Course Syllabus

CHM 362: Descriptive Inorganic Chemistry (3 Credits); Section: 1
Lecture: Tu-Th 8-9:47 am 168 SEB

Instructor: Ferman A. Chavez, Assistant Professor
Office: 227 Science and Engineering Building
Telephone: (248) 370-4092
Email: chavez@oakland.edu
Office Hours: TBA (or by appointment)
Chemistry URL: www2.oakland.edu/chemistry

Overview: Descriptive inorganic chemistry is a course which covers the inorganic chemistry of the elements. The topics to be covered include but are not limited to the following: electronic structure, shape, symmetry, and stereochemistry of inorganic molecules and ions; inorganic acids and bases; non-aqueous solvent systems; selected descriptive chemistry of the main group elements s- and p-block), the d-transition elements, and the lanthanides and actinides. Selected topics in environmental and bioinorganic chemistry will also be explored.

Prerequisites: CHM 235 or equivalent.


Supplementary Text: Shriver and Atkins, "Inorganic Chemistry," W. H. Freeman, 3rd Ed.;

Goals: The overall objective of this course is to give the student an overview of the periodicity of the properties and chemistry of the various inorganic families as well as illustrate the diversity of the chemistry that occurs for inorganic compounds. A student who has successfully completed a course in descriptive inorganic chemistry will know the following:

a) Chemical reactivity across the periodic table.

b) Properties and compositions of common chemical substances.

c) Roles of inorganic chemistry in industry and in everyday life.

d) Significance of inorganic chemistry in biology, geology, and the environment.

e) Chemical intuition for inorganic chemistry connecting chemical composition, structure and bonding with reactivity.

f) Historical perspectives leading to our present understanding of the chemical world.

Homework assignments. You will be given homework assignments periodically which will enable you to test your understanding of the material and help you do well on the exams. The homework
assignments will be collected, typically on Thursday and graded (more upon quality of attempt rather than correctness). Homework will sum to 100 points. Answers will be posted. Homework will be heavily emphasized on exams. Late homework assignments will not be accepted. Students will be given 0 points for missed homework.

Exams: There will be three exams during the semester. The exams will be administered during regular class periods. The exams are currently scheduled to be held in 168 SEB. Any room changes will be announced well in advance. All exams will be closed book and the final will be cumulative. The exams are tentatively scheduled to take place on Tuesdays; September 28, October 19, and November 9. The Cumulative Final will be from 8:00am-11:00am on Thursday, December 9.

Grading: Your final grade in CHM 362 will be computed based on a total of 600 points: each hour exam is worth 100 points, the final is worth 200 points and homework assignments will total 100 points (equal to one exam) of the final grade. The following tentative grading scale can be used to estimate your grade at any juncture in the course:

- ≥540 (≥90%) 4.0 534 – 480 (89 - 80%) 3.0
- 474 - 360 (79 - 60%) 2.0 354 – 270 (59 - 45%) 1.0
- <270 (<45%) 0.0

No make-up or early exams will be administered under any circumstances. Absence from an exam must be approved by the instructor before the date of the exam, unless it is physically impossible to do so. Written proof may be required within one week of the missed exam. In this circumstance the student’s grade will be calculated based on 500 points. All students are required to take the final; those who do not will fail the course unless they have made arrangements with the instructor to take an incomplete.

NOTE: An I (incomplete) grade is only possible if a student is doing satisfactory work (2.0 or better). A signed agreement involving the instructor and student is required and must be completed before final grades are submitted. A grade of 2.0 or better is necessary for an S grade (if S/U grading is the chosen option).

Regrades: Test regrade requests should be submitted to the instructor within one week of the test. When inquiring about a possible regrade, do not make any marks on the answer sheet.

Withdrawals: Tuesday, November 2 is the last day to withdraw from the course.

Miscellaneous Information:

Attendance: Your attendance is expected at all scheduled lecture periods. Material presented in the lecture is the core of the course and may or may not be presented in the book readings. Lecture materials will be heavily emphasized in the examinations. However students are also responsible for readings, and homework material. Reading and homework assignments given in lecture sessions on a regular basis and it is the student’s responsibility to be present to get these assignments.
Closing the University: If the University is officially closed on the day a quiz or test is scheduled, the quiz or test will be given during the next scheduled lecture meeting.

Students with Disabilities that affect their ability to participate fully in class or to meet all course requirements are encouraged to bring this to the attention of the instructor so that appropriate accommodations can be arranged. Further information is available from the Office of Disability Support Services located in 106 Foundation Hall: 370-3266 (voice); 370-3268 (TDD).

WebCT Support: Test and homework solutions and other miscellaneous information will be posted on the class web pages which are accessible through WebCT.

Important Dates:

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<th>Date</th>
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<tbody>
<tr>
<td>September 7</td>
<td>HW #1 due</td>
<td>November 9</td>
<td>EXAM III</td>
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<td>September 14</td>
<td>HW #2 due</td>
<td>November 21</td>
<td>HW #5 due</td>
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<td>September 28</td>
<td>EXAM I</td>
<td>November 23</td>
<td>Holiday</td>
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<td>October 12</td>
<td>HW #3 due</td>
<td>December 5</td>
<td>Review</td>
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<td>October 19</td>
<td>EXAM II</td>
<td>December 12</td>
<td>Final Exam*</td>
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<tr>
<td>November 2</td>
<td>HW #4 due</td>
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*The cumulative final exam will be held in SEB 168 from 8:00am to 11:00am.

Topics to be covered:

I. Structure, Bonding, and Periodic Trends: A Review
   a. The Electronic Structure of the Atom
   b. Overview of the Periodic Table
   c. Covalent Bonding Theories
   d. Symmetry of Molecules
   e. Metallic Bonding
   f. Ionic Bonding
   g. Inorganic Thermodynamics

II. Acids and Bases
   a. Trends in Acid-Base Behavior
   b. Pearson Hard-Soft Acid-Base Concepts
   c. Applications of the HSAB Concept
   d. Environmentally significant Acid-Base Reactions

III. Oxidation and Reduction
   a. Redox Terminology
   b. Oxidation Number and Formal Rules
   c. Periodic Variations of Oxidation Numbers
   d. Redox Equations

IV. Main Group Metals
   a. Hydrogen
   b. The Group 1 Elements: The Alkali Metals
   c. The Group 2 Elements: The Alkaline Earth Metals
   d. The Group 13 Elements
V. Main Group Non-Metals
   a. The Group 14 Elements
   b. The Group 15 Elements: The Pnictogens
   c. The Group 16 Elements: The Chalcogens
   d. The Group 17 Elements: The Halogens
   e. The Group 18 Elements: The Noble Gases

VI. Introduction to Transition Metal Complexes
   a. Transition Metals
   b. Transition Metal Complexes

VII. Properties of the Transition Metals
   a. Properties and periodic trends of early transition metals
   b. Transition Metals of Biological Importance

VIII. The Rare Earth and Actinoid Elements
   a. Properties of the Rare Earth Elements
   b. Properties of the Actinoids

Disclaimer: The above represents a tentative syllabus and outline and is subject to changes announced in class.

Scholastic Dishonesty Policy: Scholastic dishonesty is any conduct described as follows from the "CAS Academic Conduct Policy": Scholastic dishonesty is any act that has violated the rights of another student with respect to academic work or that involves misrepresentation of a student's own work. Scholastic dishonesty includes (but is not limited to) cheating on examinations by looking at another’s work; passing notes; sharing calculator; talking during exams; stealing exams; plagiarizing; depriving another of necessary course materials; sabotaging another's work; misrepresenting another student's work as one’s own. If a student is suspected of scholastic dishonesty, the student will be referred to the Academic Conduct Committee for review. If a student is guilty of scholastic dishonesty, they will be awarded a grade of zero for the work involved, and the incident may be reported to the college's Scholastic Conduct Committee. Such a score of zero will not be dropped in calculating the student's final course grade. Altering an exam and then submitting it for a regrade is also an act of scholastic dishonesty. For further details, see the 2006/2007 Undergraduate Catalog, pages 88 - 90.