South Central College

MTT 1120  CNC Turning Level I

Course Outcome Summary

Course Information

Description
This course provides the student an introduction to basic lathe operations. Upon completion of this course the student will have an understanding of manual and Computer Numerical Control (CNC lathe turning practices as well as gain knowledge in tooling, machining practices and applied mathematics. Teamwork, critical thinking, and problem solving are emphasized. Hands-on experience and practical applications are included. (Prerequisite: Declare MTT as a major)

Total Credits 5
Total Hours 128

Types of Instruction

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<td>Lec</td>
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<td>Lab</td>
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Pre/Corequisites
Declare MTT as a major.

Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. **Apply Shop Safety**

   **Learning Objectives**
   Explain Key Terms
   Adapt Basic Occupational Safety and Health Administration (OSHA) Requirements
   Demonstrate Proper Chip Handling
   Demonstrate Proper Lockout/Tagout Procedures
Clean Workstation

2. **Identify Basic Components of a CNC Lathe**
   Learning Objectives
   - Identify and Explain the Carriage
   - Identify and Explain the Spindle
   - Identify and Explain the Headstock and Tailstock
   - Identify and Explain the Bed and Ways
   - Use Control Panel

3. **Describe CNC Machine Modes**
   Learning Objectives
   - Analyze Manual Data Input (MDI)
   - Identify the Jog Feature
   - Acknowledge Feed Rate Override and Rapid Override Feature
   - Demonstrate Machine Home Position Sequence

4. **Use Workholding Solutions**
   Learning Objectives
   - Explain the Difference Between Universal and Independent-Type Chucks
   - Demonstrate Various Chuck Applications
   - Demonstrate Various Collet Applications
   - Demonstrate Faceplates, Centers and Mandrels Applications
   - Apply Workholding Solutions with Turning Operation

5. **Explain Depth of Cut, Speed & Feed and Time Calculation**
   Learning Objectives
   - Explain Cutting Rates
   - Identify Material
   - Calculate Spindle Revolutions Per Minutes (RPM) for Various Cutting Operations
   - Calculate Machining Time

6. **Demonstrate Facing and Turning Operations**
   Learning Objectives
   - Apply Facing Operation
   - Apply Turning Operation
   - Describe Basic Tool Geometry
   - Use Filing and Polishing Methods

7. **Demonstrate Center Drilling**
   Learning Objectives
   - Explain Reasons for Center Drilling
   - Perform Center Drilling
   - Use Spotting Drill
   - Create a Hole Using the Lathe
   - Apply Reaming, Boring, Counterboring and Countersinking Methods

8. **Learn Grooving, Cutoff and Knurling Operations**
   Learning Objectives
   - Create Internal Shoulder
   - Demonstrate Form Cutting
   - Produce Parts Using Grooving and Cutoff Methods
   - Perform Knurling Operation

9. ** Demonstrate Lathe Threading**
    Learning Objectives
    - Define Thread Terminology
    - Preform Calculations Required for Thread Cutting
10. **Demonstrate Taper Turning**

   **Learning Objectives**
   - Define a Taper
   - Perform Taper Calculations
   - Recognize Taper Per Inch (TPI) and Taper Per Foot (TPF)
   - Demonstrate Setup Procedures for Taper Turning

11. **Identify CNC Lathe Components**

   **Learning Objectives**
   - Identify Types of CNC Lathes
   - Define Axes
   - Analyze Programming Approach
   - Explain Lathe Features and Specifications

12. **Utilize Coordinate Geometry**

   **Learning Objectives**
   - Explain Real Number System
   - Explain Rectangular Coordinates
   - Explain Point of Origin
   - Explain Quadrants
   - Define Axes and Planes

13. **Identify Control System**

   **Learning Objectives**
   - Explain General Description of Operation Panel
   - Define Screen Display and Keyboard
   - Select Parameter Settings
   - Explain System Memory and Defaults

14. **Acknowledge Part Drawing**

   **Learning Objectives**
   - Interpret Part Drawing
   - Review Title Block
   - Explain Dimensioning
   - Calculate Tolerances

15. **Explain Program Planning**

   **Learning Objectives**
   - Define Part Complexity
   - Choose Steps in Program Planning
   - Demonstrate Programming

16. **Identify M & G Codes**

   **Learning Objectives**
   - Analyze Coordinate Positioning
   - Acknowledge Types of Motion
   - Identify Various Interpolation
   - Adapt Offset Commands
   - Administer M-Codes

17. **Demonstrate Coordinate Positioning for CNC Turning**

   **Learning Objectives**
   - Demonstrate Radial and Diametral Programming
   - Demonstrate Linear and Circular Interpolation for CNC Turning
   - Demonstrate Non-Axis Motion Commands
18. Describe Canned Cycles for CNC Turning Applications

Learning Objectives
Demonstrate Holemaking Canned Cycles
Apply Tapping Canned Cycles
Demonstrate Rough and Finish Turning Canned Cycles

SCC Accessibility Statement
South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-7222.

Additional information and forms can be found at: www.southcentral.edu/disability

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