Geology 622: Mineralogy
University of Maryland, Spring 2008

Course Description
Principles of mineralogy: bonding; crystallography; optical, electronic, and vibrational processes. Crystal chemistry of major rock-forming minerals.

Lectures
Tu, Th 3:30-4:45
PLS 1115

Instructor
Andrew J. Campbell
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Office hours: by appointment

Class Website
The syllabus and other relevant class materials will be posted on Blackboard (elms.umd.edu).

Honor Code
"The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.studenthonorcouncil.umd.edu/whatis.html."

Course Requirements and Grades
Assignments 30%
Midterm 30%
Term Paper 30%
Participation 10%
The topic of the term paper must be related to the subject matter of the course, and can be chosen by the student. The topic must be discussed with the instructor for approval by April 22. The papers are due May 15.

Course Outline

This course is about the fundamentals of mineral science. Instead of marching through all mineral classes, learning mineral names and formulas as you probably did in undergraduate mineralogy, our goal will be for you to become proficient with more detailed mineralogical descriptions and recent mineralogical research. The first part of the semester will be spent on the basics of mineralogy – bonding, crystallography, crystal chemistry. A likely (but not binding) set of topics follows.

Chemical bonding review

Crystallography
- Cation coordination and ionic radii
- Crystal structures and crystal classes
- Point groups, space groups

X-ray diffraction

Crystal chemistry of one or more mineral groups as in-depth examples

Crystal field theory and some applications

High-pressure mineralogy

Defects and related properties

In the second part of the semester, we will practice applying this knowledge by reading and discussing selected chapters from a recent MSA review volume. This year's specific topic is OH^- in minerals.

Textbook

I will post reading material on Blackboard as needed. As practicing geologists, however, you should at least have a decent mineralogy text on your shelf, as a reference for your research as well as this course. Contact me if this is not the case.

In addition, the latter part of this course will require the following book:

Water in Nominally Anhydrous Minerals, Reviews in Mineralogy and Geochemistry vol. 62 (eds. Keppler and Smyth), 2006. Mineralogical Society of America. ISBN 0939950-74-X.

This volume is available through MSA (www.minsocam.org/MSA/RIM/Rim62.html) for $40, and is discounted by 25% for members of MSA or Geochemical Society. (MSA student membership is $10, so you can effectively get both the book and the membership for $40.)