

# CBE 30361: Science of Engineering Materials

## Course Objective...

Introduce fundamental concepts in Materials Science & Engineering

## You will learn about:

- material structures
- how structure dictates properties
- how processing can change structure

## This course will help you to:

- use materials properly
- realize new design opportunities with materials



# COURSE MATERIALS (with WileyPLUS)

## Required text:

- WileyPLUS for *Materials Science and Engineering: An Introduction*, W.D. Callister, Jr. and D.G. Rethwisch, 9th edition, John Wiley and Sons, Inc. (2014).

## Website: <http://www.wileyplus.com>

- Can be bought online at [wileyplus.com](http://www.wileyplus.com) for 40% of textbook price
  - Includes complete online version of textbook
- Or comes bundled with textbook at bookstore
  - \$5 more than textbook alone
- Homework assignments with instant feedback and hints
- Computer graded self-help problems
- Hotlinks in homework to supporting text sections



# WEBSITES

**Course Website:** <http://www.nd.edu/~amoukasi/CBE30361>

- Lecture notes
- Solution Manual
- Grades

**Text Website:** <http://www.wiley.com/college/callister>

- VMSE for 3D interactive simulations and animations of material structures, characteristics, and properties
- Mechanical Engineering online support module
- Case studies of materials usage
- Extended learning objectives
- Self-assessment exercises



# Virtual Materials Science & Engineering (VMSE)

**Website:** <http://www.wileyplus.com/college/callister>  
Student Companion Site → VMSE

- Comprised of 8 interactive modules
  - Atomic/molecular structures - 3D perspectives (better visualizations) using click-and-drag rotations
  - Demonstrations of defects and phenomena that exist/occur in materials
  - Demonstrations of material tests - performance and results
  - Database of material property values and costs



# Virtual Materials Science & Engineering (VMSE)

- This is a screenshot of the VMSE opening window

Virtual Materials Science and Engineering

Overview Help

- Metallic Crystal Structures and Crystallography
- Ceramic Crystal Structures
- Repeat Unit and Polymer Structures
- Diffusion
- Tensile Tests
- Dislocations
- Phase Diagrams
- Solid Solution Strengthening

This site requires Java. If you are unable to display the interactive features, select here to download the latest Java.  
For the Mac, you may also need to download the latest Flash player to see the full Tensile Tests display, e.g. the axes labels, etc.

To Accompany  
William D. Callister, Jr.  
MATERIALS SCIENCE  
AND ENGINEERING/ An Introduction  
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Engineering Materials Properties

- Available in Student Companion Site at [www.wiley.com/college/callister](http://www.wiley.com/college/callister) and in WileyPLUS

