**Geology 250: Mineralogy**

Winter 2006

MW 9:50–11:00 AM, F 9:40–10:40 AM, Mudd 73
Lab: W or Th 1:00–5:00 PM, Mudd 73

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Teaching Assistants:
Dan Jones
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Evaluation:
- Problem sets - 40%
- Mineral quizzes - 15%
- Mid-term Exam - 10%
- Final exam - 20%
- Research paper - 15%

Reading:

Reference:

Due dates:
- Late work penalized 20%/day.

<table>
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<th>Week</th>
<th>Topic</th>
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Minerals to Learn #1: Tectosilicates (Klein: p. 543-563)  
Introduction to Pet Mineral project. |
Minerals to Learn #2: Phyllosilicates (Klein: p. 527-543)  
**Due Wednesday:** Problem Set #1 - Using spreadsheets to solve problems.  
**Mineral Quiz in Lab**  
**Due Friday:** Pet mineral physical properties. |
Minerals to Learn #3: Carbonates et al. (Klein: p. 411-440)  
**Due Wednesday:** Problem Set #2 - Crystal structures.  
**Mineral Quiz in Lab** |
Minerals to Learn #4: Oxides and Sulfides (Klein: p. 351-369; 378-393) 
**Due Wednesday:** Problem Set #3 - Symmetry and crystal classes 
**Mineral Quiz in Lab**
**Due Friday:** Pet mineral crystallography.

Nesse: p. 37-75. 
Minerals to Learn #5: Neso-, Cyclo-, and Sorosilicates (Klein: p. 491-514) 
**Due Wednesday:** Problem Set #4 - Refractometry 
****Mid-Term Exam in Lab****

Fri, Feb. 3  Mineral Quiz

Nesse: p. 76-109; review 122-127. 
Mineral to Learn #6: Inosilicates (Klein: p. 514-527) 
**Due Wednesday:** Problem Set #5 - Anisotropic properties and uniaxial minerals 
**Mineral Quiz in Lab**

**Due Wednesday:** Problem Set #6 - Biaxial minerals 
**Mineral Quiz in Lab**
**Due Friday:** Pet mineral optical properties.

Klein: p. 90-131; 134-141. 
**Due Wednesday:** Problem Set #7 – Halide solid-solutions. 
**Due Friday:** Pet mineral x-ray properties.

9. Feb. 27  Crystal chemistry of selected silicates. 
Klein: p. 441-490. 
**Due Wednesday:** Problem Set #8 - Mineral formulas.

10. Mar. 6  Crystal chemistry of selected silicates. 
**Due Friday:** Pet mineral paper.

**Tue., Mar. 14: Final Exam, 3:30 - 6:00 PM**
Problem Sets

I assign various problem sets throughout the term ranging from relatively easy (i.e. not very time-consuming) to rather difficult and/or involved. To do an adequate job on the later, you will need to invest a considerable amount of time. Please feel free to (and do!) work with your colleagues on these problems, however, turn in your own work. Some of these problem sets are best solved using a spreadsheet; for those of you not familiar with spreadsheets, please see me so I can get you started. Again, work with your colleagues on this, but construct and turn in your own spreadsheet calculations.

Mineral Quizzes

At the beginning of most lab periods (except weeks 1, 8, 9, 10), there will be a quiz on the minerals from the Dana collection. The chemical compositions of the starred (*) minerals must be learned (or memorized and then promptly forgotten after the quiz). Approach these minerals like you would new friends. At first you might have problems remembering names, faces, and characteristics. But the more you spend time with that person (mineral), the easier it becomes to remember who they are and their physical properties. In fact, you should become so familiar with these individuals that you can pick out traits in their close relatives (mineral unknowns) and realize that they are just like the minerals (the friends) you already met (only different in superficial characteristics like color or texture).

Pet Mineral Project

By the end of the first week, you need to identify and posses a pet mineral to study throughout the course. During the course, you will learn about the physical properties of minerals, how and why minerals form, and various techniques for identifying minerals. As different techniques are learned, you will apply what you learned to your pet mineral, and turn these data into me for review (see syllabus for due dates). By the end of the term, you will have identified your mineral and described its physical, crystallographic, optical, and x-ray properties. The final product of your research will be a scientific paper (5 pages or less) describing your results and the techniques you used. Follow the formatting guidelines of the American Mineralogist, the official journal of the American Mineralogical Society (http://www.minsocam.org/MSA/AmMin/AmMineral.html). Use 12 point Times Roman font. Like the American Mineralogist (and most journals today), you need to save your paper and figures in PDF format and send to me electronically. We will talk about how to do this in class. Here is the grading rubric I will use on your papers:

1. Title, name and address, appropriate headings and subheadings, proper format 10
2. Abstract 10
3. Body of paper
   a. Writing style 10
   b. Spelling 10
   c. Content 30
   d. Figures and tables 15
4. Acknowledgements 5
5. References (format and completeness) 10

Total: 100