

Western Technical College

## 31444303 Machine Setup for CNC Turning

### Course Outcome Summary

#### Course Information

<b>Description</b>	This course will provide instruction and practice in tool selection and setup, work-holding devices and work setup, program call up and proofing, and minor program editing and machine adjustments on CNC Tool Room lathes and CNC Turning Centers.
<b>Career Cluster</b>	Manufacturing
<b>Instructional Level</b>	One-Year Technical Diploma
<b>Total Credits</b>	2
<b>Total Hours</b>	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.

#### 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 5. Perform programming, set-up and operation of CNC Machine Tools

#### Course Competencies

1. **Perform machine start up on CNC turning machines.**

##### Assessment Strategies

- 1.1. Written assignments, quizzes, and tests.
- 1.2. Skill demonstration in the shop on CNC machine tools

##### Criteria

*You will know you are successful when*

- 1.1. you follow safety procedures when starting up machines.
- 1.2. you sequentially and accurately list the steps required to start and home CNC turning centers.
- 1.3. you correctly demonstrates the ability to start and home all CNC turning machines in the machine tool lab.
- 1.4. you score an average of 70% or better on all related assessments.

**Learning Objectives**

- 1.a. Observe safe operating procedures for machine start up
- 1.b. Demonstrate the process for starting and homing CNC turning machines.

**2. Call up programs on CNC turning machines.**

**Assessment Strategies**

- 2.1. In written assignments, quizzes, and tests.
- 2.2. Skill demonstration on CNC turning machines.
- 2.3. Given prints, process sheets, directions, and all available shop equipment and supplies

**Criteria**

*You will know you are successful when*

- 2.1. you demonstrate the process for loading programs from various program storage locations.
- 2.2. you score an average of 70% or better on all related assessments.

**Learning Objectives**

- 2.a. Identify program storage methods for CNC turning machines
- 2.b. Operate machine controls for selecting and loading programs from various storage locations.

**3. Analyze programs to determine set up requirements for CNC turning machines.**

**Assessment Strategies**

- 3.1. In written and applied assessments.
- 3.2. Given program examples.

**Criteria**

*You will know you are successful when*

- 3.1. you identify the three main sections of CNC turning programs.
- 3.2. you identify material, tooling, and work piece requirements and location for setting up CNC turning projects.
- 3.3. you score an average of 70% or better on all related assessments.

**Learning Objectives**

- 3.a. Interpret CNC turning programs to determine setup requirements.
- 3.b. Create a written process for setting up a CNC turning machine.

**4. Perform setup of CNC turning machines following program requirements.**

**Assessment Strategies**

- 4.1. Using CNC turning machines in the lab.
- 4.2. Given program examples.

**Criteria**

*You will know you are successful when*

- 4.1. you successfully complete set up of required projects.
- 4.2. you submit all related setup verification information with projects.
- 4.3. you score an average of 70% or better on all related assessments.

**Learning Objectives**

- 4.a. Load tools preparatory to setting offsets.
- 4.b. Follow written plans to setup projects in CNC turning machines.
- 4.c. Inspect parts to identify problem areas in setup procedures.
- 4.d. Make adjustments to setup to produce acceptable parts.

## 5. Verify programs graphically in CNC turning machines.

### Assessment Strategies

- 5.1. In written procedures.
- 5.2. In skill demonstration on CNC turning machines.
- 5.3. Given programs to work with.

### Criteria

- 5.1. you run programs graphically before actual machining.
- 5.2. you score an average of 70% or better on all related assessments.

### Learning Objectives

- 5.a. Verify machine movements before running a part.
- 5.b. prevent damage to the work piece or tooling/machine.

## 6. Verify program setup in CNC turning machines.

### Assessment Strategies

- 6.1. Using actual CNC machine tools
- 6.2. In written and applied assessments.
- 6.3. Given prints, stock, and all available shop equipment and supplies

### Criteria

*You will know you are successful when*

- 6.1. you complete program run check sheet prior to running programs.
- 6.2. you correctly demonstrate the use of the single block function to run programs
- 6.3. you correctly demonstrate the procedures for changing speed and feed settings with overrides and edits.
- 6.4. you demonstrate the correct use of overrides to run programs for the first time
- 6.5. you reference written setup instructions to verify the correct speed and feed settings
- 6.6. learner demonstrates the process for turning the coolant on and off
- 6.7. learner determines the correct direction and volume of the coolant flow
- 6.8. learner demonstrates the correct procedures for changing tooling and resuming operation on manual CNC machines
- 6.9. learner runs a minimum of three different new parts in conversationally controlled CNC turning machines
- 6.10. learner learner runs a minimum of two different new parts in automatic CNC turning centers
- 6.11. learner runs a minimum of eight copies of one new part
- 6.12. learner performs inspections before removing part from the machine
- 6.13. learner completes all activities with a minimum of 70% accuracy
- 6.14. learner scores a minimum of 70% on assignments, tests, and quizzes

### Learning Objectives

- 6.a. Observe safe operating procedures for running CNC turning machines
- 6.b. Follow procedures to determine that all steps have been performed prior to running programs
- 6.c. Locate and operate controls to run programs in CNC turning machines
- 6.d. Use overrides to safely run programs for the first time
- 6.e. Use single block function to safely run programs for the first time
- 6.f. Verify speed and feed settings
- 6.g. Change speed and feed settings
- 6.h. Turn coolant on and off
- 6.i. Change tools in manual CNC turning machines
- 6.j. Resume program run after optional stops
- 6.k. Run multiple new part programs in CNC turning center