MSE 360L-MATERIALS LABORATORY

Description: MSE 360L -- Materials Laboratory (1 unit) Offered in the Fall
Laboratory experiments on physical, electrical and optical properties of materials.

Prerequisite(s): MSE223R, MSE365.

Textbook: None (some class notes)

References: None specifically

Overall objective: To have the students develop a working knowledge of the design of experiments for the accurate measurement of properties of materials.

Specific Instructional Goals:
The focus of this course is on the experimental measurement of properties of materials. Some of the primary objectives are to define problems related to the measurement of properties of materials, to develop and evaluate practical solutions for these measurements and conduct acceptable experiments, perform the measurements, use necessary statistical tools to give meaning to the measurements. The experiments will be conducted on mechanical, thermal, electrical, dielectric, magnetic and optical properties of all classes of materials including metals, ceramics, semiconductors and polymers. This course will also involve laboratory and design experience in an open-ended project that require several weeks to complete and involve students in every aspects of the designing, planning, and conducting of an experiment, and in evaluating experimental data.

Topics Covered:
1. Thermal, transport, electrical, optical, dielectric, magnetic, and mechanical properties of materials.
2. Statistical analysis of data, error analysis
3. Instrumentation

Class Schedule:
(Class Hours)

1. Laboratory 1 (3)
2. Laboratory 2 (3)
3. Laboratory 3 (3)
4. Laboratory 4 (3)
5. Laboratory 5 (3)
6. Laboratory 6 (3)
7. Laboratory 7 (3)
8. Laboratory 8 (3)
9. Design of laboratory experiment (15)

Contribution to Professional
10 % Math & Basic Sci. 15% credits Math & Basic Sci.
15% Engr. Science 15% Engr. Topics
Component: **75\%** Engr. Design

**Relationship to Program Outcomes:**

<table>
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<tr>
<th>Level of Activity (High, Medium, or Low)</th>
<th>PROGRAM OUTCOMES - To produce graduates who can:</th>
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<tbody>
<tr>
<td></td>
<td>apply the fundamentals of mathematics, the physical and/or life sciences, and engineering principles.</td>
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<tr>
<td><strong>H</strong></td>
<td>apply the fundamentals of materials science and engineering, the interrelationship among processing, microstructure, properties, and performance, and can apply that knowledge in solving problems.</td>
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<tr>
<td><strong>H</strong></td>
<td>work individually and in teams in order to define alternative solutions from diverse knowledge bases and implement an acceptable solution in a local, national or global context.</td>
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<td><strong>H</strong></td>
<td>communicate effectively in verbal presentations, written reports and other media.</td>
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<td><strong>M</strong></td>
<td>utilize modern engineering tools used in the profession.</td>
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<td><strong>M</strong></td>
<td>use resources such as library facilities, the internet, data bases, professional society offerings, etc., as part of life-long learning.</td>
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<td></td>
<td>value life-long learning and can put into action their responsibilities to the profession and society.</td>
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**Person preparing syllabus:** **Pierre Deymier**