Western Technical College

10420205 Milling Operations 1 (CBE)

Course Outcome Summary

Course Information

Description	Requires the learner to identify vertical milling machine components, identify tools and tool holding accessories, verify alignment of machine components, and apply machining theory principles to fundamental vertical milling operations.
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. Interpret the use of vertical milling machine components and accessories.

Assessment Strategies

1.1. Written Product
1.2. Skill Demonstration

Criteria

1.1. you identify the location of machine controls, guards, and safety devices.
1.2. you operate machine controls, guards, and safety devices.
1.3. you describe purpose of vertical milling machine components and accessories.

Learning Objectives

1.a. Locate all machine components and accessories.
1.b. Describe the function of all machine components and accessories..
1.c. Recognize and avoid/minimize safety hazards associated with vertical milling machines.
1.d. Identify/locate machine guards/safety devices and their purpose.
1.e. Identify different types of workholding devices/accessories and their applications.
1.f. Recognize which workholding device/accessory will work best for a given milling process/situation.

2. Identify proper tools and tool holding accessories for vertical milling machining operations.

Assessment Strategies

2.1. Written Product
2.2. Skill Demonstration

Criteria

You will know you are successful when

2.1. you name and identify cutting tools used on a vertical milling machine.
2.2. you describe the purpose of the selected tool.
2.3. you name and identify types of toolholding accessories used on vertical milling machines.
2.4. you change tool inserts based on tool wear.

Learning Objectives

2.a. Identify cutting tools that are commonly used on vertical milling machines and describe their applications.
2.b. Identify types of toolholders commonly used on vertical milling machines.
2.c. Demonstrate proper mounting techniques for cutting tools used in vertical milling operations.
2.d. Recognize indications of tool wear.
2.e. Demonstrate proper technique for changing tool inserts.

3. Verify the alignment of vertical milling machine components.

Assessment Strategies

3.1. Written Product
3.2. Skill Demonstration

Criteria

You will know you are successful when

3.1. you demonstrate the tramming process.
3.2. you demonstrate the process of indicating a vise.

Learning Objectives

3.a. Recognize the results of toolhead misalignment on a work piece.
3.b. Demonstrate the process of checking/adjusting toolhead alignment on a vertical mill.
3.c. Recognize the results of misalignment of the vise on a work piece.
3.d. Demonstrate the process of aligning the vise on a vertical mill.

4. Apply appropriate Machining Theory principles to vertical milling operations.

Assessment Strategies

4.1. Written Product
4.2. Skill Demonstration

Criteria

4.1. you calculate correct spindle speeds for milling operations
4.2. you determine correct feed rates for milling operations
4.3. you determine correct infeeds for milling operations
4.4. you identify correct cutting fluids for milling operations

Learning Objectives

4.a. Demonstrate calculation of correct spindle speeds for milling operations
4.b. Demonstrate application of correct feed rates for milling operations
4.c. Demonstrate application of correct infeeds for milling operations
4.d. Identify the correct cutting fluids for milling operations

5. Mill surfaces.

Assessment Strategies

5.1. Skill Demonstration

Criteria

You will know you are successful when

5.1. you operate the machine without injury to yourself or others.
5.2. you operate the equipment without causing damage to the machine or equipment.
5.3. you follow industry safety protocols.
5.4. you mill a work piece to length
5.5. you mill opposing surfaces of a work piece parallel
5.6. you mill adjacent surfaces of a work piece perpendicular

Learning Objectives

5.a. Calculate speeds and feeds for milling operations.
5.b. Select and install appropriate cutters and tool holders.
5.c. Select and use the correct cutting fluids.
5.d. Demonstrate the ability to mill a work piece to required dimentions.
5.e. Demonstrate the ability to mill opposing surfaces parallel.
5.f. Demonstrate the ability to mill adjacent surfaces mutually perpendicular.