

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, being competency based allows 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

At the completion of 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 370,000 jobs in 2004. 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 \$33,966 in May 2004. The middle 50 percent earned between \$26,707 and \$42,286.

Computer control (CNC) programmers and operators held about 143,000 jobs in 2004, 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 \$40,165 in May 2004. The middle 50 percent earned between \$32,594 and \$49,920.

### 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

<b>Quarter 1</b>		<b>Credits</b>
1226	Trigonometry	5
3071	OSHA 30	3
3434	Machining Calculations	2
3437	Principles of Machining	3
3438	Machining – Turning I	3

<b>Quarter 2</b>		<b>Credits</b>
3025	Physics Mechanics	5
3435	Metrology	2
3439	Machining – Turning II	3
3468	Machining – Milling I	3

<b>Quarter 3</b>		<b>Credits</b>
1030	Reasoning Skills	4
1532	Composition I	4
3433	Principles of Manufacturing	3
3469	Machining – Milling II	3

<b>Quarter 4</b>		<b>Credits</b>
1385	Organizational Psychology	3
1601	Principles of Computing	1
	Technical Elective	2

<b>Quarter 5</b>		<b>Credits</b>
1533	Composition II	4
3445	CNC – Turning I	3
3447	Materials of Manufacturing	3
3475	CNC – Milling I	3
3706	Introduction to CAD	2

<b>Quarter 6</b>		<b>Credits</b>
1523	Small Group Communications	3
2018	Project Management	3
3413	Production Planning and Control	2
3436	CAD for Machining	4
3446	CNC – Turning II	3

<b>Quarter 7</b>		<b>Credits</b>
1525	Technical Writing	3
2019	Strategic Writing	4
3415	Statistical Process Control	3
3448	CNC Graphic Programming	4
3476	CNC – Milling II	3

<b>Quarter 8</b>		<b>Credits</b>
2071	Team Building	4
	Technical Elective	2

## How do I Start?

Apply online at: [www.cotc.edu](http://www.cotc.edu)  
 Contact the **Gateway - Office of Admissions:**  
 E-mail: [cotcadmissions@cotc.edu](mailto:cotcadmissions@cotc.edu)  
*Newark Campus* 740.366.9494  
 1.800.963.9275 Ext. 494  
*Coshocton Campus* 740.622.1408  
*Knox Campus* 740.392.2526  
*Pataskala Campus* 740.964.7090

Former COTC students should contact the **Gateway- Office of Academic Advising:**  
 740.366.9422

1.800.963.9275 Ext. 422

For specific questions regarding Advanced Manufacturing Technology contact:

**Gateway- Office of Academic Advising:**  
[cotcadvising@cotc.edu](mailto: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](http://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.