INORGANIC CHEMISTRY I (Chemistry 258) Spring 2009

Gustavus Adolphus College

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Office hours: I will be glad to discuss topics related to the course with you at just about any time, *with the exceptions noted below*. The most convenient times are in the morning just after class (ca. 10:00-11:30) or on Monday and Tuesday afternoons. *(The opposite is true for the time immediately preceding class.)* Other times are available, but should be scheduled ahead, as I will often have other items scheduled (labs, research, discussions with seminar speakers, etc.).

Textbook: *Introduction to Coordination, Solid State, and Descriptive Inorganic Chemistry*, Second Edition, by Glen E. Rodgers, Thomson Learning, Inc., 2002.

Homework: Homework assignments from the lecture text will be assigned and discussed in class as necessary, but will not be graded. The assignments are not optional, and you should work on them regularly. If you do this, you will find that the examples covered in the problem sets will be of great help to you in focusing your understanding of the course material; in addition, test problems will often be modeled on problems given as homework.

For certain topics, such as oxidation-reduction and electrochemistry, supplementary homework problem sets will be provided in class.

Problems associated with the laboratory experiments will be graded, as part of your lab reports. In addition, you will usually be required to have completed a pre-lab exercise before starting work on the day's experiment. I strongly advise you to complete the pre-lab no later than the day prior to the day on which you will perform the experiment.

Electronic Communication: After the first three weeks' experiments, which are to be purchased as a packet at the Book Mark, I will be distributing procedures for the laboratory experiments as e-mail attachments; other materials will occasionally be distributed by this route.

Grading System:

Four one-period tests, (**Friday**, February 20; **Friday**, March 13; **Thursday**, April 9; **Monday**, May 4), one grade dropped:	60%
Final Examination (Friday, May 22, 8:00 p.m.):	15%
Laboratory:	25%

If your final exam grade is higher than your test average, the weights will be 35% and 40%, respectively.

Your Commitment: I consider your enrollment in this course to constitute a commitment on your part to principled participation in the various facets of the course (regular class attendance, laboratory participation, completion of homework, etc.) and to a genuine effort toward achievement of a thorough understanding of the course material. Occasionally a student in the course will exhibit behavior that is grossly negligent or irresponsible with regard to these expectations. I will withdraw such individuals from the course.

It is expected that students enrolled in this course will abide by the Honor Policy as described at the Gustavus web site. http://www.gustavus.edu/oncampus/academics/general_catalog/current/index.cfm?pr=acainfo. Assignments not carried out in accord with these principles will be assigned a grade of zero. The degree of allowable collaboration on out-of-class assignments will be described on a case-by-case basis. I will be present during exams, not only as a proctor, but so that I will be able to answer questions that might arise during the exam.

(OVER)

TOPICS TO BE COVERED

The planned sequence of coverage of topics is outlined below, with the time dedicated to each being dependent on the extent and complexity of the particular topic. Coverage of chapters bracketed with square brackets will be selective, and varies from year to year. Special topics, which also vary from year to year, will also be included.

Chapter	Brief Description of Topics
Chapter 1, pp. 1-6	placement of inorganic chemistry within a historical context
Chapter 9, pp. 217-241	fundamental properties of atoms and elements - periodic dependence
Chapter 10, pp. 243-266	chemistry of elemental hydrogen and of covalent, metallic, and ionic hydrides
Chapter 11, pp. 267-301	chemistry of oxygen and of water; oxide and hydroxide chemistry; oxoacids and hydroacids
Chapter 2, pp. 9-31	coordination chemistry - history, introductory stereochemistry, isomerism, nomenclature
Chapter 3, pp. 33-55	stereochemistry and isomerism in coordination compounds
Chapter 4, pp. 57-91	bonding in coordination compounds - crystal field theory, molecular orbital theory, spectroscopy
Chapter 5, pp. 93-126	reaction mechanisms of coordination compounds
Chapter 12, pp. 303-329	chemistry of the alkali metals; basic concepts of electrochemistry
Chapter 13, pp. 331-353	chemistry of the alkaline earth metals
[Chapter 6, pp. 127-149]	hard/soft acid/base theory; industrial and biomedical applications of coordination compounds; transition metal biochemistry
[Chapter 14, pp. 355-386]	boron and aluminum chemistry, with some chemistry of Ga, In, Tl
[Chapter 15, pp. 346-425]	chemistry and of the Group 4A (14) elements - carbon, silicon, germanium, tin, and lead
[Chapter 16, pp. 427-466]	pnicogens (group 5A or group 15 elements) - most coverage will be of nitrogen, but will also include P, As, Sb, Bi
[Chapter 17, pp. 467-494]	sulfur and its congeners (Se, Te, Po)
[Chapter 18, pp. 495-528]	halogens - chemistry of fluorine; oxidation-reduction and structural chemistry of chlorine, bromine, and iodine
[Chapter 19, pp. 529-547]	noble gases - mostly chemistry of xenon, with a limited amount of krypton chemistry

You probably noticed when reading the table above that we will not be covering the text chapters in strict numerical order. This arrangement is possible because our textbook is designed so as to consist of three free-standing segments: coordination chemistry, structural chemistry, and descriptive chemistry of the elements.

We will begin with a selection of the theoretical and descriptive chemistry chapters so as to review some basic concepts, study the chemistry of aqueous solutions, and introduce the chemistry of the non-metallic elements. The introductory descriptive chemistry will be followed by studies of the properties of coordination complexes of the transition metals. Coverage of the alkali and alkaline earth metals will follow, and will include learning how to apply electrochemical measurements to the determination of thermodynamic quantities. These broad areas will include most of the important basic concepts of mechanistic inorganic chemistry. Further elaboration and application of these concepts will be done in selections from the remaining descriptive chemistry chapters.