



Western Technical College

10420227 Precision Machining Capstone - Milling (CBE)

Course Outcome Summary

Course Information

Description	Requires the learner to produce a complex part using student developed programs incorporating multiple milling processes.
Career Cluster	Manufacturing
Instructional Level	One-Year Technical Diploma
Total Credits	1
Total Hours	36

Textbooks

Mastercam Mill 2D & Lathe Combo. Copyright 2022. Mastercam. Publisher: Caminstructor Inc. **ISBN-13:** 978-1-988-76679-9. Required.

Learner Supplies

Safety glasses with side eye protection that meet Z87 OSHA guidelines. **Vendor:** Campus Shop. Required.

Proper footwear - \$35.00-75.00. **Vendor:** To be discussed in class. Required.

Scientific calculator (recommend T1-36x Solar). **Vendor:** Campus Shop. Required.

Three-ring binder. **Vendor:** Campus Shop. Required.

Clipboard. **Vendor:** Campus Shop. Required.

Pens/Pencils/Black Sharpie Marker. **Vendor:** Campus Shop. Required.

Minimum 4GB USB Flash Drive. **Vendor:** Campus Shop. Required.

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Live Responsibly: Foster Accountability
3. Refine Professionalism: Improve Critical Thinking
4. Refine Professionalism: Participate Collaboratively
5. Refine Professionalism: Practice Effective Communication

High Impact Practices

1. Capstone Experience: in this course, you will develop a project that integrates and applies many of the concepts, skills, and characteristics needed of an industry expert in the field.

Program Outcomes

1. Apply basic safety practices in the machine shop
2. Interpret industrial/engineering drawings
3. Apply precision measuring methods to part inspection
4. Perform basic machine tool equipment set-up and operation
5. Perform programming, set-up and operation of CNC Machine Tools

Course Competencies

1. **Develop a process plan for to produce a work-based learning (WBL) project.**

Assessment Strategies

- 1.1. Written Product - Plan

Criteria

You will know you are successful when

- 1.1. you determine part to be produced.
- 1.2. you specify part name; operation; program number; stock type, size, and quantity.
- 1.3. you summarize operation and setup processes.
- 1.4. you describe the setup, including work holding.
- 1.5. you list the tool number, tool description, and relevant comments.
- 1.6. you accurately lists tool speeds, feed rates, and cutting depths.

Learning Objectives

- 1.a. Identify part or product you will machine.
- 1.b. Determine feeds and speeds.
- 1.c. Select tooling.
- 1.d. Determine work holding.
- 1.e. Determine material type, size, and quantity.

2. **Perform operation of CNC Milling machines.**

Assessment Strategies

- 2.1. Performance

Criteria

You will know you are successful when

- 2.1. you call up programs.
- 2.2. you set up tools and work.
- 2.3. you execute program.
- 2.4. you perform part inspection.
- 2.5. you adjust speeds and feeds.

Learning Objectives

- 2.a. Operate controls on a CNC milling machine.
- 2.b. Call up and run programs on a CNC milling machine.
- 2.c. Set up work and tools in CNC milling machines.
- 2.d. Adjust speeds and feeds to optimize CNC machining conditions

3. Perform set-up of CNC Milling machines.

Assessment Strategies

- 3.1. Product

Criteria

You will know you are successful when

- 3.1. you plan setups for CNC milling machines.
- 3.2. you perform work and tool setups in CNC milling machines.
- 3.3. you call up and verify programs in CNC milling machines.
- 3.4. you run new programs.
- 3.5. you inspect parts milled.
- 3.6. you perform tooling and offset adjustments as needed.

Learning Objectives

- 3.a. Load the correct program into the machine
- 3.b. Verify the CNC program in graphics.
- 3.c. Verify work and tool offsets
- 3.d. Execute program
- 3.e. Adjust speeds and feeds to optimize CNC machining conditions
- 3.f. Adjust tool off-sets to make parts within specifications.

4. Perform programming of CNC Milling Machines.

Assessment Strategies

- 4.1. Product

Criteria

You will know you are successful when

- 4.1. you write basic program for CNC milling machine.
- 4.2. you write CNC machining center programs for multiple parts set ups.
- 4.3. you set up machine to run program.
- 4.4. you load and call up program for the job.
- 4.5. you run programs in CNC machining centers.
- 4.6. you inspect parts for dimensional accuracy.
- 4.7. you adjust machine control offsets and/or program for parts specifications.

Learning Objectives

- 4.a. Write basic programs for specified CNC machine tools according to EIA-ISO standards
- 4.b. Load the correct program into the machine