CHEMISTRY 3100

FALL SEMESTER 2012

TEXT: "Chemistry 3100 Notes," (Parts 1-3 and 4-8) Ernst (required)
"Inorganic Chemistry," Housecroft and Sharpe (recommended)

CLASS: M W H F: 11:50 – 12:40 pm, ROOM 2004 HEB

INSTRUCTOR: Dr. Richard D. Ernst, OFFICE: HEB 2166, Consultation hours - generally open, but also by appointment (801)581-8639; ernst@chem.utah.edu; or my secretary Connie (801)581-5074; cgorton@chem.utah.edu (not via CANVAS).

FINAL EXAM: Wednesday, December 12, 2012 - 10:30 am – 12:30 pm

PROBABLE ORDER OF TOPICS:

General Bonding (2, 5, 6), Hydrogen (7, 9, 10), Alkali Metals (11), Alkaline Earths (12), GRP 3 (13), GRP 4 (14), GRP 5 (15), GRP 6 (16), Halogens (17) Noble Gas Chemistry (18), Coordination Chemistry (22, 23, 26), Group Theory (4), Boron Chemistry (13), Crystal Field Theory (20, 21), Metal Carbonyls (24), Organometallic Chemistry (24, 27).

It is strongly suggested that students review the basics of atomic orbitals (Appendix 3), electrochemistry (half-cell reactions, etc.), chirality, thermodynamics (ΔG, ΔH, ΔS, K), rules for assigning oxidation states (Appendix 19), and the basics of aqueous transition metal ion chemistry (Appendix 20) in order to better comprehend lecture materials. In addition, it would be beneficial to look over the appropriate chapters in the recommended text, prior to coverage in class, which should help put the material in better perspective.

WITHDRAWAL:

Last day for withdrawal is Friday, October 19, 2012

MISSED EXAMS:

No make-up exams will be given without documentation of significant extenuating circumstances, and all exams will be counted. In the event of an unavoidable problem a written excuse with documentation (doctor's letter, obituary announcement, etc.) is necessary to avoid an exam grade of 0. If at all possible, notification must be made prior to the time of the exam, and as early as possible in the event of an arguable excuse (professional traveling, etc.). Exam dates will be announced in class about one week prior to their dates. Students are expected to be aware of these and any other announcements made in class. Any incident of academic dishonesty could result in a grade of E.

ACADEMIC DISHONESTY:

By submitting an assignment, you are representing that it is your own work and that you have followed the rules associated with the assignment. Incidents of academic misconduct (including, cheating, plagiarizing, research misconduct, misrepresenting one's work, and/or inappropriately collaborating on an assignment) will be dealt with severely, in accordance with the Student Code (http://www.admin.utah.edu/ppmanual/8/8-10.html). A single instance of academic misconduct may result in a failing grade for the course. Multiple instances of academic misconduct may result in probation, suspension or dismissal from a program, suspension or dismissal from the University, or revocation of a degree or certificate.

EXAMINATIONS:

NO PROGRAMMABLE CALCULATORS MAY BE BROUGHT TO ANY EXAM - a grade of 0 will be given in such cases. An inexpensive, simple calculator (including logs) must either be purchased or borrowed (roommate, etc.). Any requests for regrading must be made within one week of the time exams are returned in class. Any exam problems must show the work involved in all steps of the solution for credit to be given. Exams not picked up within the two week period following final exam week are subject to disposal. Exams may cover lecture material as well as in-class demonstrations.

GRADING:

In addition to three (3) Midterms (100 points each) and a Final (200 points), 100 points will be based on discussion section performance. Note that supplemental (as opposed to explanatory) material provided in parentheses is only included for those interested in such topics. **No exam score will be dropped.** The final exam is a requirement of this course, and a failure to take the final will lead to a course grade of E.

ELECTRONIC DEVICES:

Cell phones, texting devices, personal computers, etc. are not to be used in class. Violators will be dismissed for the day. Students seeking exception to this policy must submit a request in writing beforehand, and sit near the front of the room.

EQUAL OPPORTUNITY:

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, (801)581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.

All written information in this course can be made available in alternative format with prior notification to the Center of Disability Services.

RECOMMENDED REFERENCES:

*F. Cotton and G. Wilkinson, "Advanced Inorganic Chemistry"

*F. Cotton, G. Wilkinson, and P.L. Gaus, "Basic Inorganic Chemistry"

*F. Cotton, "Chemical Applications of Group Theory"

B. Douglas and D. McDaniel, "Concepts and Models of Inorganic Chemistry"

*R. Drago, "Physical Methods in Inorganic Chemistry"

H. Emeleus and A. Sharpe, "Modern Aspects of Inorganic Chemistry"

E. Gould, "Inorganic Reactions and Structures"

N.N. Greenwood, "Chemistry of the Elements"

R. Heslop and K. Jones, "Inorganic Chemistry: A Guide to Advanced Study"

*J. Huheey, "Inorganic Chemistry: Principles of Structure and Reactivity"

*W. Jolly, "The Principles of Inorganic Chemistry"

W. Jolly, "The Synthesis and Characterization of Inorganic Compounds"

J. Lagowski, "Modern Inorganic Chemistry"

*K. Purcell and J. Kotz, "Inorganic Chemistry"

D.F. Shriver, "Inorganic Chemistry"

A.F. Wells, "Structural Inorganic Chemistry"

*2 hour loan period

EXPECTED LEARNING OUTCOMES:

a. Students will learn about the bonding fundamentals for both ionic and covalent compounds, including electronegativities, bond distances and bond energies using MO diagrams and thermodynamic data

b. Students will learn how to predict geometries of simple molecules

c. Students will learn the fundamentals of the chemistry of the main group elements, and important real world applications of many of these species

d. Students will learn to use group theory to recognize and assign symmetry characteristics to molecules and objects, and to predict the appearance of a molecule's vibrational spectra as a function of symmetry

e. Students will gain an understanding of the bonding models, structures, reactivities, and applications of coordination complexes, boron hydrides, metal carbonyls, and organometallics