

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)	<u>Fundamentals of Materials Science and Engineering, an Integrated Approach, 4th Edition</u> , W.D. Callister, Jr. (John Wiley and Sons, Inc., 2005) OR older editions.
Additional Reading Materials:	<u>The Science and Engineering of Materials</u> , D.R. Askeland and P.P. Phule (Thomson Engineering, 2002) and other editions.
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