

## MSE 360L – Materials Laboratory

<b>Credits and contact hours:</b>	1 credit (3 hours/week)
<b>Indicate: math, basic science, engineering topic or other</b>	Basic science, Materials Engineering
<b>Instructor's or course coordinator's name:</b>	Pierre A. Deymier
<b>Textbook, title, author and year:</b>	None (some class notes)
<b>Other Supplemental materials:</b>	None
<b>2020-2021 catalog description:</b>	Laboratory experiments on physical, electrical and optical properties of materials.
<b>Prerequisites:</b>	None
<b>Co-requisites:</b>	None
<b>Required, Elective, or Selected Elective:</b>	Required
<b>Instruction Outcomes:</b>	<p>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 <b>measurement</b> of properties of materials, to develop and evaluate practical solutions for these measurements and conduct acceptable experiments, perform the measurements, use necessary <b>statistical tools</b> 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.</p>

**Student Outcomes –  
Listed in Criterion 3 or  
any other outcomes are  
addressed by the course:**

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

**Topics covered:**

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