

Western Technical College

31420343 Machining Practicum

Course Outcome Summary

Course Information

Description	This course requires students to further practice and refine the skills learned in previous manual machining courses through additional projects.
Career Cluster	Manufacturing
Instructional Level	One-Year Technical Diploma
Total Credits	2
Total Hours	72

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

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Live Responsibly: Develop Resilience
3. Live Responsibly: Foster Accountability
4. Refine Professionalism: Improve Critical Thinking

Program Outcomes

1. MACH 1. Apply basic safety practices in the machine shop
2. MACH 2. Interpret industrial/engineering drawings

3. MACH 3. Apply precision measuring methods to part inspection
4. MACH 4. Perform basic machine tool equipment set-up and operation

Course Competencies

1. Operate machines according to industry regulations.

Assessment Strategies

- 1.1. Skill Demonstration
- 1.2. Project

Learning Objectives

- 1.a. Locate all machine controls on turning and milling machines
- 1.b. Describe the function of all machine controls for turning and milling.
- 1.c. Recognize and avoid or minimize safety hazards associated with turning and/or milling machines.
- 1.d. Identify and locate all machine guards and safety devices.
- 1.e. Follow industry regulations and standards for safe operation.

2. Use proper tools and toolholding for various machining operations.

Assessment Strategies

- 2.1. Skill Demonstration
- 2.2. Project

Criteria

You will know you are successful when

- 2.1. you receive approval on project planning sheets submitted prior to machining.
- 2.2. you complete and submit all projects for inspection.

Learning Objectives

- 2.a. Identify various cutting tools that are commonly used on turning machines, and their applications.
- 2.b. Identify various cutting tools that are commonly used on vertical milling machines, and their applications.
- 2.c. Demonstrate proper mounting techniques for various cutting tools used in turning operations and/or in vertical milling operations.
- 2.d. Identify various types of toolholders commonly used on vertical milling machines.
- 2.e. Recognize results of improper tool alignment in turning operations, and take action to correct.
- 2.f. Recognize results of improper tool alignment or geometry in vertical milling operations, and take action to correct.

3. Use proper workholding devices machining operations.

Assessment Strategies

- 3.1. Skill Demonstration
- 3.2. Project

Criteria

You will know you are successful when

- 3.1. you receive approval of project planning sheets submitted prior to machining.
- 3.2. you complete all projects.

Learning Objectives

- 3.a. Determine level of accuracy/precision required on workpiece.
- 3.b. Identify different types of workholding devices/accessories and their applications for turning and/or milling operations.
- 3.c. Recognize which workholding device/accessory will work best for a given turning or milling process/situation.

4. Determine setup parameters for machining operations.

Assessment Strategies

- 4.1. Skill Demonstration
- 4.2. Project

Criteria

You will know you are successful when

- 4.1. you receive approval on project planning sheets for all related operations prior to machining.
- 4.2. you complete the shop projects.

Learning Objectives

- 4.a. Identify components of a thread callout.
- 4.b. Locate and utilize thread dimensioning tables in Machinery's Handbook.
- 4.c. Use the three wire thread charts to determine dimensions for machining/inspecting various threads.
- 4.d. Locate and utilize various taper charts/tables in the Machinery's Handbook.
- 4.e. Use reference materials and tables.

5. Manipulate machine components and accessories to machine specific features of a work piece.

Assessment Strategies

- 5.1. Skill Demonstration
- 5.2. Project

Criteria

You will know you are successful when

- 5.1. you complete all related projects.

Learning Objectives

- 5.a. Setup the Taper Attachment on a turning machine.
- 5.b. Machine threads.
- 5.c. Face and center drill a work piece.
- 5.d. Turn diameters and lengths.
- 5.e. learner demonstrates the ability to bore.
- 5.f. Machine grooves.
- 5.g. Machine knurls.
- 5.h. Machine angles.
- 5.i. Mill angles on a work piece.
- 5.j. Locate a work piece using an edge finder.
- 5.k. Locate a work piece using an indicator.
- 5.l. Use a digital readout on a vertical mill.
- 5.m. Use an offset boring head on the vertical mill.

6. Verify the alignment of the machining components.

Assessment Strategies

- 6.1. Skill Demonstration
- 6.2. Project

Learning Objectives

- 6.a. Recognize the results of toolhead misalignment on a work piece.
- 6.b. Demonstrate the process of checking/adjusting toolhead alignment on a vertical mill.
- 6.c. Recognize the results of misalignment of the vise on a work piece.
- 6.d. Demonstrate the process of aligning the vise on a vertical mill.
- 6.e. Recognize the results of tailstock miss-alignment on a work piece.
- 6.f. Demonstrate the process of checking/adjusting tailstock alignment on a turning machine.
- 6.g. Recognize the results of chuck run out on a work piece.
- 6.h. Demonstrate the process of checking chuck run out on a turning machine.

7. Evaluate grinding wheels for specific applications.

Assessment Strategies

- 7.1. Project inspection

Learning Objectives

- 7.a. Recognize the difference between grit sizes of wheels.
- 7.b. Interpret identification code on the grinding wheels.
- 7.c. Identify recommended grit size based on project requirements (finishing, roughing, W-P material, etc.)

7.d. Select grinding wheel based on specific application to be performed on a surface grinder.

8. Perform wheel truing/dressing techniques for various types of grinding processes.

Assessment Strategies

8.1. Project inspection

Criteria

You will know you are successful when

8.1. you complete all related projects within tolerance using the machines in the shop.

Learning Objectives

- 8.a. Describe the proper dressing diamond location relative to the vertical center line of the wheel.
- 8.b. Describe the proper dressing diamond location for dressing the side of the wheel.
- 8.c. Dress periphery of the grinding wheel per specifications.
- 8.d. Dress side of the grinding wheel per specifications.
- 8.e. Identify surface finishes that do not meet specifications.
- 8.f. Adjust dressing techniques to correct the surface finish.
- 8.g. Verify wheel selection for process/material.
- 8.h. Adjust in-feeds and table movements to correct surface finish.

9. Grind work piece surfaces/features to within specified tolerances.

Assessment Strategies

9.1. Project inspection

Criteria

You will know you are successful when

9.1. you successfully complete related projects within tolerances

Learning Objectives

- 9.a. Grind surfaces to a specified surface finish and flatness/parallelism/angularity.
- 9.b. Inspect and verify flatness/parallelism/angularity.
- 9.c. Troubleshoot when surfaces are not within flatness/parallelism/angularity specifications (burrs, cleanliness, W/P condition) and correct.