

**I. COURSE INFORMATION:**

- A. Division: Technical  
Department: Machine Trades  
Course ID: MACH 129B  
Course Title: Manufacturing Processes  
Units: 3  
Lecture: 3 hours  
Laboratory: None  
Prerequisite: None  
Corequisite: None  
Dept. Advisory: None
  
- B. Catalog and Schedule Description: Manufacturing processes, tapping and threading terminology, machining speeds/feeds, basic heat treating, turning processes, tool selection for turning, milling and drilling, processing of plastics and basic machine design.

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

**III. EXPECTED OUTCOMES:**

- Upon successful completion of the course, the student should be able to:
- A. Calculate the correct RPM when given a diameter and surface speed.
  - B. Calculate the volume of basic shapes and determine the weight of the shape given its density.
  - C. Determine the correct type of tap to use when given the material and hole configuration and determine the feed rate needed to tap the hole.
  - D. Identify the two types of plastics and the basic differences between them.

**IV. COURSE CONTENT:**

- A. Basic Machining Equations
  - 1. Metal removal rates
  - 2. RPM/SFM, weight
  - 3. Helix angles of threads
  - 4. Maximum threading speeds on a lathe
  - 5. Percent of thread
- B. Using the World Wide Web to Research Machining Problems
  - 1. Understanding URL's and book marking favorite sites
  - 2. Using news groups to find answers to machining and CAD/CAM problems
  - 3. Using CD-ROM programs to research process information and tooling
- C. Materials
  - 1. Differences between pure metals and alloys
  - 2. Differences between ferrous and non-ferrous metals
  - 3. Mechanical properties of metals
  - 4. Chemical composition of common ferrous and non-ferrous alloys
- D. Material Processing
  - 1. Normalizing
  - 2. Annealing
  - 3. Full hardening
  - 4. Anodizing
- E. Threading
  - 1. Terminology of taps
  - 2. Thread milling concepts
  - 3. Calculate pitch, BASIC dimensions
  - 4. Tapping heads, tapping on a lathe
- F. Introduction to Parametric Programming
  - 1. Why use parametric programs

2. Family of part programming
3. Multiple parts machining with parametric programs

**V. 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: Demonstration of using Internet to research manufacturing techniques
- \_\_\_\_\_ 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: Read assigned chapters and answer the questions at the end of each chapter.

Typical Questions:

1. What are the two general types of polymers?
2. Define two finishing processes and write a one-page report on this process.

- B. Writing Assignment. Writing assignments are required and may include (but are not limited to) the following: Complete a written report on an industry process.

1. Write a one-page report on a manufacturing process.
2. List three basic manufacturing processes.

- C. Critical Thinking Assignment. Critical thinking assignments are required and may include (but are not limited to) the following: Complete special assignments for machining calculations.

Sample Problem:

Utilizing the formula:  $4 \times \frac{CS}{DIA} = RPM$ ,

calculate the RPM rate for 2-in. diameter piece of stock.

**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: Field Trip Reports
- \_\_\_\_\_ Other:
- \_\_\_\_\_ Other:

**VIII. TYPICAL TEXTS:**

- A. Oberg, Erik, Machinery's Handbook, 27th Edition, Industrial Press, 2004
- B. Hoffman, Edward G., Student Shop Reference Book, 2<sup>nd</sup> Edition, Industrial Press, New York, 2002

**IX. OTHER SUPPLIES REQUIRED OF STUDENTS:**

- A. Two-inch, 3-ring notebook for handouts
- B. Safety glasses for field trips and demonstrations
- C. One blank CD-R for class files