MEASUREMENT MATERIALS AND SAFETY
Course Syllabus

Course Number: NCMT-1683          OHLAP Credit: No
OCAS Code: None
Course Length: 75 Hours
Career Cluster: Machining
Career Pathway: Production
Career Major(s): Certified Machine Operator, Certified Machine Technician

Pre-requisite(s):

Course Description: This course covers the following: Machine tool math fractions, basic geometry, trigonometry, and metrics; measuring systems both semi-precision and precision along with but not limited to the use of various measuring instruments; quality assurance, process planning and quality control; metal composition and classification and heat treatment of metals; maintenance, lubrication and cutting fluids; general safety guidelines including, tool and equipment identification, usage and operations; manufacturing safety rules and regulations. Course objectives will be stated. Key terms and definitions will be studied. Upon completion of this course students should be able to successfully complete a NIMS certification exam in Measurement, Materials and Safety.


Course Objectives:

A. The Introduction to Safety
   1. General Safety Guidelines
   2. General Clothing for a Machining Environment
   3. Personal Protective Equipment (PPE)
   4. Housekeeping
   5. Guards and Barriers
   6. Handling and Lifting
   7. Compressed Air Safety
   8. Lockout/Tagout
   9. Hazardous Materials
  10. Fire Safety
  11. Safety Documentation

B. Measurement Systems and Machine Tool Math
   1. Measurement Systems of the Machining Worlds
   2. Machining Mathematics Concepts and Operations

C. Semi Precision Measurement
   1. What is Semi-Precision Measurement?
   2. Rules
   3. Calipers
   4. Adjustable Squares
   5. Angular Measurement
   6. Fixed Gages
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D. Precision Measurement
   1. What is Precision Measurement?
   2. Care of Precision Tools
   3. Straight Edges
   4. Precision Fixed Gages
   5. Surface Plates
   6. Solid Squares
   7. Gage Blocks
   8. Vernier Measuring Tools
   9. Micrometers
  10. Dial and Digital Measuring Tools
  11. Precision Transfer or Helper Type Measuring Tools
  12. Dial and Digital Indicators
  13. Sine Tools Surface Finish Measurement
  14. Optical Comparators
  15. Toolmaker’s Microscope
  16. Coordinate Measuring Machine

E. Quality Assurance, Process Planning and Quality Control
   1. Quality Assurance
   2. The Process Plan
   3. Quality Control

F. Metal Composition and Classification
   1. Ferrous Metals
   2. Nonferrous Metals

G. Heat Treatment of Metals
   1. Hardening
   2. Tempering
   3. Annealing
   4. Normalizing
   5. Heat Treatment of Nonferrous Metals
   6. Heat-Treating Furnaces
   7. Heat Treatment Safety
   8. Hardness Scales and Testing

H. Maintenance, Lubrication and Cutting Fluid Overview
   1. Maintenance
   2. Cutting Fluids

Teaching Methods: The class will be taught primarily by the lecture and demonstration method and will be supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

Grading Procedures: 1. Students are graded on theory and shop practice and performance.
                      2. Each course must be passed with seventy (70%) percent or better.
                      3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.
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**Description of Classroom, Laboratories, and Equipment:**
Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.

**Available Certifications/College Credit**
The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

**College Credit Eligibility:**
The student must maintain a grade point average of 2.0 or better.