MAE 302L
Mechanical Engineering Laboratory I
Spring Semester 2005

Catalog Description: (1-3-2)
Application of basic measurement techniques and instrumentation to the experimental investigation of mechanical engineering systems – refrigeration systems, flow and heat transfer devices, and mechanical systems. Identification of experimental objectives, planning of experimental processes and procedures, collection and evaluation of experimental data, and analysis of experimental results. Reports of experimental investigation, including descriptions of study objectives, procedures and methods, analysis methods, results, and conclusions.

Prerequisites: EGR 235, MAE 320, MAT 335
Corequisite: MAE 430

Course Content:
This course consists of a weekly 50-min lecture and laboratory period lasting 2 hrs and 45 min. Lectures will discuss basic concepts in the theory of experimentation to include: uncertainty analysis, statistical analysis, report writing, and dynamic system measurements.

A total of eight laboratory experiments will be performed by students during the laboratory periods which will be presented for grading in the form of written reports. Students will be given handouts with the theoretical background and procedures explaining the first 5 experiments. For the final three laboratories, students are required to plan and conduct experiments to meet a final objective for a given apparatus.

(ISBN 0-07-282538-3)

References:
Jeter, S. and Donnell, J., Writing Style and Standards in Undergraduate Reports, College Publinshing, 2004 (ISBN: 0-9679121-7-2)
**Grading:**
- Lab reports 1-5: 20% (Lab report evaluation form 1)
- Lab reports 6-8: 30% (Lab report evaluation form 2)
- Teamwork: 10% (Self/Peer Team Assessment form)
- Homework: 10% (over lectured material)
- Exams: 30% (over lectured material)

**Schedule:**

<table>
<thead>
<tr>
<th>Week of</th>
<th>Activity</th>
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<tr>
<td>10-Jan</td>
<td>Lecture/ No Lab</td>
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<td>17-Jan</td>
<td>Lecture/ No Lab</td>
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<td>24-Jan</td>
<td>Lecture/ Lab 1</td>
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<td>31-Jan</td>
<td>Lecture/ Lab 2</td>
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<td>7-Feb</td>
<td>Lecture/ Lab 3</td>
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<td>14-Feb</td>
<td>Lecture/ Lab 4</td>
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<td>21-Feb</td>
<td>Lecture/ Lab 5</td>
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<td>28-Feb</td>
<td>Lecture/ No Lab</td>
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<td>7-Mar</td>
<td>Spring Break</td>
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<td>14-Mar</td>
<td>Lecture/ Lab 6</td>
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<td>21-Mar</td>
<td>Lecture/ Lab 6 cont.</td>
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<td>28-Mar</td>
<td>Lecture/ Lab 7</td>
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<td>4-Apr</td>
<td>Lecture/ Lab 7 cont.</td>
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<td>11-Apr</td>
<td>Lecture/ Lab 8</td>
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<td>18-Apr</td>
<td>Lecture/ Lab 8 cont.</td>
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<td>25-Apr</td>
<td>Lecture/ No Lab</td>
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<td>2-May</td>
<td>No Lecture or Labs</td>
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**Laboratories:**
- Laboratory 1 – Shear strength
- Laboratory 2 – Modulus of Elasticity; Beam bending
- Laboratory 3 – Hardness
- Laboratory 4 – Column Buckling
- Laboratory 5 – Temperature Measurement

A **short** narrative report of each laboratory assignment (1-5) is due at the beginning of laboratory period in the following week.

- Laboratory 6 - Fluid Flow
- Laboratory 7 - Refrigeration Cycle
- Laboratory 8 - Heat Transfer

A **long** narrative report of each laboratory assignment (6-8) is due at the beginning of the subsequent laboratory assignment (i.e. two weeks after the start of that laboratory assignment).

**Location:**
- Lectures: 218 - EGC
- Thermal Science Labs (5-8): 123 - EGC
Instructors:
A. Butler  
Office: room 101g, Engineering  
Email: BUTLER_AJ@mercer.edu  
Phone: (478)301-2476
L. B. S. Sumner  
Office: room 101f, Engineering Building  
Email: SUMNER_LB@mercer.edu  
Phone: (478)301-5533

Course Standards:

Homework: Problems will be assigned periodically with a specified due date. Assignments must be submitted to the instructor at the beginning of class. Late homework will receive a 10% penalty per business day and must be labeled with the appropriate number of past-due days for acceptance. Once a homework assignment has been graded and returned, late submission of that assignment will NOT be accepted.

Exams: Two exams will be given during the lecture period on dates to be specified by the instructor. The exams will be closed book and will contain a page with relevant equations. Makeup exams will only be given due to extenuating circumstances discussed prior to the regularly scheduled examination.

Laboratory Attendance: Attendance during the laboratory experiments is mandatory for all members of each group. Each laboratory period missed will result in a 10% reduction on the laboratory report grade for the individual student.

Lecture Attendance: Lecture attendance is not considered in the determination of a final grade for the course. It is recommended that you attend every lecture. The instructor is not responsible for providing materials to students outside of lecture.

Out-of-Class Assistance: Students are encouraged to seek help from the professors as needed throughout the semester. In the event that a student acquires excessive lecture absences, the instructors reserve the right to refuse learning assistance over material he/she would otherwise have been exposed to in lecture.

Honor Code: You are expected to know and abide by the honor code of Mercer University. A description of the honor system including a list of honor code violations can be found in your student handbook, The Lair, http://www2.mercer.edu/CampusLife/Policies/default.htm. Any violation of the honor code in this course will be immediately submitted to the honors council.

Plagiarism is a violation of the honor code. When you submit an assignment with your group members names on it, you are indicating that the work on the following pages is solely the work of group members and that no inappropriate aid has been given or received in preparation of the assignment. Inclusion of the thoughts and/or results of other works in your report must be referenced appropriately. Simply forgetting to include a necessary reference OR failing to mark all direct quotes are both forms of plagiarism.

Disability Services: Students with a documented disability should inform the instructor at the close of the first class meeting. The instructor will refer you to the office of Student Support Services (SSS) for consultation regarding evaluation, documentation of your disability, and recommendations for accommodation, if needed. Students will receive from SSS the Faculty Accommodation Form. On this form SSS will identify reasonable accommodations for this class. The form, signed by SSS, must be given to the course instructor for his/her signature and then returned to SSS. One copy will remain with the instructor.

This syllabus is subject to change upon written notification.