Chemistry 4:206: Solid-State and Materials Chemistry

Tuesday/Thursday 10:55 am - 12:10 pm in C139 PC

This graduate course provides a comprehensive introduction to the language and techniques of solid-state and materials chemistry. Emphasis will be placed on synthetic approaches to inorganic materials and the utility/limitations of a variety of physical characterization methods. The interplay between structure and properties of "real world" examples will be emphasized.

Instructor: Prof. Edward Gillan
Contact information: email (edward-gillan@uiowa.edu), phone (335-1308)
Office hours (481 CB): Mon./Wed. 10:30 - 11:30 am and by appointment

Course web page: www.uiowa.edu/~c004206

Texts: *Basic Solid State Chemistry* by A. R. West (**required**). Supplements from *Solid State Chemistry and its Applications* by A. R. West; *Solid State Chemistry Techniques (vol. 1) and Compounds (vol. 2)* by A. K. Cheetham and P. Day; assorted research articles and reviews.

Course grading (400 total points, +/- course grades will be given):
5 Problem sets @ 15 points each = 75 pts (19 %)
2 In-class exams @ 100 points each = 200 pts (50 %)
Final exam (cumulative) = 125 pts (31 %)

Approx. dates	General topics	West Text Chapters
Week 1, 2	General preparative and crystal growth methods	handouts (also Chp. 9)
Week 2, 3	Atomic packing in solids and structure types	1
Week 3, 4	Bonding descriptions, energetics and defects	2 (1^{st} half), 5
Week 4, 5	X-ray diffraction: theory and practice	3
Tuesday, February 27th	***First Exam (in class)***	
Week 6	More XRD, solid solutions, structure solutions	3,5
Week 7	Thermal analysis	4, handouts
Week 7, 8	Band approach to solids	2 (2^{nd} half), handouts
Week 8, 9	Electrical properties and semiconductors	7
Week 9, 10	Magnetic properties of solids	8
Week 11	Superconductivity	7
Tuesday, April 17th	***Second Exam (in class)***	
Week 12	Low dimensional solids	7, supplements
Week 13 - 15	Special topics (e.g., organic conductors, nanostructures)	7, supplements

Final Exam (#3) on Monday, May 7, 2007 from 12 - 2 pm

Note on Problem Set Assignments: While you may engage in *general discussions* about the homework problems with your classmates, your answers must be in your own words and be a product of your independent reasoning. These are intended as individual assessments of your problem solving abilities and are not group assignments.

Any questions about grades and scores received for course assignments should be directed to Prof. Gillan. General class score and point distributions will be periodically posted on the class web site and individual cumulative scores may be obtained from Prof. Gillan.

Collegiate Guidelines

Your responsibilities to this class, and to your education as a whole, include attendance and participation. You are also expected to be honest and honorable in your fulfillment of assignments and in test-taking situations (the College's policy on plagiarism and cheating is on-line in the College's Student Academic Handbook http://www.clas.uiowa.edu/students/academic_handbook/). You have a responsibility to the rest of the class-and to the instructor-to help create a classroom environment where all may learn. At the most basic level, this means that you will respect the other members of the class and the instructor, and treat them with the courtesy you hope to receive in turn. All students in the College have specific rights and responsibilities. You have the right to adjudication of any complaints you have about classroom activities or instructor actions. Information on these procedures is available in the Schedule of Courses and on-line in the College's Student Academic Handbook (http://www.clas.uiowa.edu/students/academic_handbook/).

Specifically for 4:206, any complaints with the operation of this course should be initially directed to Prof. Gillan. This includes any issues with course requirements, exams, and grading. Students in need of additional information may contact staff in the Chemistry Center (231 CB) during normal business hours. This course is given by the College of Liberal Arts and Sciences. This means that class policies on matters such as requirements, grading, and sanctions for academic dishonesty are governed by the College of Liberal Arts and Sciences.

Americans with Disabilities Act - Guidelines for Students with Disabilities: I would like to hear from anyone who has a disability, which may require some modification of seating, testing, or other class requirements so that appropriate arrangements may be made. Please contact me after class or during my office hours.