

# MACHINE MANUFACTURING TECHNOLOGY

[pcc.edu/programs/machine-manufacturing/](http://pcc.edu/programs/machine-manufacturing/)

## CAREER AND PROGRAM DESCRIPTION

Machinists operate various types of material processing equipment such as lathes, drill presses, milling machines, grinders, computer numerical control (CNC) machines, rapid prototyping, and computer assisted machining (CAM) systems. Machinists may specialize in the operation of one type of machine or work in a shop where they are required to operate several different machines.

The Machine Manufacturing Technology (MMT) program has been developed specifically in a modular self-paced format, allowing the student to attend courses on a schedule they choose (day or evenings). The open exit design of the program allows a student to focus on a course and complete the materials in a matter of days or weeks instead of traditional term-long classroom formats. The program fits the needs of students in that it is designed to be self-paced (students learn at their own speed, taking as many or as few modules as they desire), individualized (courses tailored to students), flexible (students select their own attendance schedules), and open-exit (students complete courses whenever the work is done, and they may leave the program when they have met their training goals or needs).

Existing MMT students are given priority enrollment until the final day of the previous term. New students will be admitted after that time until a predetermined enrollment count is reached. Consult a program advisor through the department to help plan a course of study that will allow you to achieve your educational goals.

## DEGREES AND CERTIFICATES OFFERED

### ASSOCIATE OF APPLIED SCIENCE DEGREE

Machine Manufacturing Technology

### ONE-YEAR CERTIFICATE

CNC Milling  
CNC Turning  
Manual Machining

### LESS THAN ONE-YEAR: CAREER PATHWAY CERTIFICATE

Manufacturing Technician

### Academic Prerequisites

- Successful completion of IRW 90 or (RD 90 and WR 90) or (ESOL 260 and ESOL 262 and ESOL 254) and MTH 65 or equivalent placement test scores.
- Machine Manufacturing Technology is a limited entry program. Certificate seeking students must meet with a program advisor, complete a department entry document, and may potentially be placed on a wait list for an entry position.

### Academic Requirements

- In order to continue beyond the Manufacturing Technician Certificate, students must complete MCH 121 with a grade of "C" or "P" or better.

### Non-Academic Prerequisites

- None

### Non-Academic Requirements

- None

## MACHINE MANUFACTURING TECHNOLOGY AAS DEGREE

Minimum 98.5 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of four courses of General Education. Math/computation competency is met through the courses in the program of study indicated with a § symbol. A maximum of 24 credits of Pass/No Pass and a maximum of 24 credits of cooperative education (MCH 280) are allowed in the Machine Manufacturing Technology AAS Degree. Students should consult with program advisors for course planning.

### Machine Manufacturing Technology Degree Courses

Code	Title	Credits
MCH 100	Machine Tool Basics	1
MCH 110B	Blueprint Reading for Machine Manufacturing	3
or MCH 105 & MCH 110	and	
MCH 115		3.5
or MCH 115A & MCH 115B	Geometric Dimensioning and Tolerancing I and Geometric Dimensioning and Tolerancing II	
MCH 120	Machine Shop Math §	2
MCH 121	Manufacturing Processes I	5
MCH 130	Machine Shop Trigonometry §	2.5
MCH 160	Drilling Machines and Operations	2
MCH 185	Turning Machines and Operations	4
MCH 190B	Boring and Threading on the Lathe	4
or MCH 190 & MCH 195	and	
MCH 205	Vertical Milling Machines and Operations	3.5
MCH 259	CNC Programming-Lathe	5
MCH 268	CNC Programming-Mill	5
MCH 272	Mastercam Level I	5
MCH 273	Mastercam Level II	5
MCH 278	CNC Operation - Mill	4
MCH 279	CNC Operation - Lathe	4
MCH 280	Cooperative Education: Machine Technology	4
MCH 287A	Technical Skill Assessment in CNC Turning	5
MCH 288A	Technical Skill Assessment in CNC Milling	5
MSD 115	Improving Work Relations	3
MCH Degree Electives		11
General Education: 4 courses		
Total Credits		98.5

§ Course cannot be substituted for another course.

## MACHINE MANUFACTURING TECHNOLOGY DEGREE ELECTIVES

Code	Title	Credits
ENGR 100	Exploring Engineering	1
MCH 101		3
MCH 102		3
MCH 121	Manufacturing Processes I	5
MCH 123		4

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MCH 157	Project Machine Technology I	1.5	MCH 205	Vertical Milling Machines and Operations	3.5
MCH 158	Project Machine Technology II	3	MCH 268	CNC Programming-Mill	5
MCH 159	Project Machine Technology III	4.5	MCH 272	Mastercam Level I §	5
MCH 210	Project Machine Technology IV	6	MCH 278	CNC Operation - Mill	4
MCH 211		7.5	MCH 280	Cooperative Education: Machine Technology §	4
MCH 212	Project Machine Technology VI	9	MCH 288A	Technical Skill Assessment in CNC Milling	5
MCH 213	Project Machine Technology VII	10.5	MSD 115	Improving Work Relations §	3
MCH 214			Total Credits		45
MCH 215	Horizontal Milling Machines	2.5	§ Course contains Related Instruction and cannot be substituted with another course; Related Instruction details can be viewed here. <sup>1</sup> MCH 110B requirement can be met by the completion of MCH 105 and MCH 110. <sup>2</sup> MCH 115A requirement can be met by the completion of MCH 115.		
MCH 222	Coordinate Measuring Machine Operation	2			
MCH 227	CNC Grinder Operation	2.5			
MCH 228		1.5			
MCH 229	Rapid Prototyping	5			
MCH 235		2			
MCH 240		2			
MCH 245	Metallurgy	2.5			
MCH 262	CNC Conversational Controls	2			
MCH 263					
MCH 266					
MCH 276	Mastercam Solids	3			
MCH 277		3			
MCH 280	Cooperative Education: Machine Technology	1-8			
MCH 282	CNC Router Operation	3			
MCH 283					
MCH 286A	Technical Skill Assessment in Manual Machining	5			
MCH 290	Mastercam Fundamentals Orientation	1			
MCH 291	Laser Cutting and Engraving Fundamentals	1			
MCH 292	FDM Additive Manufacturing Fundamentals Orientation	1.5			
MCH 293		1			
MCH 294		1.5			
MCH 296A		2			
MCH 297A		2			

### ONE-YEAR CERTIFICATE

CNC Milling (p. 2)  
 CNC Turning (p. 2)  
 Manual Machining (p. 2)

### LESS THAN ONE-YEAR: CAREER PATHWAY CERTIFICATE

Manufacturing Technician (p. 3)

### CNC MILLING ONE-YEAR CERTIFICATE

Minimum 45 credits. Students must meet all certificate requirements.

#### CNC Milling Certificate Courses

Code	Title	Credits
MCH 100	Machine Tool Basics	1
MCH 110B	Blueprint Reading for Machine Manufacturing	3
MCH 115A	Geometric Dimensioning and Tolerancing I	2
MCH 120	Machine Shop Math §	2
MCH 121	Manufacturing Processes I	5
MCH 130	Machine Shop Trigonometry §	2.5

### CNC TURNING ONE-YEAR CERTIFICATE

Minimum 45.5 credits. Students must meet all certificate requirements.

#### CNC Turning Certificate Courses

Code	Title	Credits
MCH 100	Machine Tool Basics	1
MCH 110B	Blueprint Reading for Machine Manufacturing <sup>1</sup>	3
MCH 115A	Geometric Dimensioning and Tolerancing I <sup>2</sup>	2
MCH 120	Machine Shop Math §	2
MCH 121	Manufacturing Processes I	5
MCH 130	Machine Shop Trigonometry §	2.5
MCH 185	Turning Machines and Operations	4
MCH 190B	Boring and Threading on the Lathe <sup>3</sup>	4
MCH 259	CNC Programming-Lathe §	5
MCH 279	CNC Operation - Lathe	4
MCH 280	Cooperative Education: Machine Technology §	4
MCH 287A	Technical Skill Assessment in CNC Turning	5
MCH 290	Mastercam Fundamentals Orientation	1
MSD 115	Improving Work Relations §	3
Total Credits		45.5

§ Course contains Related Instruction and cannot be substituted with another course; Related Instruction details can be viewed here.  
<sup>1</sup> MCH 110B requirement can be met by the completion of MCH 105 and MCH 110.  
<sup>2</sup> MCH 115A requirement can be met by the completion of MCH 115.  
<sup>3</sup> MCH 190B requirement may be met by the completion of MCH 190 and MCH 195.

### MANUAL MACHINING ONE-YEAR CERTIFICATE

Minimum 45.5 credits. Students must meet all certificate requirements.

#### Manual Machining Certificate Courses

Code	Title	Credits
MCH 100	Machine Tool Basics §	1
MCH 110B	Blueprint Reading for Machine Manufacturing <sup>1</sup>	3

MCH 115A	Geometric Dimensioning and Tolerancing I <sup>2</sup>	2
MCH 120	Machine Shop Math <sup>§</sup>	2
MCH 121	Manufacturing Processes I <sup>§</sup>	5
MCH 130	Machine Shop Trigonometry <sup>§</sup>	2.5
MCH 160	Drilling Machines and Operations	2
MCH 185	Turning Machines and Operations	4
MCH 190B	Boring and Threading on the Lathe <sup>3</sup>	4
MCH 205	Vertical Milling Machines and Operations	3.5
MCH 215	Horizontal Milling Machines	2.5
MCH 225	Surface Grinding Machines and Operations	2
MCH 280	Cooperative Education: Machine Technology <sup>§</sup>	4
MCH 286A	Technical Skill Assessment in Manual Machining	5
MSD 115	Improving Work Relations <sup>§</sup>	3
Total Credits		45.5

§ Course cannot be substituted with another course.

<sup>1</sup> MCH 110B requirement can be met by the completion of MCH 105 and MCH 110.

<sup>2</sup> MCH 115A requirement can be met by the completion of MCH 115.

<sup>3</sup> MCH 190B requirement may be met by the completion of MCH 190 and MCH 195.

## **MANUFACTURING TECHNICIAN CAREER PATHWAY CERTIFICATE**

Minimum 15.5 credits. Students must meet all certificate requirements. The Manufacturing Technician Certificate is a Career Pathway. All courses are contained in the Machine Manufacturing Technology AAS Degree.

### **Manufacturing Technician Certificate Courses**

Code	Title	Credits
MCH 100	Machine Tool Basics	1
MCH 110B	Blueprint Reading for Machine Manufacturing <sup>1</sup>	3
MCH 115A	Geometric Dimensioning and Tolerancing I <sup>2</sup>	2
MCH 120	Machine Shop Math	2
MCH 121	Manufacturing Processes I	5
MCH 130	Machine Shop Trigonometry	2.5
Total Credits		15.5

<sup>1</sup> MCH 110B requirement may be met by the completion of MCH 105 and MCH 110.

<sup>2</sup> MCH 115A requirement may be met by the completion of MCH 115.