plan, it is competency-based to allow students to enter at their own level and progress at their own pace.

The program works closely with regional manufacturers through its Academic Advisory Committee to ensure the curriculum remains current and relevant. Graduates of the program will have opportunities for employment in a variety of metal manufacturing industries.

Learning Outcomes

After completing this plan of study the student will be able to:

1. Demonstrate setup, layout, maintenance, safe operation, monitoring and troubleshooting manual and Computer Numerically Controlled (CNC) machines.

2. Demonstrate project management, production planning and control and quality assessment in manufacturing.
3. Demonstrate good team and interpersonal skills to enhance both oral and written communication with colleagues, management and other professionals within the manufacturing industry.
4. Create CAD drawings and interpret simple to complex blueprints for the manufacturing of a product.
5. Create, troubleshoot and train others on CNC programming.
6. Demonstrate math skills relating to dimensions, measuring, determining layout of manual and CNC machining and programming.

Profession

Machinists operate metal-removing equipment such as lathes, drill presses, milling machines and grinders, many of which are numerically controlled (CNC). Machinists may specialize in operating one type of machine or they may be required to work equally well on several. The expectation of a machinist is to make accurate parts using precision layout, measuring/gauging tools, and to remove material with the aid of machine tools. Some of the basic machine tools operated by a machinist include the engine lathe, drill press, grinder, horizontal and vertical mill, and computer numerical controlled (CNC) machining and turning center.

Technological advances and continued expansion of the machining industry have increased the demands for well-trained entry level technicians both locally and state-wide. Individuals with knowledge of CNC lathes and mills and computer-aided manufacturing

(CAM) are especially in demand.

Because the technology of machining is changing rapidly, machinists must learn to operate a wide range of machines. Along with operating machines that use metal cutting tools to shape work pieces, machinists operate machines that cut with lasers, water jets, or electrified wires. While some of the computer controls may be similar, machinists must understand the unique cutting properties of these different machines. As engineers create new types of machine tools and new materials to machine, machinists must constantly learn new machining properties and techniques.

Career Opportunities/Salary

Graduates of this program will have career opportunities as either machinists or computer control programmers and operators.

Machinists held about 419,070 jobs nationally in 2008 with Ohio ranking second in the number of machinists employed in the U.S. Most machinists work in small machining shops or in manufacturing industries, such as machinery manufacturing and transportation equipment manufacturing (motor vehicle parts and aerospace products and parts). Maintenance machinists work in most industries that use production machinery. Despite relatively slow employment growth, job opportunities for machinists should continue to be good. The number of workers obtaining the skills and knowledge necessary to fill machinist jobs is expected to be less than the number of job openings arising each year from the need to replace experienced machinists who transfer to other occupations or retire, and from job growth.

Median annual earnings of machinists were \$36,780 in 2008. The middle 50 percent earned between \$28,420 and \$45,440.

Computer control (CNC) programmers and operators held about 160,020 jobs in 2008, mostly working in machine shops, plastics products manufacturing, machinery manufacturing, or transportation equipment manufacturing making mostly aerospace and automobile parts. Although computer control programmers and operators work in all parts of the country, jobs are most plentiful in the areas where manufacturing is concentrated. Due to the limited number of people entering training programs, employers are expected to continue to have difficulty finding workers with the necessary skills and knowledge.

Median annual earnings of numerical tool and process control programmers were \$44,800 in 2007. The middle 50 percent earned between \$33,970 and \$53,010.

Important Student Characteristics

- Ability to visualize shapes & space
- Detail-oriented mind
- Enjoyment of hands-on work
- Enjoyment of problem-solving
- Interest in computers
- Team player & independent worker

Transferability

Graduates of the Advanced Manufacturing Technology – Machining Option have many opportunities to continue their education by pursuing a bachelor's degree. For more information, please contact a COTC academic advisor or admissions representative.

Sample Curriculum

Course Title	Credit Hours
First Quarter	
Machining Calculations	2.00
Principles of Machining	3.00
Machining - Turning I	3.00
OSHA 30	3.00
Trigonometry	5.00
<i>Total Credit Hours:</i>	16.00
Second Quarter	
Metrology	2.00
Machining - Turning II	3.00
Machining - Milling I	3.00
Physics Mechanics	5.00
<i>Total Credit Hours:</i>	13.00

Third Quarter

Principles of Manufacturing	3.00
Machining - Milling II	3.00
Reasoning Skills	4.00
Composition I	4.00
<i>Total Credit Hours:</i>	14.00

Fourth Quarter

Organizational Psychology	3.00
Principles of Computing	1.00
Technical Elective	2.00
<i>Total Credit Hours:</i>	6.00

Fifth Quarter

CNC - Turning I	3.00
Materials of Manufacturing	3.00
CNC - Milling I	3.00
Composition II	4.00
Introduction to CAD	2.00
<i>Total Credit Hours:</i>	15.00

Sixth Quarter

Production Planning and Control	2.00
CAD for Machining	4.00
CNC - Turning II	3.00
Project Management	3.00
Small Group Communications	3.00
<i>Total Credit Hours:</i>	15.00

Seventh Quarter

Statistical Process Control	3.00
CNC Graphic Programming	4.00
CNC - Milling II	3.00
Managerial Skills	4.00
Technical Writing	3.00
<i>Total Credit Hours:</i>	17.00

Eighth Quarter

Team Building	4.00
Technical Elective	2.00
<i>Total Credit Hours:</i>	6.00
<i>Program Total Credit Hours:</i>	102.00

How do I Start?

If you are a new student, you may apply online at www.cotc.edu. You may also contact a **Gateway** office for more information:

E-mail: cotcadmissions@cotc.edu	
Newark Campus	740.366.9222 800.963.9275 Ext. 222
Coshocton Campus	740.622.1408
Knox Campus	740.392.2526
Pataskala Campus	740.964.7090

Returning COTC students should contact one of the **Gateway** offices listed previously.

For specific questions regarding Advanced Manufacturing Technology, please contact Alan Gibson, Advanced Manufacturing Instructor, at agibson@cotc.edu.

You may also contact the **Gateway- Office of Academic Advising** at cotcadvising@cotc.edu.

Accreditation/Membership

Central Ohio Technical College is accredited by The Higher Learning Commission and is a member of the North Central Association. Phone: 312-263-0456
www.ncahigherlearningcommission.org

COTC is also a member of the American Association for Higher Education, the American Association of Community Colleges, the American Council on Education, the American Technical Education Association, Inc., the Ohio Association of Two-Year Colleges and the Ohio College Association.

Non-Discrimination Statement

Central Ohio Technical College does not discriminate on the basis of sex, race, age, national origin, sexual orientation, religion, color, veteran status, and/or disability. General information, questions, concerns, or complaints related to these matters are to be directed to the Title IX Coordinator, John Berry, Warner Center Suite 226, Ohio State Newark/COTC, 1179 University Drive, Newark, Ohio 43055-1797 (740-364-9578) or ADA/504 Coordinator, Connie Zang, at the same location.



Newark • Coshocton • Knox • Pataskala

www.cotc.edu