South Central College

MTT 1140 Measurement, Materials and Safety Level I

Course Outcome Summary

Course Information

Description This course provides an exploration of the basics in machining, raw materials, use of hand tools, safety and maintenance. Topics include an overview of measurement techniques, materials, safety, machine tool math, quality control and maintenance. Teamwork, critical thinking and problem solving are emphasized. Hands-on experience and practical applications are included. (Prerequisite: Declare MTT as a major)

Total Credits 3

Total Hours 80

Types of Instruction

Instruction Type	Credits/Hours
Lec	1/16
Lab	2/64

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. Explore Shop Floor Layout

Learning Objectives

Explain General Shop Layout
Differentiate Conventional Machinist, Programmer, Computer Numerical Control (CNC) Machinist
Apply Housekeeping Standard
Demonstrate Mechanical Aptitude

2. Identify Safety

Learning Objectives
Explain Key Safety Terms
Demonstrate Personal Protective Equipment (PPE)
Apply Lockout\Tagout
Use Guards and Barriers
Adapt Personal Protective Equipment (PPE)
Acknowledge OSHA Guidelines

3. Explain Types of Machines

Learning Objectives
Demonstrate Safety Practices
Explain Personal Protective Equipment (PPE)
Apply Lockout/Tagout Procedure
Use Guards and Barriers

4. Apply Measurement Systems and Machine Tool Math

Learning Objectives
Explain the English System
Explain the Metric System
Apply Fractional Operations
Use Basic Geometry, Trigonometry and Ratios
Demonstrate Fractional/Decimal Conversions
Recognize Tolerances on a Print
Explain Numbering Found on a Print (Tenths, 150 millionths, etc.)
Articulate Numbering Systems Found on Prints (Tenths, Millionths, etc.)

5. Define Major Machine Tools

Learning Objectives
Use Drill Press
Demonstrate Sawing Machine
Explain Machine Differences
Differentiate Hand Tools
Identify Lathe, Mill and Various "Axes"
Learn the Names and to Identify Types of Drills, Mills and Insert Tooling

6. Utilize Semi-Precision Measurement Tools

Learning Objectives
Explain Key Measurement Terms
Demonstrate Calipers Use
Use Adjustable Squares
Apply Angular Measurements
Demonstrate Fixed Gage Applications

7. Utilize Precision Measurement Hand Tools

Learning Objectives
Explain Precision Measurement
Use Precision Fixed Gages
Demonstrate Surface Plates
Characterize Vernier Measuring Tools
Use Micrometers

8. Learn Special Measurement Tools

Learning Objectives
Identify Coordinate Measuring Machine
Define Optical Comparator Operation
Explain Toolmaker's Microscope

9. Apply Quality Assurance Planning

Learning Objectives
Apply Quality Practices
Compare Inspection and Preventative Processes
Calculate Average, Standard Deviation and Determine Capability Range (Average +/- 3 Standard Deviations)
Develop Sampling Plan
Create Inspection Plan
Define Differences Between Attributes and Variables (Surface Finish/Appearance vs. Measurable)

10. Differentiate Raw Material Composition

Learning Objectives
Explain Ferrous Metals
Explain Nonferrous Metals
Define Tempering
Describe Heat Treatment Process
Characterize Hardness Scales and Test Variety of Specimens

11. Adopt Maintenance Schedules

Learning Objectives
Communicate Lubrication Needs
Use Cutting Fluids
Demonstrate Measuring of Cutting Fluid Techniques
Explain Methods of Application

12. Categorize Heat Treatment of Metals

Learning Objectives
Distinguish Direct, Surface and Case Hardening
Distinguish Tempering, Anodizing and Normalizing
Analyze Hardness Scales and Testing

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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