Course Description and Syllabus

Welcome to Mineralogy! In this course you will learn about the structure and chemical makeup of Earth materials. We will concentrate on the physical and chemical properties of minerals, 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 seven modules. The first reviews relevant chemistry, the second investigates how and why minerals are classified and introduces symmetry, the third introduces controls on mineral composition, the fourth presents optical mineralogy, the fifth introduces us to major rock-forming minerals in a systematic progression, the sixth investigates crystal growth, and lastly we'll learn about some of the analytical tools of modern mineralogy.

Course Information

Credits: 4 Semester: Fall 2009 Lecture : MWF 11:30 am- 12:20 pm POST 703 Lab: Tuesday 1:30 – 4:20 pm POST 703

Instructor: Dr. Julia Hammer Office: POST 617B Office Phone: 956-5996 Email: jhammer@soest.hawaii.edu Office hours: M 1-3 pm and by appointment TA: Tom Shea Office: POST 615B email: tshea@hawaii.edu phone: 956-8558 Office hours: TBA

Required Texts: Nesse Introduction to Mineralogy Optional Texts and Resources: Perkins Mineralogy 2nd Ed. Klein Manual of Mineral Science 22nd Ed. Perkins and Henke Minerals in Thin Section 2nd Ed. Deer, Howie, and Zussman, An Introduction to the Rock Forming Minerals

Prerequisites:

GG 200 CHEM 162 and CHEM 162L or CHEM 171 and CHEM 171L or CHEM 181A and CHEM 181L

Course Objectives and Components

Goals of this course include understanding:

- (1) the characteristics of major mineral groups in hand specimen and thin section
- (2) formation environments and associations of rock-forming minerals
- (3) crystal symmetry, crystallography, and atomic structure

At the end of this course, you will be able to:

- (1) **identify** rock-forming minerals in hand specimen and in thin section using diagnostic physical, optical, and chemical properties
- (2) infer formation environment of a silicate mineral using only its formula
- (3) interpret a phase diagram
- (4) predict some of the physical properties of a substance from its symmetry content
- (5) calculate a mineral formula from weight percent oxide components

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. Periodically, I will supplement reading assignments with handouts.

Bring a **calculator** to class each day. We will work problems out in real-time together. Colored pencils or pens may be helpful.

<u>Lab</u>

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, always following what we have discussed in lecture. Therefore, lab material will be incorporated with lecture material for the five quizzes. Quizzes will be in part "practical", that is, requiring microscopes and other lab materials.

All labs are designed to take 3 hours or less to complete. Nonetheless, they can be handed in up to three days after the lab takes place (i.e. Friday afternoon latest). This ensures that labs are graded over the weekend and that any problems can be discussed on the following week. Unless there is a good excuse, late fees apply! At the beginning of each lab, Tom will go over the weaker or less well understood points from the previous week. Students are encouraged to ask LOTS of questions!

You are required to obtain a **hand lens** for this course. You will use this tool frequently, not only in this class, but in many of the upper division Geology courses. (A geologist always has a hammer and a hand lens when going into the field!)

Grading	
Labs	(30%)
Participation and attendance	(5%)
Homework	(15%)
Quizzes -5 , one of which will be the final exam	(50%)