**MSE 403: Synthesis of Materials**  
Fall 2017

Prof. Daniel Shoemaker

Class Schedule: Tuesday/Thursday 9:30 – 10:50AM, 4101 MSEB  
Email: dpshoema@illinois.edu  
Office: 112 Materials Research Laboratory  
Office Hours: Email for appointment

**Grader:**


**Grading:**

- 20% Homework: biweekly, turned in via Compass, 40% late penalty per 24 hours  
- 20% In-class activities, including quizzes, daily reading questions  
- 20% Midterm 1: In-class [Tentative: Oct 10]  
- 20% Midterm 2: In-class [Tentative: Nov 16]  
- 20% Poster Project: During Finals slot

**Objectives:**

- Understand the processes, energy balance, and motivation for compound formation  
- Learn general methodologies for materials synthesis in a variety of systems  
- Suggest and evaluate reasonable syntheses for a variety of applications  
- Investigate one arena of synthesis in detail and present a poster to your peers

**Topics:**

- Origins and synthesis of Metals, Ceramics, Polymers:  
  - Chemical bonding  
  - Thermodynamics  
  - Thermal synthesis, Oxidation and Reduction  
  - Kinetics and Catalysis  
  - Nucleation and Growth  
- Vapor Deposition  
- Sol-gel Techniques  
- Nanomaterials

**Grades** will be assigned using the following scale:

- **A+** > 98%  
- **A** > 93%  
- **A-** > 90%  
- **B+** > 88%  
- **B** > 83%  
- **B-** > 80%  
- **C+** > 78%  
- **C** > 73%
At my discretion, the minimum score needed to earn a certain letter grade may be lowered, but it will not be raised.

**Ethics:**
Plagiarism of text, data, figures, graphs, etc., is strictly not allowed. Instances of plagiarism will result in a zero grade for the assignment for all authors. Please read and understand the rules:

www.library.uiuc.edu/learn/research/academicintegrity.html

Instances in which answers are copied (from any source, including references, classmates, or old answer sets) will result in sanctions in accordance with the Illinois Student Code, ranging from a zero grade for that assignment to immediate failure in the course.

**Resources for Students in Distress:**
Take care of yourself, your friends, and acquaintances. For personal or academic issues, it is important to remember that many consulting options are available to students, through the College of Engineering (206 Engineering Hall, walk-in during business hours), McKinley, or the Counseling Center (http://counselingcenter.illinois.edu/). If you would like to speak to someone about a situation you've encountered, please call the Counseling Center at 217-333-3704, or the after-hours Crisis Line at 217-359-4141.

**Graphics and Plotting Software:**
Any software can be used to create effective graphs and figures, but some are more effective than others. Some suggestions:

**Data plotting:** Matlab, Octave, Mathematica, Grace, Origin, R, gnuplot, matplotlib

**Graphics:** GIMP (raster), Photoshop (raster), Inkscape (vector), Illustrator (vector)