Western Technical College

31420323 CNC Lathe Setup

Course Outcome Summary

Course Information

Description	The setup of CNC (Computer Numerical Control) turning centers is covered in this course. Applications include selection of tools and workholding devices, setting tool offsets and work coordinate positions, calling programs, proofing programs, and minor edits and machine adjustments.
Career Cluster	Manufacturing
Instructional Level	Technical Diploma Courses
Total Credits	1.00

Textbooks

No textbook required.

Learner Supplies

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

Proper work boots - $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.

Course Competencies

1. Detail CNC programming methods for setting up CNC turning machines

Assessment Strategies

1.1. In the classroom, lab, or shop setting
1.2. Using interactive computer software and/or actual CNC machine tools
1.3. In written and applied assignments
1.4. Individually
1.5. On tests and quizzes
1.6. Given program examples, templates, materials, and all available shop equipment and supplies

Learning Objectives

1.a. Identify differences related to conversational programming for different machine brands
1.b. Define the elements in conversational programs

1.c. Explain the major sections of G&M code programs
1.d. Describe the major processes required for setting up a machine that uses G&M code programming
1.e. Analyze similarities between G&M code programs and conversational code programs

2. Use CNC turning center controls to perform machine start up

Assessment Strategies

2.1. In the classroom, lab, or shop setting
2.2. Using actual CNC machine tools
2.3. In written and applied assignments
2.4. Individually
2.5. On tests and quizzes
2.6. Given all available shop equipment and supplies

Learning Objectives

2.a. Observe safe operating procedures for machine start up
2.b. Locate and identify the main machine controls on CNC turning machines
2.c. Describe the process for starting and homing CNC turning machines
2.d. Demonstrate the process and procedures for starting and homing CNC turning machines
2.e. Perform CNC turning center warm up
2.f. Locate and describe the use of job controls
2.g. Demonstrate the use of jog controls

3. Plan setups for CNC turning machines

Assessment Strategies

3.1. In the classroom, lab, or shop setting
3.2. Using interactive computer software and/or actual CNC machine tools
3.3. In written and applied assignments
3.4. Individually
3.5. On tests and quizzes
3.6. Given prints, diagrams, process sheets, materials, and all available shop equipment and supplies

Learning Objectives

3.a. Analyze prints to determine machining processes
3.b. Locate reference datums
3.c. Determine material requirements
3.d. Determine outer dimension machining sequences
3.e. Determine inside dimension machining sequences
3.f. Document the machining sequences for parts
3.g. Determine tooling to be used for part machining
3.h. Analyze programs to determine longest Z dimension

4. Perform work setups in CNC turning machines

Assessment Strategies

4.1. In the classroom, lab, or shop setting
4.2. Using actual CNC machine tools
4.3. In written and applied assignments
4.4. Individually
4.5. On tests and quizzes
4.6. Given prints, diagrams, materials, and all available shop equipment and supplies

Learning Objectives

4.a. Observe safe operating procedures for setting up work in CNC machines
4.b. Select stock for jobs
4.c. Secure stock in CNC turning machine workholding device
4.d. Determine whether stock must be supported by tailstock

5. Perform tool setups in CNC turning machines

Assessment Strategies

5.1. In the classroom, lab, or shop setting
5.2. Using interactive computer software and/or actual CNC machine tools

5.3. In written and applied assignments
5.4. Individually
5.5. On tests and quizzes
5.6. Given prints, diagrams, materials, and all available shop equipment and supplies

Learning Objectives

5.a. Observe safe operating procedures for setting up tools in CNC machines
5.b. Use machine controls to locate tool library and offset pages
5.c. Locate tools in tool library
5.d. Describe tools for given applications
5.e. Identify tip types relative to actual tools
5.f. Determine tools needed for specific jobs from specification or process sheet
5.g. Set up tools in holder for manual CNC machines
5.h. Load tools in turret
5.i. Turn spindle on and off
5.j. Set tools to measure x diameters
5.k. Set tools to measure z faces
5.l. Set tool offsets for all tools in programs to be ran
5.m. Explain the use of tool presetters
5.n. Demonstrate the use of tool presetters

6. Call up programs to run in CNC turning machines

Assessment Strategies

6.1. In the classroom, lab, or shop setting
6.2. Using interactive computer software and/or actual CNC machine tools
6.3. In written and applied assignments
6.4. Individually
6.5. On tests and quizzes
6.6. Given prints, process sheets, directions, and all available shop equipment and supplies

Learning Objectives

6.a. Describe program storage methods for CNC turning machines
6.b. Operate controls for selecting, activating, and loading programs
6.c. Load programs from a disk
6.d. Load programs from a USB drive
6.e. Describe program loading options
6.f. Load programs
6.g. Locate stored programs
6.h. Activate programs from control memory
6.i. Delete programs

7. Verify programs graphically in CNC turning machines

Assessment Strategies

7.1. In the classroom, lab, or shop setting
7.2. Using actual CNC machine tools
7.3. In written and applied assignments
7.4. Individually
7.5. On tests and quizzes
7.6. Given prints, process sheets, specification sheets, and all available shop equipment and supplies

Learning Objectives

7.a. Locate and operate controls to verify programs in graphical interface of CNC turning machines
7.b. Select and activate specified programs
7.c. Run programs in graphical interface
7.d. Analyze graphical path to determine program viability
7.e. Analyze program to locate possible errors
7.f. Resize the graphical interface

8. Run new programs in CNC turning machines

Assessment Strategies

8.1. In the classroom, lab, or shop setting

8.2. Using actual CNC machine tools
8.3. In written and applied assignments
8.4. Individually
8.5. On tests and quizzes
8.6. Given prints, stock, and all available shop equipment and supplies

Learning Objectives

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

9. Inspect parts turned in CNC turning machines

Assessment Strategies

9.1. In the classroom, lab, or shop setting
9.2. Using actual CNC machine tools
9.3. In written and applied assignments
9.4. Individually
9.5. On tests and quizzes
9.6. Given prints, diagrams, inspection sheets, stock, and all available shop equipment and supplies

Learning Objectives

9.a. Use safety precautions when inspecting work in CNC turning machines
9.b. Perform first part inspections during run
9.c. Calculate tolerances
9.d. Determine part acceptability based on tolerances
9.e. Determine part surface finish quality
9.f. Analyze problems and suggest solutions
9.g. Adjust overrides to improve part surface finish
9.h. Complete first inspection report

10. Perform minor tooling and offset adjustments on CNC turning machines

Assessment Strategies

10.1. In the classroom, lab, or shop setting
10.2. Using actual CNC machine tools
10.3. In written and applied assignments
10.4. Individually
10.5. On tests and quizzes
10.6. Given prints, diagrams, pictures, inspection sheets, materials, and all available shop equipment and supplies

Learning Objectives

10.a. Use safety precautions when adjusting tools and offsets on CNC turning machines
10.b. Adjust tools to correct part quality
10.c. Adjust offsets to bring part within tolerance
10.d. Inspect tools for wear and damage
10.e. Inspect part for indications that tools need changed

11. Restart programs after tooling or offset adjustments

Assessment Strategies

11.1. In the classroom, lab, or shop setting
11.2. Using interactive computer software and/or actual CNC machine tools
11.3. In written and applied assignments
11.4. Individually

11.5. On tests and quizzes
11.6. Given diagrams, materials, and all available shop equipment and supplies

Learning Objectives

11.a. Use safe operating procedures when restarting CNC turning machines
11.b. Describe the procedures for stopping and restarting programs in CNC turning machines
11.c. Explain manual restart functions
11.d. Explain automatic restart functions
11.e. Record stop and start sequences
11.f. Locate restart block in program
11.g. Explain the procedure for locating the turret in a restart
11.h. Restart programs