CHEM 240 INORGANIC CHEMISTRY

C. Baumann (http://www.scranton.edu/faculty/baumann/)
LSC 451
570-941-6389
christopher.baumann@scranton.edu

Text: "Foundations of Inorganic Chemistry" Gary Wulfsberg.

This course introduces the student to the descriptive chemistry of main group and selected transition elements and their compounds. The described phenomena will be correlated with the periodic table, physical properties, atomic and molecular structure.

TOPIC	CHAPTER
Periodic Trends	1
Monatomic Ions	2
Polyatomic Ions	3
Ionic Compounds	4
EXAM I : March 12	
Coordination Equilibria	5
Oxidation-Reduction Reactivity	6
EXAM II : April 16	
Transition Metal Complexes	7
Oxides and Silicates	8
Periodic Trends	9
FINAL EXAM: May ??	

GRADING POLICY

Each semester exam is worth 300 points; the final is worth 400 points. **All in-class exams must be done with non-communicating devices (pencil, pen, slide rule, abacus, noncommunicating calculator). Use of a communicating calculator on an in-class exam will result in a score of 0 on that assignment. The instructor reserves the right to further limit the use of calculators on in-class exams.**

Homework will be assigned, but not collected.

Students with Disabilities

Reasonable academic accommodations may be provided to students who submit relevant and current documentation of their disability. Students are encouraged to contact the Center for Teaching and Learning Excellence (CTLE) at disabilityservices@scranton.edu or (570) 941-4038 if they have or think they may have a disability and wish to determine eligibility for any accommodations. For more information, please visit www.scranton.edu/disabilities.

Academic honesty:

The first time that a student is caught plagiarizing or using fabricated data in a report, he or she will receive a grade of zero points for that assignment. For further consequences of violating academic ethics please refer to the University of Scranton Student Handbook.

https://www.scranton.edu/academics/wml/acad-integ/acad-code-honesty.shtml

ASSIGNMENTS

Chapter	**Exercises**
1	1-62
2	1-50
3	1-30, 36-50, 55-75
4	1-21, 28-37, 41-49
5	1-18, 25-38, 41-59
6	1-18, 26-31, 33-43
7	1-22, 30-37, 47-58
8	1-12, 18-30, 38-50
9	1-8, 17-28, 35-50

The SLO Track

In completing this course students should be able to:

1. know the long form of the periodic table so that given a short-form table and the symbol (or atomic number) of each element, write its characteristic valence electron configuration extrapolate plausible valence electron configurations, electronegativities, ionic radii, and common positive oxidation numbers for these elements.

2. use the charge, radius, and electronegativity, classify a metal ion as nonacidic, feebly acidic, weakly acidic, moderately acidic, strongly acidic or very strongly acidic and explain the relationship of hydration energy and the acidity of a cation.

3. rank a series of oxides or hydroxides from the same group, period, or element in order of increasing basicity and decide whether a given oxide is likely to be soluble or not and to determine the melting points of a series of oxides.

4. balance oxidation-reduction equations and half-reaction equations and know the general periodic trends in the stability of high oxidation states of elements; classify high-oxidation-state oxo acids and anions as to relative strength as oxidizing agents. Interpret oxidation and reduction potentials using Pourbaix Diagrams.

5. describe the structures and physical properties (allotropes, physical states, color, ease of boiling, conductivity) of any nonmetallic elements**.**

6. draw Lewis dot structures of and predict the geometry of molecules and ions including bond angles and distortions including those with monodentate, chelating, and macrocyclic ligands.

7. Interpret the E and C parameters of different Lewis acids or bases to compare their strengths at covalent bonding or at electrostatic bonding.

8. use HSAB to predict whether a given equilibrium reaction will lie to the left or to the right and to predict whether a given halide, sulfide, selenide, or telluride will be soluble or insoluble in water.

9. tell whether a given halide is likely to be a gas, a liquid, a low-melting solid or a high-melting solid at room temperature; relate this to the type of structures that the halide is likely to have and choose an appropriate type of synthesis for a given halide.

10. tell whether a given hydride is likely to be a gas, a liquid, a solid at room temperature; relate this to the type of structure the hydride has and determine whether a given hydride is likely to have an endothermic or exothermic heat of formation or whether it is nonexistent.

11. without the use of the tables, describe the main and anomalous periodic trends in the following atomic variables: Pauling electronegativity, covalent/metallic radius, the most stable oxidation numbers or ionic charges of the elements and covalent single and multiple bond energies.

12. through an understanding of nuclear chemistry, explain the difficulties in synthesizing superheavy nuclei and predict some such nuclei that ought to be relatively stable.