

ME 336 MATERIALS AND MECHANICS LAB

INSTRUCTOR:

Dr. Jan Gou

Office hours: MW, 10:30 - 11:30 a.m., T, 2:00 - 4:00 p.m., also by appointment

PREREQUISITE:

ME 326 Materials Science

COURSE OBJECTIVES:

1. Students will conduct tensile, torsion, impact, hardness, beam bending, strain gage, and column buckling tests, and collect, analyze, and apply statistics to interpret data to determine the relevant mechanical properties.
2. Students will correlate the mechanical properties of steel to its structure and thermal processing history.
3. Students will design and conduct experiment to investigate the effects of aging temperature and time on the hardness of age-hardenable aluminum alloys.
4. Students will conduct cooling curve experiment to validate phase diagram.

GRADING POLICY:

| | |
|---------------------|------------|
| Pre-Lab Assignments | 30% |
| Lab Reports | <u>70%</u> |
| | 100% |

COURSE GRADE: A (90-100); B (80-89); C (70-79); D (60-69); F (<60)

LAB SUPPLIES: Safety Glass and 3.5' floppy disc.

COURSE POLICY:

1. You must wear safety glasses when conducting experiments in the lab.
2. There will be no make-up for a missed lab. It is student's responsibility to find out about all the assignments and announcements made in the lab.
3. Pre-lab and lab report are due at the beginning of the lab period.
4. Cheating and plagiarism are serious academic matters and they will be handled by the following policy and by the University policy. A grade of zero is assigned for the entire assignment. Automatic failure of the course can result from a zero grade on an individual assignment. The case will be reported to the Dean of Students for disciplinary action.
5. In accordance with Americans Disabilities Act, students with bona fide disabilities will be afforded reasonable accommodation. The office of Special Student Services will certify a disability and advise faculty members of reasonable accommodations. If you have a specific disability that qualifies you for academic accommodations, please notify your instructor and provide certification from Disability Services (Office of Special Students Services). The Office of Special Student Services is directed by Ms. Bernita Pulmas and is located in the Student Center, Room 270, Phone 460-7212.

6. Since all classes do not progress at the same rate, the instructor may wish to modify the syllabus requirements or their timing as circumstances dictate. For example, the instructor may wish to change the number the number and sequence of assignments. If such a modification is warranted, students will be given adequate notification in writing.

ME 336 MATERIALS AND MECHANICS - SPRING 2007

| | DATE | | TIME | EXPERIEMNT |
|----|-----------|------------|---------|---------------------------------|
| 1 | Wednesday | 8 January | 2:30 PM | Introduction, Form Teams |
| 2 | Wednesday | 17 | 2:30 PM | Three-Point Bending |
| 3 | Wednesday | 24 | 3:30 PM | Column Buckling |
| 4 | Wednesday | 31 | 4:30 PM | Tensile Test |
| 5 | Wednesday | 7 February | 2:30 PM | Torsion |
| 6 | Wednesday | 14 | 3:30 PM | Strain Gage |
| 7 | Wednesday | 21 | 4:30 PM | Chapy Impact Test |
| 8 | Wednesday | 28 | 2:30 PM | Precipatation Hardening |
| 9 | Wednesday | 7 March | | Precipatation Hardening |
| | Wednesday | 15 | | Spring Break |
| 10 | Wednesday | 21 | 3:30 PM | Metallography |
| 11 | Wednesday | 28 | 4:30 PM | Heat Treatment of Carbon Steels |
| 12 | Wednesday | 4 April | 2:30 PM | Heat Treatment of Carbon Steels |
| 13 | Wednesday | 11 | 3:30 PM | Cooling Curve |
| 14 | Wednesday | 18 | 4:30 PM | Corrosion |
| 15 | Wednesday | 25 | 2:30 PM | Composite Processing |

LAB REPORT REQUIREMENTS

ME 336 Materials and Mechanics Lab

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All laboratory reports should be typed with 12-point Roman Times font, and should contain the following sections:

1. Title Page

The title page should include the title of the experiment along with other necessary information including the names of the experimenters and date of the experiment.

2. Table of Contents

The table of contents should list the major sections of the report and the page where they can be found.

3. Objectives

The objectives should be concisely stated, using past tense. Teaching the experimenters to use the equipment or to perform the experiment is secondary and should not be used as the objective of the experiment.

4. Theory and Analysis

Applicable principles and equations should be presented and terms defined. Graphs can be used to illustrate the theory.

5. Data and Results

This section should briefly discuss the data collected by your group and the results that the data support, and include any table(s) and/or graph(s) generated from the collected data. Tables and graphs should have table/figure numbers and captions.

6. Discussion, Conclusions, and Recommendations

All conclusions should be related to the objectives of experiment. Each conclusion should be substantiated by specific references to data and results using numerical values. This will aid the reader in following the progression from results to stated conclusions without having to check calculations. It should be clearly stated that the conclusions are the results of the judgment of the author and not fact. The judgment should be supported with comparison with theory, with data obtained from similar experiment, with manufacturer's performance ratings, or reference material from textbooks and handbooks.

The recommendations made as the result of experiment are usually more important than the conclusions drawn from the data obtained. Few experimental projects are an end in themselves. Either the results are to be used for a purpose, or at least the experimenter sees more work that could be done. Student experiments in particular

are hampered by lack of time and experience, shortcomings of methods and equipment, and insufficient attention to accuracy in computations. Recommendations should be made for any changes or further work that would more adequately accomplish the original objectives. Any part of the discussion that could have been written without having first performed the experiment can not realistically evaluate the experiment that was done or become a valid conclusion based on that experiment.

7. Bibliography

This section should list any references made in the report.

8. Appendices

Original data sheets, diagrams, and sketches are placed in the appendix as a record of true experiment data. These data sheets may appear as copies of the original, if multiple copies of the report are needed. Extensive sample calculations are to be placed in the appendix as are calibration data. The list of materials and equipment are also placed in the appendix.