## MSE 222 – Introduction to Materials Science and Engineering

**Designation:**  
Required

**2012-2013 catalog description:**  
Introduction to the structure of materials and how structure influences properties. Elementary crystallography, crystal chemistry, and microstructure effects are covered. Examples are taken from all classes of materials: metals, semiconductors, ceramics, polymers, glasses, and composites.  
[3 credits offered in the Fall]

**Prerequisite(s):**  
MSE 110 or CHEM 103b, MATH 129, CHEM 103a

**Textbook(s)**  

**Additional Reading Materials:**  

**Supplementary Materials:**  
Lecture slides available on the D2L site for the course.

**Course Management:**  
The Desire 2 Learn (D2L) website will be used for course materials distribution (e.g. lecture slide copies, homework) and general announcements.

**Course objectives:**  
Provide an introduction to the basic concepts and principles involved in the description, evolution, and characterization of multi-length scale structure in materials systems. Develop an appreciation for the link between these issues, their manipulation through material formulation and processing, and the resulting material properties and performance.

**Topics covered:**  
Introduction/Materials classifications  
Atomic structure and bonding  
Crystalline structure and description  
Imperfections in material structure  
Solid-state diffusion in materials  
Phase Stability and Transformations  
Mechanical behavior (including elastic/plastic behavior, failure modes)

**Grading:**  
2 regular tests during the semester: **25% each**  
1 final (cumulative) **25%**  
Homework (associated with different chapter topics) **25%**

**Person preparing syllabus and date:**  
B.G. Potter, Jr., Ph.D., 15 February 2010