



Western Technical College

10420207 Milling Operations 3 (CBE)

Course Outcome Summary

Course Information

Description	Requires the learner to combine multiple machining processes with vertical milling components and accessories to machine specific features of a work piece.
Career Cluster	Manufacturing
Instructional Level	One-Year Technical Diploma
Total Credits	1
Total Hours	36

Textbooks

No textbook 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. Live Responsibly: Foster Accountability
2. Refine Professionalism: Improve Critical Thinking
3. Refine Professionalism: Participate Collaboratively

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.

Course Competencies

1. Use proper tools, tool-holding, and work-holding devices for vertical milling operations.

Assessment Strategies

- 1.1. Demonstration

Criteria

You will know you are successful when

- 1.1. you follow industry regulations and standards for safe operation.
- 1.2. you determine the level of accuracy/precision required on the workpiece.
- 1.3. you select the cutting tool needed for the workpiece.
- 1.4. you properly mount the selected tool and toolholder.
- 1.5. you correct misaligned tools.

Learning Objectives

- 1.a. Operate machines according to industry standards following safety protocols.
- 1.b. Select the cutting tools needed for the application.
- 1.c. Determine proper mounting techniques for selected tool.
- 1.d. Select the type of toolholder needed for the application.
- 1.e. Recognize results of improper tool alignment and take action to correct.
- 1.f. Select the workholding devices/accessories needed for the application.

2. Determine setup parameters for milling operations.

Assessment Strategies

- 2.1. Demonstration

Criteria

You will know you are successful when

- 2.1. you identify relevant information from charts and table in Machinery's handbook.
- 2.2. you apply relevant information to setup machine parameters.
- 2.3. you verify parameters are met.

Learning Objectives

- 2.a. Identify components of a thread callout.
- 2.b. Determine tap drill size according to Tap Drill chart.
- 2.c. Use reference materials and tables.

3. Machine specific features of a work piece.

Assessment Strategies

- 3.1. Product

Criteria

You will know you are successful when

- 3.1. you operate the machine without injury to yourself or others.
- 3.2. you operate the equipment without causing damage to the machine or equipment.
- 3.3. you follow industry safety protocols.
- 3.4. you follow instructions on project planning sheets to mill a product within specified tolerances.

Learning Objectives

- 3.a. Combine skills to create a finished product within specified dimensions and tolerances.
- 3.b. Mill opposing surfaces parallel.

- 3.c. Mill adjacent surfaces mutually perpendicular.
- 3.d. Mill a slot to width, depth, and location.
- 3.e. Mill a pocket to width, length, depth, and location.
- 3.f. Mill angles to size and location.
- 3.g. Use various form cutters on the vertical mill.
- 3.h. Use an edge finder for precision location on a vertical mill.

4. Heat treat milled product.

Assessment Strategies

- 4.1. Demonstration

Criteria

You will know you are successful when

- 4.1. you follow safety precautions for using the equipment.
- 4.2. you determine the required temperatures for the material used.
- 4.3. you wrap material in heat-treatment foil, if required.
- 4.4. you select the time needed for heat treating.
- 4.5. you set the oven to the correct temperature.
- 4.6. you use draw furnace to reduce hardness.

Learning Objectives

- 4.a. Identify safety measures needed when using the equipment.
- 4.b. Identify the required temperatures for the material used.
- 4.c. Wrap material in heat-treatment foil, if required.
- 4.d. Identify the time needed for heat treating.
- 4.e. Set the oven to the correct temperature.
- 4.f. Use draw furnace to reduce hardness.