



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

Instruction Type	Credits/Hours
Lec	2/32
Lab	3/96

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
Perform Calculations Required for Thread Cutting

Demonstrate Proper Setup for Cutting Threads
Verify Thread Measurement and Classes of Fit

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

Demonstrate Tool Nose Radius Compensation (TNRC) for CNC Turning

18. Describe Canned Cycles for CNC Turning Applications

Learning Objectives

Demonstrate Holmaking 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

This material can be made available in alternative formats by contacting the Academic Support Center at 507-389-7222.