



South Central College

## MTT 1120 CNC Turning Level I

### Course Outcome Summary

#### Course Information

<b>Description</b>	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)
<b>Total Credits</b>	5
<b>Total Hours</b>	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 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](http://www.southcentral.edu/disability)

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