

Machine Tool Technology

The Machine Tool Technology program provides basic skills in machine tool operations and experience on a variety of machine tools, such as lathes, milling machines, computer numerical control (CNC) machines, and the CAD-CAM.

The program integrates the National Institute for Metalworking Skills (NIMS) national metalworking standards and credentialing assessments, combining the traditional on the job learning of apprenticeship with the use of NIMS assessments as performance measures.

The NIMS Competency Based Apprenticeship System brings national standards and third party objective assessments to the nation's metalworking industry. To become a NIMS Certified Machinist, Toolmaker, CNC Setup Programmer or a Certified Journey Worker at any NIMS occupation, the apprentice must earn NIMS credentials in demonstrating satisfactory performance in a required number of competencies.

LENGTH OF PROGRAM

The average length of the competency-based program is 1728 hours (16 months)

Machine Tool Technology Competency and Award Level

FIRST TRIMESTER

MTT 101 Technology Foundations - 30 hours

- Verify basic skill sets

MTT 102 Worker Ethics - 12 hours

- Understand 10 Worker Characteristics

MTT 103 Orientation and Practical Safety - 30 hours

- **NIMS Competency**
- Follow Safety Manual and All Safety Regulations/Requirements
- Use Personal Protective Equipment
- Follow Safe Operating Procedures for Hand and Machine Tools
- Maintain a Clean and Safe Work Environment
- Lift Safety Application

MTT 104 Math Concepts - 54 hours

- Perform Basic Arithmetic Functions
- Convert Fractions/Decimals
- Convert Metric/English Measurements
- Perform Basic Algebraic Operations
- Calculate Speeds and Feeds for Machining
- Use Coordinate Systems

MTT 105 Engineering Drawings 1 - 30 hours

- Identify Basic Layout of Drawings
- Identify Basic Types of Drawings
- Review Blueprint Notes and Dimensions
- List the Purpose of Each Type of Drawing
- Verify Drawing Elements
- Introduction to Geometric Dimensioning and Tolerance (GD&T)

MTT 106 Shop Theory 1 - 54 hours

- Understand Measurement Terms
- Select Measurement Tools
- Measure with Hand Held Instruments
- Eliminate Measurement Variables
- Measure/Inspect Using Surface Plate and Accessories

MTT 107 Benchwork and Manual Machine Tools - 222 hours

- Prepare and Plan for Benchwork and Machining Operations **NIMS Competency**
- Use Hand Tools

- Operate Power Saws
- Operate Drill Presses
- Introduction to Vertical Milling Machines (Basic)
- Introduction to Metal Cutting Lathes (Basic)

Certificate Production Machine Tender 432 hours

SECOND TRIMESTER

- MTT 202 **Worker Ethics 2 - 12 hours**
- Understand 10 Worker Characteristics
- MTT 204 **Math Concepts 2 - 54 hours**
- Understand Practical Geometry
 - Understand Basic Trigonometry
 - Perform Calculations for Sine Bar and Sine Plate
 - Calculate for Direct, Simple, and Angular Indexing
 - Perform Calculations Necessary for Turning Tapers
 - Calculate Depth of Cut for Round Surfaces
- MTT 205 **Engineering Drawings 2/CAD - 30 hours**
- Introduction to Computer Aided Drafting
 - Introduction to Computer Aided Manufacturing
 - Introduction to Solid Modeling
- MTT 206 **Shop Theory 2 - 54 hours**
- Develop safe working habits
 - Perform machine maintenance and record keeping
 - Understand material holding devices
 - Understand order of operations
 - Understand and use indicators and stops
 - Understand set-ups and machine limitations
- MTT 207 **Manual Lathe - 96 hours**
- Set up and Operate Metal Cutting Lathes **NIMS Competency**
- MTT 208 **Manual Milling Machine – 96 hours**
- Set up and Operate Milling Machines **NIMS Competency**
- MTT 209 **Grinding and Abrasive Machines - 30 hours**
- Set up and Operate Grinding/Abrasive Machines **NIMS Competency**
- MTT 210 **Manufacturing Materials and Processes - 30 hours**
- Identify Materials with Desired Properties (ID)
 - Identify Materials and Processes to Produce a Part
 - Understand the Heat Treating Process
 - Test Metal Samples for Hardness
 - Understand Welding Operations
- MTT 211 **Introduction to Computer Numerical Control - 30 hours**
- Understand basics of CNC
- Certificate** **Machine Set-up Operator 864 hours**
- Optional** **NIMS Competency and Level 1 Credentialing**

THIRD TRIMESTER

- MTT 302 Worker Ethics 3 - 12 hours**
- Understand 10 Worker Characteristics
- MTT 305 Engineering Drawings 3/CAM - 30 hours**
- Understand Computer Aided Drafting
 - Understand Solid Modeling
 - Understand Computer Aided Manufacturing
- MTT 306 Shop Theory 3 - 54 hours**
- Develop safe working habits
 - Understand finishes and grinding operations
 - Understand reverse engineering
 - Understand Cartesian Coordinates System
 - Understand basics of CNC
- MTT 309 Precision Grinding - 54 hours**
- Set-up and operate Surface Grinders **NIMS Competency**
 - Set-up and operate O.D. Grinders
 - Set-up and operate Tool and Cutter Grinders
- MTT 311 Computer Numerical Control Machining - 282 hours**
- Perform Computer Numerical Control Machining
 - Prepare and Plan for CNC Machining Operations
 - Select and Use CNC Tooling Systems
 - Program CNC Machines **NIMS Competency**
 - Program CNC Machines Using A CAM System
 - Measure/Inspect Using Stationary Equipment
 - a) Introduction to Optical Comparator
 - b) Introduction to Coordinate Measuring Machine (CMM)
- Diploma General Machinist 1296 hours**
Optional NIMS Level 1 Credentialing

FOURTH TRIMESTER

- MTT 401 Employability Skills - 6 hours**
- MTT 402 Worker Ethics 4 - 12 hours**
- Understand 10 Worker Characteristics
- MTT 403 Introduction to Additive Manufacturing - 36 hours**
- Understand and Operate 3D Printer
- MTT 406 Shop Theory 4 - 54 hours**
- Develop safe working habits
 - Understand material holding equipment
 - Understand and program with CAM
 - Understand tooling selection
 - Understand order of operations
- MTT 407 CNC Turning Center - 108 hours**
- Set-up and Operate CNC Turning Centers **NIMS Competency**
- MTT 408 CNC Machining Center - 108 hours**
- Set-up and Operate CNC Machining Center **NIMS Competency**
- MTT 412 Electrical Discharge Machining - 108 hours**

- Set-up and operate EDM

Diploma Machinist I 1728 hours

Optional NIMS Level 1 Credentialing

CLASS HOURS

Classes meet from 8:00 a.m. to 3:00 p.m. Monday-Friday at the Main Campus.