Chemistry 4:206: Solid-State and Materials Chemistry

Mon./Wed./Fri. from 9:30 - 10:20 am in E264 CB

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 (W325 CB): Mon./Wed./Fri. from 10:30 - 11:30 am (after class) and by appointment

Course web page: see UI ICON site at http://icon.uiowa.edu/index.shtml

Texts: Basic Solid State Chemistry by A. R. West (required). Other handout 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 (1st half), 5
Week 4, 5 X-ray diffraction: theory and practice 3
Week 6, 7 More XRD, solid solutions, structure solutions 3, 5

Wednesday, March 2nd First Exam (in class)

Week 8 Thermal analysis 4, handouts
Week 8 Band approach to solids 2 (2nd half), handouts
Week 9, 10 Electrical properties and semiconductors 7
Week 10, 11 Magnetic properties of solids 8
Week 12 Superconductivity 7

Wednesday, April 20th Second Exam (in class)

Week 12, 13 Low dimensional solids 7, supplements
Week 14, 15 Organic conductors, nanostructures 7, supplements

Cumulative Final Exam (#15) Wednesday, May 11, 2011 from 12 - 2 pm in E264 CB
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.

Class assignment scores and point distributions will be updated on the ICON web site after each exam. Any questions about grades and scores received for course assignments should be directed to Prof. Gillan. Given that this is a graduate level course, the average course grade will be near the B+/A- level.

*The College of Liberal Arts and Sciences Policies* (www.clas.uiowa.edu/faculty/teaching/policies.shtml)

**Administrative Home:** The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS *Student Academic Handbook.*

**Electronic Communication:** University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences. (*Operations Manual, III.15.2.*)

**Accommodations for Disabilities:** A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See [www.uiowa.edu/~sds/](http://www.uiowa.edu/~sds/) for more information.

**Academic Fraud:** Plagiarism and any other activities when students present work that is not their own are academic fraud. Academic fraud is a serious matter and is reported to the departmental DEO and to the Associate Dean for Undergraduate Programs and Curriculum. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. See the CLAS Academic Fraud section of the *Student Academic Handbook.*

**CLAS Final Examination Policies:** Final exams may be offered only during finals week. No exams of any kind are allowed during the last week of classes. Students should not ask their instructor to reschedule a final exam since the College does not permit rescheduling of a final exam once the semester has begun. Questions should be addressed to the Associate Dean for Undergraduate Programs and Curriculum.

**Making a Suggestion or a Complaint:** Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO (Chemistry Main Office E331 CB, 335-1350). Complaints must be made within six months of the incident. See the *CLAS Student Academic Handbook.*

**Understanding Sexual Harassment:** Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI *Comprehensive Guide on Sexual Harassment* for assistance, definitions, and the full University policy.

**Reacting Safely to Severe Weather:** In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety *web site.*