

# MACHINE TOOL TECHNOLOGY - ADVANCED TECHNICAL CERTIFICATE (ATC)

Explore More About This Program: <https://cwi.edu/program/machine-tool-technology>

## Certificate Quick Facts

- **Instructional School:** Industry, Engineering, and Trades
- **Department:** Manufacturing and Welding
- **Program Code:** MACH.ATC
- **Program Type:** Career and Technical Education
- **Available Fully Online:** No
- **Eligible for Federal Financial Aid:** Yes

## Certificate Requirements

Course	Course Title	Min Credits
<b>General Education Requirements</b>		
<i>Choose one of the following courses to complete the GEM 1 or GEM 2 requirement:</i>		
Select one of the following:		
	<u>GEM 1 - Written Communication course</u>	3
	<u>GEM 2 - Oral Communication course</u>	
<i>Complete the following course to fulfill the GEM 3 requirement:</i>		
	<u>GEM 3 - Mathematical Ways of Knowing course</u>	3
<i>Complete the following course to fulfill the GEM 6 requirement:</i>		
	<u>GEM 6 - Social &amp; Behavioral Ways of Knowing course</u>	3
<b>Major Requirements</b>		
MACH 103	Machine Shop Laboratory I	3
MACH 104	Machine Shop Laboratory II	3
MACH 105	Machine Shop Laboratory III	6
MACH 126	Related Blueprint Reading I	2
MACH 127	Related Blueprint Reading II	2
MACH 153	Machine Shop Theory I	2
MACH 154	Machine Shop Theory II	2
MACH 155	Machine Shop Theory III	2
MACH 203	Advanced Machine Shop Laboratory I	6
MACH 204	Advanced Machine Shop Laboratory II	6
MACH 210	Fundamentals of Computer-Aided Drafting and Design	3
MACH 212	Computer-Aided Manufacturing	3
MACH 224	Tool Design for Manufacturing	2
MACH 253	Advanced Machine Shop Theory I	3
MACH 254	Advanced Machine Shop Theory II	3
<b>Minimum Credit Hours Required</b>		<b>57</b>

## Plan of Study Guide

The course sequence listed below is strongly recommended in order to complete your program requirements. Many Career and Technical Education (CTE) courses have prerequisites and/or corequisites that have been accounted for within this Plan of Study Guide. Please register for your major requirements each semester as shown below using the Student Planning tool in myCWI. Consult your Student Success Advisor for any questions regarding this plan.

*NOTE: The required general education courses may be completed during any semester the student prefers, including summer semesters.*

### First Year

Fall		Credit Hours
MACH 103	Machine Shop Laboratory I	3
MACH 104	Machine Shop Laboratory II	3
MACH 126	Related Blueprint Reading I	2
MACH 153	Machine Shop Theory I	2

MACH 154	Machine Shop Theory II	2
Select one of the following:		3
<u>GEM 1 - Written Communication course</u>		
<u>GEM 2 - Oral Communication course</u>		
<b>Total Semester Credit Hours</b>		<b>15</b>
<b>Spring</b>		
MACH 105	Machine Shop Laboratory III	6
MACH 127	Related Blueprint Reading II	2
MACH 155	Machine Shop Theory III	2
MACH 224	Tool Design for Manufacturing	2
<u>GEM 3 - Mathematical Ways of Knowing course</u>		3
<b>Total Semester Credit Hours</b>		<b>15</b>
<b>Second Year</b>		
<b>Fall</b>		
MACH 203	Advanced Machine Shop Laboratory I	6
MACH 212	Computer-Aided Manufacturing	3
MACH 253	Advanced Machine Shop Theory I	3
<b>Total Semester Credit Hours</b>		<b>12</b>
<b>Spring</b>		
MACH 204	Advanced Machine Shop Laboratory II	6
MACH 210	Fundamentals of Computer-Aided Drafting and Design	3
MACH 254	Advanced Machine Shop Theory II	3
<u>GEM 6 - Social &amp; Behavioral Ways of Knowing course</u>		3
<b>Total Semester Credit Hours</b>		<b>15</b>
<b>Minimum Credit Hours Required</b>		<b>57</b>

## Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Demonstrate knowledge and application of safe work habits in all phases of machine shop operation.
- Demonstrate knowledge and application of advanced setup, operation, and maintenance of manual milling machines.
- Demonstrate knowledge and application of advanced manual engine lathe set-up techniques and operations, as well as precision surface grinding and measuring techniques.
- Perform and utilize advanced setup techniques, tool and hardware selection, and process planning for manufacturing, as well as jig and fixture design for production machining.
- Apply advanced interpretation of machine shop specific detail and assembly drawings emphasizing machining operations and materials; apply the Machinery's Handbook in interpreting blueprint specifications and associated machining processes.
- Program and operate computer numerical control (CNC) machining and turning centers. Emphasis on manually writing (G&M compatible) programs, debugging programs, setups and fixturing, tooling selection, and offset calculations.
- Operate basic computer-aided drafting and design systems using keyboarding, system operation, and applying computer graphics to machine standards. Operate interactive computer graphics system to prepare drawings on a CRT.
- Write computer numerical control (CNC) machine tool programs using computer-assisted techniques to generate G-Code and M-Function programs. Apply tooling concepts, machining methods, definition of part geometry, writing of tool motion statements, use of the computer to process program inputs, analysis, and debugging of computer outputs to develop a functional program.
- Apply, explain, and use geometric dimensioning and tolerancing (GD&T) methods as interpreted in ASME Y14.5M. Read and use geometric tolerancing symbolism and terms.
- Work professionally and productively with others through collaboration and teamwork in a shop or lab environment.