



## Machine Trades Program Description

### Industry Description

The machinist is a skilled metal worker who produces metal parts by using machine tools and hand tools. Training and experience enable the machinist to plan and carry through all the operations needed to turn out a finished machine product and to switch readily from one kind of product to another. The machinist's background and knowledge enables him/her to turn a block of metal into an intricate, precise part.

All options are an art as well as a skill, and are considered to be demanding occupations. There is a great variety in the construction of dies and molds, depending on the design of a part, the type of materials used, the ingenuity of the designer, and the knowledge and skill of the die and mold maker, who must machine intricate components of various tooling to tolerances expressed in fractions of one-thousandths of an inch.

Although no prior knowledge or experience is necessary to succeed in this program, a background in shop math and algebra, mechanical drafting, machine shop, and mechanical skills can be helpful.

**IMPORTANT** ACCUPLACER Test Requirement: ACCUPLACER testing in math, reading and writing. Any needed developmental courses must be completed before receiving a diploma or an A.A.S. award.

### Program Essentials

#### Length of Program

CNC Manufacturing Technology AAS	72 credits
CNC Manufacturing Technology Diploma	63 credits
CNC Machinist Diploma	50 credits
Machinist Diploma	32 credits
Multi Axis Machining Advanced Certificate	9 credits

#### Start Dates

Fall Semester:	August
Spring Semester	January

### Program Contact

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For information on how to apply or to schedule a campus tour please contact the Admissions Office, Phone (763) 576-4700 and E-mail [info@anokatech.edu](mailto:info@anokatech.edu)

This information is available in alternative formats by calling (763) 576-4700. TTY users can call Minnesota Relay at (800) 627-3529. Anoka Technical College • (763) 576-4700 • 1355 West Highway 10, Anoka, MN 55303 • A member of the Minnesota State Colleges and Universities System • Anoka Technical College is an equal opportunity, affirmative action employer and educator.

## **CNC Manufacturing Technology Associate of Applied Science**

**72 Credits**

The CNC Manufacturing Technology Associate of Applied Science Degree (AAS) program includes technical and general education components. This degree provides the skills for trade entry plus the possibility to pursue a Bachelor of Arts (BA) degree with cooperating colleges and universities. This career major prepares people to write and edit CNC programs, perform complex setups, basic troubleshooting of machine problems, cycle time reduction practices, fixture design & building, recognize areas for process improvements and operate the following equipment: manual lathes, drills, mills, grinders, CNC mills, CNC lathes, CNC wire EDM and CNC sinker EDM, coordinate measuring machine, CAD/CAM and 4&5 axis CNC mills. They would also be skilled in the areas of CNC programming, parametric programming, basic troubleshooting of machine problems, cycle time reduction practices, fixture design & building, blueprint reading, GD&T, statistical process control, lean manufacturing, math, inspection, and the correct sequence of operation required. Those employed in this position would be expected to write and edit CNC programs, perform complex setups, basic troubleshooting of machine problems, cycle time reduction practices, fixture design & building and recognize areas for process improvements on manual lathes, drills, mills, grinders, CNC mills, CNC lathes, CNC wire EDM and CNC sinker EDM, coordinate measuring machine, and CAD/CAM as well as invoke lean manufacturing process and practices.

### **General Education 18 Credits**

ENGL1105	Composition I	4
MATH1650	College Trigonometry	3
Choose from	<a href="#">MnSC Transferable General Education courses</a>	11

### **Technical Education 54 Credits**

MACH1100	Machine Technology I	7
MACH1120	Machine Technology II	3
MACH1130	Blueprint Reading I /CAD	3
MACH1200	Machine Technology III	3
MACH1220	Machine Technology IV	2
MACH1230	Blueprint Design/ CAD II	2
MACH1240	Geometric Dimensioning & Tolerancing	3
MACH1250	C.N.C.I	2
MACH1260	CNC Programming I	2
MACH2310	C.N.C. II	3
MACH2320	C.N.C III	3
MACH2330	C.A.M.I	2
MACH2340	CNC Programming II	2
MACH2350	Mold/Die Making Theory	2
MACH2360	Fixture and Tooling	4
MACH2410	Tool and Cutter Grinding	1
MACH2420	E.D.M. Machining	2
MACH2430	C.A.M. II	2
MACH2440	CNC Programming III	1
MACH2450	CNC Design and Manufacture	5

## **CNC Manufacturing Technology**

### **Diploma**

**63 Credits**

This career major prepares people to write and edit CNC programs, perform complex setups, basic troubleshooting of machine problems, cycle time reduction practices, fixture design & building, recognize areas for process improvements and operate the following equipment: manual lathes, drills, mills, grinders, CNC mills, CNC lathes, CNC wire EDM and CNC sinker EDM, coordinate measuring machine, CAD/CAM and 4&5 axis CNC mills. They would also be skilled in the areas of CNC programming, parametric programming, basic troubleshooting of machine problems, cycle time reduction practices, fixture design & building, blueprint reading, GD&T, statistical process control, lean manufacturing, math, inspection, and the correct sequence of operation required. Those employed in this position would be expected to write and edit CNC programs, perform complex setups, basic troubleshooting of machine problems, cycle time reduction practices, fixture design & building recognize areas for process improvements on manual lathes, drills, mills, grinders, CNC mills, CNC lathes, CNC wire EDM and CNC sinker EDM, coordinate measuring machine, and CAD/CAM as well as invoke lean manufacturing process and practices.

### **General Education**

**9 Credits**

ENGL1105	Composition I	4
MATH1050	Technical Math	5

### **Technical Education**

**54 Credits**

MACH 1100	Machine Technology I	7
MACH 1120	Machine Technology II	3
MACH 1130	Blueprint Reading I /CAD	3
MACH 1200	Machine Technology III	3
MACH 1220	Machine Technology IV	2
MACH 1230	Blueprint Design/ CAD II	2
MACH 1240	Geometric Dimensioning & Tolerancing	3
MACH 1250	C.N.C. I	2
MACH 1260	CNC Programming I	2
MACH 2310	C.N.C. II	3
MACH 2320	C.N.C III	3
MACH 2330	C.A.M. I	2
MACH 2340	CNC Programming II	2
MACH 2350	Mold/Die making Theory	2
MACH 2360	Fixture and Tooling	4
MACH 2410	Tool and Cutter Grinding	1
MACH 2420	E.D.M. Machining	2
MACH 2430	C.A.M. II	2
MACH 2440	CNC Programming III	1
MACH 2450	CNC Design and Manufacture	5

## **CNC Machinist**

### **Diploma**

**50 Credits**

This career major prepares people for entry level positions to operate and perform offset changes as well as basic setups on the following equipment: manual lathes, drills, mills, grinders, CNC mills, CNC lathes, CNC wire EDM and CNC sinker EDM, coordinate measuring machine, and CAD/CAM. They would also be skilled in the areas of blueprint reading, GD&T, statistical process control, lean manufacturing, math, inspection, and the correct sequence of operation required. Those employed in this position would be expected to operate and perform offset changes as well as basic setups on manual lathes, drills, mills, grinders, CNC mills, CNC lathes, CNC wire EDM and CNC sinker EDM, coordinate measuring machine, and CAD/CAM as well as invoke lean manufacturing process and practices.

**PREREQUISITE: The 32 credits from Machinist Certificate.**

#### **General Education** **2 Credits**

COMP1002	Computer Technologies for Communication	2
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#### **Technical Education** **16 Credits**

MACH 2310	C.N.C. II	3
MACH 2320	C.N.C III	3
MACH 2330	C.A.M. I	2
MACH 2340	CNC Programming II	2
MACH 2350	Mold/Die Making Theory	2
MACH 2360	Fixture and Tooling	4

## **Machinist**

### **Diploma**

**32 Credits**

This career major prepares people for entry level skills to setup and operate the following equipment: manual lathes, drills, mills, and grinders. They would also be skilled in the area of blueprint reading, geometrics, statistical process control, math, and inspection, and the correct sequence of operation required. Those working in this field would be expected to setup and operate manual lathes, drills, mills, and grinders. They should be able to inspect and produce parts to the desired dimensions, with proper supervision.

#### **General Education** **5 Credits**

MATH1050	Technical Math	5
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#### **Technical Education** **27 Credits**

MACH 1100	Machine Technology I	7
MACH 1120	Machine Technology 2	3
MACH 1130	Blueprint Reading I /CAD	3
MACH 1200	Machine Technology III	3
MACH 1220	Machine Technology IV	2
MACH 1230	Blueprint Design/CAD II	2
MACH 1240	Geometric Dimensioning & Tolerancing	3
MACH 1250	C.N.C. I	2
MACH 1260	CNC Programming I	2

**Multi Axis Machining  
Advanced Certificate**

**9 Credits**

This advanced certification prepares students in the understanding of multi axis programming and the art of machining. Students will be skilled in the areas of multi axis principles of programming and machining, and cycle time reduction. This certificate is designed to give the student a deeper insight into the knowledge needed to create complex 3-dimensional shapes and 5 sided machining. This increases the machining operations to be performed in one setup, reducing handling and machines necessary to complete the job. With more companies utilizing lean manufacturing the use of this technology continues to grow. (Prerequisites: Evaluation exam through Admissions)

<b>Technical Education</b>		<b>9 Credits</b>
MACH 2510	Multi Axis CNC Programming	4
MACH 2520	Multi Axis CNC Machining	5