BME-650: Biomedical Measurement and Instrumentation Spring 2009

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Office Hours: TBA  

TA  Leanne Chan  
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Office Hours: T9-11a  

Lectures  MW 8-9:20 am  
OHE 136  

Course Website  See Blackboard  

Course Description from Catalog:  
Design of measurement systems and biomedical instrumentation; architecture of electronic instruments used to measure 
physiological parameters, analysis of major process functions integrated in these instruments. Open to M.S., Medical Device 
and Diagnostic Engineering and biomedical engineering Ph.D. students only.  

Course Prerequisites:  BME 513 recommended.  

Prerequisite knowledge and/or Skills  
Basic knowledge of electronics, physics, and chemistry. Fundamental knowledge of basic electronic circuits is strictly required.  

Textbook:  None, lecture notes only.  

Recommended References: (Available for 2 hr check-out in Science and Engineering Library)  

Class Format and Grading Policy:  There will be one lecture per week on M and W from 8-9:20am in OHE 136.  
The final grade will be based on the following:  
(1)  Homework (40 %)  
a.  In general, weekly homework is assigned on Wednesday and due the following Wednesday at the beginning  
of class. Assignments test your understanding of material presented in class and your ability to apply that 
knowledge to engineering problems. From time to time, you may also be asked do your own research and 
discover new material as part of your homework assignment.  
b.  Do not use email to ask questions about homework. All questions on homework should be posted to the  
appropriate discussion board on Blackboard. The TA will check posts until 6p each day. Posts made after 
this time will be addressed the following morning.  
c.  Please bring a physical copy to class (do not use the digital drop box). All derivations must be included with 
symbols before numbers are “plugged in.” Units must accompany numerical results when applicable. DEN  
students should use the normal DEN homework submission procedure (time stamped before the beginning  
of class).  
d.  Collaboration is permitted on HW, however copying is not. Collaboration is highly encouraged and includes 
discussions of concepts, exchange of information, and working together. Each student is responsible for 
individually preparing and fully understanding the work they submit. Review the university and course  
Integrity Policies (course one below). They will be strictly enforced.  
e.  Late homework is not accepted (only exception is a valid family or medical excuse).  
(2)  Exam 1 (30 %)  
(3)  Exam 2 (30 %)  

Homework/Academic Integrity Policy  
Students are expected to do their own homework assignments and should completely understand everything that they submit as  
their own. It is anticipated and expected that students consult one another for clarification of concepts, advice, to compare 
homework solutions, etc. You may also use whatever materials you find on the web, in other texts, or other sources to assist in
preparing your homework. You **may not** consult homework from previous offerings of BME 650 (in any form). Also, copying homework prepared by another student and plagiarizing are strictly prohibited. Violations of this policy will result in an **automatic F** in the class and filing of an academic misconduct report to the Office of Student Conduct. All students are expected to be familiar with and adhere to the USC standards of Academic Integrity (http://www.usc.edu/student-affairs/SJACS/docs/AcademicIntegrityOverview.pdf and http://www.usc.edu/student-affairs/SJACS/docs/GradIntegrity.pdf).

**Statement for Students with Disabilities**
Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to the TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. – 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.
## Course Outline and Schedule (Tentative)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics Covered</th>
<th>HW Out</th>
<th>HW Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/12, 14/09</td>
<td>Course Introduction Characteristics of Measurement Systems</td>
<td>Quiz</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1/21/09</td>
<td>Operational Amplifiers Instrumentation Amplifiers</td>
<td></td>
<td>HW 1</td>
</tr>
<tr>
<td>3</td>
<td>1/26, 28/09</td>
<td>One Recorded this Week (tentative)</td>
<td>HW 2</td>
<td>HW 1</td>
</tr>
<tr>
<td>4</td>
<td>2/2, 4/09</td>
<td>Signals and Noise Filters</td>
<td></td>
<td>HW 2</td>
</tr>
<tr>
<td>5</td>
<td>2/9, 11/09</td>
<td>Origin of Biopotentials</td>
<td></td>
<td>HW 3</td>
</tr>
<tr>
<td>6</td>
<td>2/18/09</td>
<td>Human Biopotentials Biopotential Electrodes</td>
<td></td>
<td>HW 4</td>
</tr>
<tr>
<td>7</td>
<td>2/23, 25/09</td>
<td>Other Electrodes</td>
<td></td>
<td>HW 4</td>
</tr>
<tr>
<td>8</td>
<td>3/2, 4/09</td>
<td>Mechanical Transducers Midterm Review</td>
<td></td>
<td>HW 5</td>
</tr>
<tr>
<td>9</td>
<td>3/9, 11/09</td>
<td>Exam 1, given in 2 parts (in class/DEN)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3/16, 18/09</td>
<td>Spring Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>3/23, 25/09</td>
<td>Temperature Transducers</td>
<td>HW 6</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>3/30, 4/1/09</td>
<td>Light and Spectrophotometry</td>
<td>HW 7</td>
<td>HW 6</td>
</tr>
<tr>
<td>13</td>
<td>4/6, 8/09</td>
<td>Measurement of Liquid and Gas Flows</td>
<td>HW 8</td>
<td>HW 7</td>
</tr>
<tr>
<td>14</td>
<td>4/13, 15/09</td>
<td>Pressure, Motion, and Force Measurement Analog Linearization</td>
<td>HW 9</td>
<td>HW 8</td>
</tr>
<tr>
<td></td>
<td>4/27, 29/09</td>
<td>Safety in Bioinstrumentation Final Review Exam 2, 11a-1p</td>
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<td>HW 10</td>
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### Recommended Classes for Further Study in Medical Instrumentation

- BME 302L Medical Electronics
- BME 405L Senior Projects: Measurements and Instrumentation
- BME 425 Basics of Biomedical Imaging
- BME 523 Measurement and Processing of Biological Systems
- BME 525 Advanced Biomedical Imaging
- BME 620L Applied Electrophysiology
- AME 305 Mechanical Design
- AME 503 Advanced Mechanical Design