

GLY 4200C
MINERALOGY AND CRYSTAL CHEMISTRY
4 Credits

PREREQUISITES:

GLY 2010 and 2010L or equivalent. One semester college chemistry and one year college physics. All students should have these courses before taking GLY4200C. Students are strongly advised to take one year of college chemistry. Students who choose to ignore prerequisites often do poorly.

TERM AND LOCATION:

Fall Semester, 2012, Section 92871, Science Engineering 417, Monday, Wednesday, 9:00-10:20 a.m, (Lecture) and Science Engineering 435, Monday/Wednesday, 10:30-12:20 p.m. (Laboratory)

Class begins on Monday, August 20, 2012

DATES: August 22 through December 5, 2012 excluding September 3, 2012, November 12, 2012, and November 22-23, 2012

INSTRUCTOR:

Dr. David L. Warburton
SE 466
(561) 297-3312 FAX (561) 297-2745
E-mail Warburto@FAU.EDU

CLASSROOM ETIQUETTE :

In order to enhance and maintain a productive atmosphere for education, personal communication devices such as cellular telephones, are to be disabled in class sessions. (University policy which applies to all classes - <http://www.fau.edu/academic/registrar/catalog/academic>). Any use of these devices during a quiz or examination will be considered cheating, and will be penalized accordingly. Communication devices (cell phones, laptop computers, etc.) must be turned off and stowed during all examinations.

ADDITIONAL SUPPLIES:

One hand lens (10 X) - should have a metal case - 20 X is also useful but 10 X is better for most purposes. See [Field Equipment](#) for a list of possible sources.

HOLIDAYS:

Labor Day, September 3, 2012

Veteran's Day, November 12, 2012

METHOD OF INSTRUCTION:

The material for the lecture part of the course will be presented in lecture format, usually accompanied by PowerPoint presentations. The laboratory portion of the course will consist of a number of exercises done during the Monday afternoon laboratory section, with write-ups done outside of class.

COURSE WEB PAGES:

Web pages for the course are located at:
<http://www.geosciences.fau.edu/Resources/Course>

The approximate laboratory examination schedule is as follows:

Lab Quiz 1 Labs 1-3 (Physical properties, Native elements, Sulfides, Sulfosalts, Oxides and Hydroxides) September 28, 2011

Laboratory Quiz 2 (Symmetry-K & H, Chapter 2, 20-100) - October 19, 2011

Laboratory Quiz 3 (Halides, Sulfates, Borates, Carbonates, Bicarbonates, Phosphates) November 2, 2011

Laboratory Final (Optical Mineralogy Techniques) - Wednesday, December 7, 2011 10:30 a.m. - 1:00 p.m.

Laboratory quizzes and examinations are hands-on exercises involving the identification of minerals, and determination of mineral properties, including optical properties using the petrographic microscope.

Make-up tests and quizzes will be given under unusual circumstances, which involve a problem or problem beyond the students control, and which could not be foreseen a reasonable time in advance of the examination. Students who know a problem are urged to contact the instructor two weeks before the examination, to see if alternative arrangements can be made. Anyone missing a quiz or exam must contact the instructor as soon as possible after the exam. Don not wait until the next class! Make-up exams are often in different format than the original examination, and many students consider the make-up exams to be more difficult than the original.

TOPICS COVERED:

Introduction	K & D , Chapter 1
Physical properties, crystal habit, form, mineral physics, piezoelectricity, pyroelectricity	K & D , Chapter 2 Frye, Chapter 3, 131-140, 142 - 152; Z & S, Chapter 6, 149 - 167
Crystal chemistry, composition of the earth's crust, atoms, ions, quantum numbers, bonding, Pauling's Rules, crystal structures, and crystalline solution	K & D , Chapter 3, 4, and 5 Frye, Chapter 5, 171-187 Chapter 1, 27 - 42 Battey, Chapter 1, 3-28

MIDTERM I

Crystallographic concepts, symmetry elements and operations, order, overview of point group symmetry

K & D , Chapter 6, 7, and 9

Mineral reactions, crystallization,

K & D , Chapter 10

An Introduction to Mineralogy for Geologists W.J. Phillips & N. Phillips
QE 363.2 P44

Mineralogy - Concepts and Principles Tibor Zoltai and James H. Stout
QE 363.2 Z 65

The book by Frye describes chemical bonding and close packing well in Chapter 1, and has a very good discussion of color and luster in Chapter 5. The Sinkankas book contains excellent descriptions of minerals, including the origin of mineral name, methods of identification, and noteworthy occurrences of type or museum specimens. Also included are many illustrations of crystals showing common crystal faces and interfacial angles. The theoretical sections are relatively uncomplicated and thus easier to understand than some textbooks, although detail is sacrificed. The Phillips book contains a great deal of information on crystal structure, a subject not emphasized in this course, and the habits and representations of many rock-forming minerals. The growth and twinning of crystals is also discussed. The book by Zoltai and Stout was formerly used as the textbook for this course, and contains a wealth of detailed information on many of the theoretical aspects of mineralogy.