

I. COURSE INFORMATION:

A. Division: Technical
Department: Machine Trades
Course ID: MACH 120B
Course Title: Machine Shop Theory
Units: 2
Lecture: 2 hours
Laboratory: None
Prerequisite: None
Corequisite: None
Dept. Advisory: None

B. Catalog Description: The basic cutting concepts of machine tools are described and diagramed with cutting tool geometric and variations examined. New technologies in manufacturing are explored as well as discussion of National Industry Metal Skill Standards (NIMS).

C. Schedule Description: The basic cutting concepts of machine tools are described and how National Industry Metal Skill Standards (NIMS) correlate with manufacturing.

I. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

II. EXPECTED OUTCOMES:

Upon successful completion of the course, the student should be able to:

- A. Demonstrate their knowledge of safe machine operating practices, CNC machines, and conventional machine tools.
- B. Explain the formula for calculating feeds and speeds.
- C. Identify the proper use of precision measuring tools when manufacturing.
- D. Select the appropriate layout tools for certifying to NIMS standards.

III. COURSE CONTENT:

- A. Safety Functions of Machine Tools
 - 1. Turning type machines
 - 2. Saw type machines
 - 3. Grinding type machines
 - 4. Shop safety around machine tools
- B. Measurement Tools
 - 1. Precision measurement tools
 - 2. Inspection type tooling
 - 3. Semi-precision measuring tools
 - 4. Layout
- C. Machine Tool Operations
 - 1. Drills and drilling machines
 - 2. Saw type machines
 - 3. Lathes
- D. Materials
 - 1. Ferrous metals
 - 2. Non-ferrous metals
 - 3. Processes-heat treating

IV. METHODS OF INSTRUCTION: (Please check all that apply and add any additional not listed.)

Lecture

Class and/or small group discussion

Critical evaluation of texts, newspapers, journal articles, and other printed research

- Critical evaluation of films, videotapes, audiotapes, or other media forms
- Classroom demonstrations
- Field trips
- Guest speakers
- _____ Other:
- _____ Other:
- _____ Other:

VI. TYPICAL OUT-OF-CLASS ASSIGNMENTS:

- A. Reading Assignment. Reading assignments are required and may include (but are not limited to) the following:
 - 1. Read Machining Fundamentals, Grinding Wheels; be prepared to discuss the optional methods of determining the soundness of grinding wheels.
 - 2. Read Machining Fundamentals, Programming Coordinate Measuring Machines (CMM); be prepared to discuss the inspection process.
- B. Writing Assignment. Writing assignments are required and may include (but are not limited to) the following: Develop a simple Sequence of Operations (SOP) for laying out a NIMS certification part.
- C. Critical Thinking Assignment. Critical thinking assignments are required and may include (but are not limited to) the following: Assign students a NIMS sketch. Work through the layout sequences preparing a written report on the processes.

VII. EVALUATION:

A student's grade will be based on multiple measures of performance and will reflect the objectives explained above. A final grade of "C" or better should indicate that the student has the ability to successfully apply the principles and techniques taught in this course. These evaluation methods may include, but are not limited to, the following (Please check all that apply, and add additional ones not listed):

- _____ Portfolios
- Projects
- _____ Written papers or reports
- Presentations (oral and visual)
- _____ Work performance (internships or field work)
- Lab work
- Comprehensive examinations (cumulative finals or certifications)
- _____ Peer evaluation
- _____ Self evaluation
- Classroom participation
- _____ Homework
- _____ Other:
- _____ Other:
- _____ Other:

VIII. TYPICAL TEXTS:

- A. John Walker, Machining Fundamentals, Goodheart-Wilcox, Tinley Park, Illinois, 2002
- B. Rex Miller, Machine Shop Basics, Wiley Publishing, Crosspoint, Indiana, 2003
- C. Edward G. Hoffman, Student Shop Reference Book, 2nd Edition, Industrial Press, New York, 2002

IX. OTHER SUPPLIES REQUIRED OF STUDENTS:

Calculator