GG301 Mineralogy: Course Description and Syllabus

Welcome to Mineralogy! In this course you will learn about the structure and chemical makeup of Earth materials. We will investigate minerals over a range of scales, from macroscopic to microscopic. Since this is a geology course, we will investigate how geologic materials and processes influence mineral occurrence, stability, and composition. The course is divided into three modules. The first introduces key concepts in crystal chemistry and symmetry, the second presents the fundamentals of optics and X-ray diffraction as techniques central to the identification and characterization of minerals, and the third introduces us to major rock-forming minerals in a systematic progression, concluding with discussion of crystal nucleation and growth.

**Essential Info**
Credits: 4  
Semester: Fall 2016  
Lecture time and place: MWF 11:30 am- 12:20 pm POST 703  
Lab: Tuesday 1:30 – 4:20 pm in POST 703 and computer lab POST 733

**Instructors:**  
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**Course Prerequisites**  
GG 200; CHEM 162 and CHEM 162L or CHEM 171 and CHEM 171L or CHEM 181A and CHEM 181L

**Texts: Required:** Nesse *Introduction to Mineralogy* 1st Ed. (The 2nd Edition is fine, but the page numbers of assignments differ). Look for used copies at Amazon.com.  

**Other Required Materials**  
Students are required to purchase a **GG301 Workbook**, consisting of loose-leaf homework assignments and lab exercises that we will need this semester. The cost of this workbook is $25 and is available for purchase (cash only) from Susan in POST 701.

You are required to obtain a **hand lens** for this course. You will use this tool frequently, not only in this class, but also in many of the upper division Geology courses. (A geologist always has a hammer, notebook, and a hand lens when going into the field.) Look for a handheld lens that is 13-20 mm in diameter, providing 10x or 15x magnification. Order your lens from the web site Amateur Geologist ([http://www.amateurgeologist.com/](http://www.amateurgeologist.com/)) or a similar vendor of geological supplies.

We will be using **polleverywhere** in this course. Fully 10% of the course grade is based on participation in lecture, and interactive polling questions are used as part of this assessment.
Learning Objectives
The Department of Geology and Geophysics defines five learning objectives for the undergraduate degree program related to the relevance of geology and geophysics, the acquisition of technical knowledge, implementation of the scientific method, developing oral and written skills, and understanding the basic principles of science. This course objectives encompass three levels of maturity in all five categories, by introducing computer applications relevant to mineral sciences; developing understanding of the impact of geology and geophysics to understanding Earth, articulating scientific problems, applying scientific ethics, exploring the basic tenets of geologic and geophysical sub-disciplines, and learning how these disciplines relate to other basic sciences; and gaining proficiency in the application of math, physics, chemistry, laboratory methods, critical analysis, problem-solving, and explaining complex phenomena.

Assessments
Lecture
Use of the texts and all supplemental reading is critical. Lecture will not be a forum where basic material from the text is reiterated. During lecture we will clarify parts of the reading that are not being understood, develop concepts from the text, and work together to solve problems. You are required, therefore, to read the assigned text before class. This will be reinforced using questions to be answered before class using the Laulima site for this course. We will also use a phon-ready polling app to assess participation and lecture preparedness. Bring a calculator to class each day. We will work problems out in real-time together. Colored pencils, pens, and a stapler are helpful.

Lab
Lab is scheduled for 3 hours on Tuesday afternoons. Several of the labs explore lecture material by directing your observations of mineral specimens. We will also use calculations, computer programs, and physical models to learn concepts. Labs will be integrated with lecture material to the greatest possible extent, usually following what we have discussed in lecture. Therefore, lab material will be incorporated with lecture material for the exams. All labs are designed to take 3-6 hours to complete. Students who arrive prepared, having read the lab assignment, read the associated text, and completed any pre-lab exercises, may finish the lab activity during the 3-hour session. You will be given access to POST 703 and POST 733 after hours, and you should anticipate spending additional time on many of the labs. Labs should be handed to the TA on time. Unless there is a good excuse, late penalties apply. At the beginning of each lab, the TA will go over the weaker or less well understood points from the previous week. Students are encouraged to askLOTS of questions!

Grading (number of assessments and contribution of each to course grade)
Labs (15 @ 2% each) 30%
Midterm Exams (3 @ 7.5% each) 22%
Final Exam (1 @ 1.5%) 8%
Homework (usually 15 @ 1.33% each) 20%
Reading Questions answered on Laulima (usually 27 assignments @ 0.37% each) 10%
Lecture preparedness (variable) 10%