



MEMORANDUM

TO: Curriculum Preview Committee

FROM: Dr. William R. Clarke
Machinist Technology/Water Supply Technology Department
Head

DATE: February 10, 2005

**SUBJECT: Rationale for Course Number, Description, and Prerequisite
Modification**

Request to modify:

Course Number from MACH 062x3 to **MACH 062x2** Since the Mold Standards are updated every five years, basic standards can be achieved in approximately two semesters.

Course and Schedule Description to reflect the latest changes in technology.

Prerequisite from MACH 120A to **MACH 120B** to reflect curriculum changes.

I. COURSE INFORMATION:

- A. Division: Technical
- Department: Machinist Technology
- Course ID: MACH 062x2
- Course Title: Introduction to Mold Making
- Units: 2
- Lecture: 1 hour
- Laboratory: 3 hours
- Prerequisite: MACH 120B
- Corequisite: None
- Dept. Advisory: None

- B. Catalog Description: Introduction to mold making and injection molding technology designed to give students a history and practical application of mold making for the industry. An overview of all mold making and injection molding procedures covering basic machining practices related to mold making and automated processes used in the mold making industry.
- C. Schedule Description: Introductory course on mold making and molding technology. The study and application of machine shop practice for engineering and technical students for basic mold making procedures using automated processes such as CNC, EDM, and solid modeling processes for mold making.

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

III. EXPECTED OUTCOMES:

Upon successful completion of the **first** semester, the student should be able to:

- A. Recognize safety factors related to mold making.
- B. Distinguish fundamentals of mold making and injection molding.
- C. Recognize the various types of molding processes.
- D. Design a simple injection mold utilizing Solid Modeling Software.
- E. Manufacture a single runner mold and extrude the desired part.

Upon successful completion of the **second** semester, the student should be able to:

- A. Manufacture a mold with multiple runners.
- B. Set-up a simple molding machine.
- C. Demonstrate various molding compounds and shaping methods.
- D. Explain how molding processes are structured.
- E. Build a mold utilizing gating process.
- F. Define injecting molding processes i.e. holding pressure, cooling and feeding rates and their impact on injection molding.

IV. COURSE CONTENT:

- A. Safety
 - 1. General Safety
 - 2. Personal Safety
 - 3. Machine Safety
- B. Fundamentals of Mold Making and Injection Molding
 - 1. What are the tasks of the injection molding?
 - 2. How molds operate
 - 3. Relationship between quality and production
 - 4. The relationship between mold maker and injection molder
- C. Type of Molds
 - 1. Injection molds
 - 2. Transfer molds

3. Compression molds
 4. Blow molds
 5. Extrusion molds
- D. Simple Mold Base Design and Construction
1. Type A molds
 2. Type B molds
 3. Hot runner molds
- E. Mold Operation Classification
1. Hand loaded molds
 2. Semi-automatic molds
 3. Automatic molds
- F. Injection Molding
1. What is injection molding?
 2. What types of injection molding machines exist?
 3. What major components make up injection molding machine?

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:
- 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 chapter on Injection Molding: Be able to explain mold base setup and installation.
 2. Read chapter on NTMA Introduction to Mold Making: Discuss the implications of various molding processes.
- B. Writing Assignment. Writing assignments are required and may include (but are not limited to) the following: Visit an injection molding shop and write a two-hundred words description of the types of molding processes that are in operation. The paper should include student's analysis of the molding process.
- C. Critical Thinking Assignment. Critical thinking assignments are required and may include (but are not limited to) the following:
1. Inspect and evaluate a mold cavity using an inspection planning critique sheet.
 2. Evaluate the proper technique for installing a mold base into a molding machine.

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. F. Johannaber, Injection Molding Machines, 3rd Edition, Hanser Publishers, Munich, Vienna, New York, 2002
- B. Mold Making and Diecasting Die Makers, 2nd Edition, National Institute of Metal Working Standards, Fairfax, Virginia, 2003
- C. Walter Michaeli/Helmut Greif/Hanns Kaufmann, Training in Injection Molding, Hanser Publishers, Munich, New York, 2002

IX. OTHER SUPPLIES REQUIRED OF STUDENTS:

Safety glasses

**PREREQUISITE/COREQUISITE/ADVISORY
COURSE GRID FORM**

Target Course: MACH 062x2: Introduction to Mold Making

Prerequisite Course: MACH 021B Machine Shop I

Instructions:

- 1) List exit competencies (skills) from Prerequisite Course. These skills are listed in the "Student Outcomes" section of the Course Outline ("upon completion of the course, the student should be able to...")
- 2) Indicate which of the listed exit competencies (skills) are necessary entry skills needed for success in the target course. Mark with an "X" each needed skill.
- 3) Indicate the degree of importance of each needed entry skill for course success, using the following rating scale:

1=Critical

2=Very Helpful

3=Desirable

Skills Analysis

Entry Skills in Target Course	Exit Skills Provided by Prerequisite Course (Mark with an X if needed and indicate Prerequisite Course if more than one).	Degree of Importance (Rate 1 – 3)
1. Apply safety in the machine shop area utilizing OSHA standards.	X	1
2. Utilize machine tools in a safe manner.	X	1
3. Accurately hold tolerances to a given print drawing.	X	1
4. Properly maintain equipment to industry specifications.	X	1