

MAE 250L, Section 1  
Manufacturing Practices  
Fall 2017

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**Class:** Room 118 - Engineering Building from 2:00-4:50 pm on Monday and Wednesday.

**Office Hours:** MW 10:00 – 10:50, TR10:50 – 12:05

**Catalogue Data:** Theory and applications of metal working machinery. Industrial safety. Engineering and technological aspects of joining operations. Interpretation of engineering drawings. Introduction to design of simple jigs and fixtures.

**Objectives:** Familiarity with welding, use of the lathe and milling machine and use of other common shop machines such as sheet metal benders, drill presses and hack saws.

**Prerequisites:** PHY 141 or PHY161, MAE 205

**Texts:** Machining Fundamentals, by JR Walker, Goodheart-Willcox, 2004. Welding Technology Fundamentals by WA. and K. E. Bowditch,, Goodheart-Willcox, 2010.

**References:** The library has several books, which contain useful information. Four of these are listed below.

- T. J. Drozda, ed., Jigs and Fixtures, Third Edition, Society of Manufacturing Engineers, 1989.

- W. Boyes and R. Baskerjian, Handbook of Jig and Fixture Design, Second Edition, Society of Manufacturing Engineers, 1989.

- E. G. Hoffman, ed., Fundamentals of Tool Design, Second Edition, Society of Manufacturing Engineers, 1984

- T. J. Drozda, ed., Tool and Manufacturing Engineers Handbook, Fourth Edition, Volume I, Machining, Society of Manufacturing Engineers, 1983.

<b>Grading:</b>	Written Tests (2)	15% each
	Practical Tests (3)	10%
	Quizzes (7)	5%
	Design Project	40% total (3 parts)
	Performance	15%

**Attendance:** Attendance is important. The object of the course is to provide each student a hands-on familiarity with the machines and tools used in fabrication of a device. Your instructor expects you to be both on-time for the start of, and present for the entirety of, each session. An absent

student cannot acquire the desired level of familiarity with the equipment to be used. Consequently, a late arrival for a lab, or an absence from lab, will affect your grade in the following manner:

- Each recorded late arrival will result in a one point reduction of your final average, computed before your letter grade is assigned.
- Each recorded absence will result in a four point reduction of your final average, computed before your letter grade is assigned.

**Overall Description of the course:** The course consists of three major parts:

- 1 - machine shop familiarization,
- 2 - welding technique familiarization,
- 3 - design project.

At the first meeting, each student will be assigned to a team of two or three members. The members of each team will work together on all group activities during the term, one of which is the design and construction of a fixture to accomplish an assigned goal. The team will also test the designed device and demonstrate its performance to the class. The final eight sessions of the class are devoted to the team effort of building a fixture according to the team's design. This is followed by a demonstration of the performance of the fixture.

**Written Tests:** There will be two closed book exams during the term. If you have a good reason for missing an exam, such as an anticipated medical requirement, military orders or an athletic team trip, tell the instructor in advance. The student has the responsibility for arranging for a makeup exam!

**Practical Tests:** At the end of each block of instruction in shop skills there will be a test of your ability to use the skills that have been covered. Thus, at the end of the welding segment you will be asked to demonstrate some of the welding skills you have learned. Similarly, at the end of the machine shop segment you will demonstrate your ability to perform tasks in the machine shop.

**Quizzes:** There will be seven short quizzes during the term. These quizzes will cover material of current interest.

**Design Project:** The design project will require your effort during a significant portion of the term. The problem will be assigned during the third week of the course. You and your team members will then develop and submit a preliminary design to satisfy the goal. The approach selected is a team effort. Once the preliminary design has been accepted, the team develops a final design. Each team will submit a final design report, including working drawings, before beginning construction of the device. The final eight sessions of the course are devoted to construction of the device designed followed by a demonstration of its performance. The weight assigned each portion of the design process is as follows:

- Proposal (group) 15% (of course grade)
- Preliminary Design Report (group) - 15% (of course grade)
- Functional Demonstration of the Device - 10% (of course grade)

You will receive more detailed information about the project when it is assigned.

**Performance:** Your performance in this course will be rated in at least two areas. First, you will be doing a number of exercises to develop skill in using machine tools or welding equipment. If you approach these activities in a positive manner, doing what you are asked to do, trying to be helpful where you can, then you will do well. If you approach these tasks in a surly, negative manner, doing as little as you can, you will do poorly. Second, an important part of this course is your team activity, in both the design project and the skill exercises. The faculty takes your functioning as a part of the team seriously. We consider your performance as a team member an important part of your development as an engineer. Thus, your performance as a member of your team will be an important part of your performance grade.

**Planned Subject Outline and Reading Assignments:** This schedule is subject to change. Pay attention to announcements in class for schedule updates

1. Wed August 23 Introduction to machine shop  
Dress code,safety in shop discussion,measuring ex.  
*Ch.1 ,2,3,4,12,13,15*  
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2. Mon August 28 tour welding shop,measuring ex. chop saw, cold saw  
And lathe demo; students use machine tools  
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3. Wed August 30 **1st Quiz 1,2,3,4,12,13,15** in class,  
Machine chuck wrenches on lathe  
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4. Wed Sept 6 *Ch.5-8* Hand tools demo.and nomenclature  
Work on lathe, Intro to mill  
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5. Mon Sept 11 Die stock and tap wrench demo.on lathe  
Work on lathe, mill edge finder, dro  
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6. Wed Sept 13 **2nd Quiz 5,6,7,8** in class ,Fixture class,  
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7. Mon Sept 18 *Ch.10,17,18* Mill class if needed  
Combination class lathe chuck wrench,mill--- cold roll plate

#### **DESIGN PROJECT ASSIGNED**

8. Wed Sept 20 **3rd Quiz 10,17,18** Plasma cutter demo  
Start punches  
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9. Mon Sept 25 *Ch.19,21,22,24,25,27,28*  
Work on punches and fixtures  
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10. Wed Sept 27 Radial class ,Work on punches,hammers and  
fixtures  
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11. Mon Oct 2 **4th Quiz 19,21,22,24,25,27,28**

Popeye grinder demo, work on lathe and mill, heat treat punches

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12. Wed Oct 4 *Ch.1-7* Welding book,MIG Welding demo, Students weld  
Work on punches,hammers,fixtures

**PROPOSAL DUE AT THE BEGINNING OF CLASS**

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13. Mon Oct 9 **Final in Machine Shop** Welding project assigned,  
TIG demo,Students work on various projects
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14. Wed Oct 11 Stick welding demo, Students work on projects  
Practice welding time
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15. Mon Oct 16 **1st Quiz Welding Ch.1-7**  
Students work on projects
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16. Wed Oct 18 *Ch. 8-15* Students work on projects
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17. Mon Oct 23 Students work on projects
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18. Wed Oct 25 Students work on projects
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19. Mon Oct 30 *Ch.16-22* Students work on projects

**PRELIMINARY DESIGN REPORT DUE AT THE BEGINNING OF CLASS**

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20. Wed Nov 1 **2nd Quiz welding Ch.8-15**  
Students work on projects
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21. Mon Nov 6 CNC class Students work on projects
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22. Wed Nov 8 **3rd Quiz welding Ch.16-22**  
2 nd CNC class  
Students work on projects
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23. Mon Nov 13  
Students work on projects
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24. Wed Nov 15 **Final in Welding**  
Students work on projects
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25. Mon Nov 20 Students work on projects
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26. Mon Nov. 27 Students work on projects
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27. Wed Nov 29 **Test fixtures and finish hammers.**

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28. Mon Dec 4 Students work on projects  
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29. Wed Dec 6 **Demonstrate fixtures to Mr. Mullis & Dr. Kunz**  
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Fall Break – October 5 & 6, 2017

Middle of Term – October 13, 2017

Last Day for Course Withdrawal – October 27, 2017

Thanksgiving Break – November 22 to 24, 2017

Last Day of Class – December 8, 2017

Reading Days – December 9, 10 & 13

Final Exam Days – December 11,12 and 14-16

**Academic Integrity:** For non-group activities (*e.g.*, tests, quizzes), unless otherwise specified, students are expected to work individually on their assignments. Any cheating, plagiarism, or other academic dishonesty may be referred to the appropriate authorities; and consequences may include, but are not limited to, lowered grades for the assignment or course.

**Disruptive Behavior and Machine Shop Safety:** Please be considerate of other students and refrain from activities which might disrupt the learning environment for others. Any person exhibiting disruptive behavior may be asked to cease such behavior or leave the classroom. Machine shop safety is of the utmost importance; persons exhibiting frequent or egregious unsafe behavior may be banned from the machine shop, which could significantly affect their course grade. Please remember that cleanup of your station/equipment after use is both a courtesy and a safety issue.

**Special Accommodations:** Students requiring accommodations or modifications for a disability should inform the instructor at the close of the first class meeting or as soon as possible. The instructor will refer you to the ACCESS and Accommodation Office to document your disability, determine eligibility for accommodations under the ADA/Section 504 and to request a Faculty Accommodation Form. Disability accommodations or status will not be indicated on academic transcripts. In order to receive accommodations in a class, students with sensory, learning, psychological, physical or medical disabilities must provide their instructor with a Faculty Accommodation Form to sign. Students must return the signed form to the ACCESS Coordinator. A new form must be requested each semester. Students with a history of a disability perceived as having a disability or with a current disability who does not wish to use academic accommodations are also strongly encouraged to register with the ACCESS and Accommodation Office and request a Faculty Accommodation Form each semester. For further information, please contact Director and ADA/504 Coordinator, at 301-2778 or visit the ACCESS and Accommodation Office website at <http://www.mercer.edu/disabilityservices>