030.449 Chemistry of Inorganic Compounds

COURSE DESCRIPTION
The course focuses on the synthesis, structure, and reactivity of materials and inorganic compounds. Modern approaches to chemical bonding, including molecular orbital, ligand field, and crystal field theories, will be applied to understanding the physical and chemical properties of inorganic materials. Course topics will include: Molecular Structure and Bonding, Group Theory, Coordination Chemistry, Reactions and Mechanisms, Spectroscopy, as well as introduction to Organometallic Chemistry, Bioinorganic Chemistry, Solid State Chemistry, and Electrochemistry.

COURSE-LEVEL LEARNING GOALS
- Correlate chemical and physical properties with coordination geometries and electronic configuration
- Predict chemical reactivity and bonding in coordination compounds using crystal field, ligand field, and molecular orbital theories.
- Derive reaction mechanisms from the analysis of thermodynamic and kinetic parameters for coordination compounds
- Explain electronic transitions of inorganic compounds using coordination chemistry principles.
- Develop scientific presentation skills.

CLASS
TuTh 12:00-1:15 pm, Croft B32

EXAMS
Midterm 1: Tues, Sept 24, 12:00 – 1:15 pm
Midterm 2: Thurs, Oct 17, 12:00 – 1:15 pm
Final Exam: Thurs, Dec 19, 6:00 – 9:00 pm

INSTRUCTOR
Prof. Sara Thoi, NCB 114
sarathoi@jhu.edu
Office Hour: Wed 11 am-12 pm, or by appt

TEACHING ASSISTANT
James Zhang, NCB 116
jzhan212@jhu.edu
Office Hour: Mon 4 pm, or by appt

TEXTBOOK
Inorganic Chemistry by Gary Miessler and Donald Tarr (ISBN: 9780136128663 or 0130354716 or 9780321811059), 3rd, 4th, or 5th Ed. [M&T]. This book is available for check out at the library. Reading and problem sets will be assigned in class. Physical textbooks and e-books are available online and at the bookstore.
GRADING

5%    Class participation
20%   Class assignments
15%   Class Project
25%   Midterm
35%   Final Exam

Final grades will be assigned by looking at class averages, medians, and large point gaps between students. However, the minimum grades are as follows: A‐ (85%), B‐ (75%), C‐ (65%). This means that if you obtain 85% of all the points in this class, you will receive an A- or higher.

EXAMS:
1. Missed exams cannot be made up. Instead, your grade for that exam will be assigned based on your performance on the midterm and assignments. Except in the case of sickness, absences from exams must be excused at least 3 days in advance with documentation. In the case of sickness on exam days, Health and Wellness will provide notes and this documentation is required upon your return.
2. Regrade Policy: If you believe that a mistake was made in grading your exam, you may submit a regrade request. A regrade request should be on a clean sheet of paper with a short description of what was done wrong paper-clipped to the front of your exam. Note that the entire exam may be subjected to a regrade if a request is received. All regrade requests are due one week after the exam is returned.

In all cases, you must email Prof. Thoi BEFORE the start of the exam. If you do not request permission BEFORE the start of the exam, you will receive a 0 for that exam EVEN IF you provide documentation. In rare cases, an exam will be excused in order to help you to recover from a serious illness, but these arrangements must be worked out in advance.

HOMEWORK
There are 4 problem sets that will be assigned in class and graded. Late assignments are not accepted.

CLASS PROJECT
You will present on a journal article relevant to Inorganic Chemistry during the last week of class. The presentation should be 10-12 minutes, followed by a Q&A section. The journal article must be approved by the instructor by Nov 7th.

ACADEMIC INTEGRITY
The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor. Please see the web site (https://studentaffairs.jhu.edu/policies-guidelines/undergrad-ethics/) for more information.
COURSE SCHEDULE

Please note that the following schedule is tentative and are subject to change.

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<th>Thursday</th>
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<td>Quantum Mechanics/Periodic Trends</td>
<td>Ch 1, 2</td>
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<td>2</td>
<td>9-Sep Simple Bond Theory (Lewis, VSEPR)</td>
<td>Molecular Orbital Theory (diatoms)</td>
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<td>16-Sep Symmetry and Point Groups</td>
<td>Group Theory</td>
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<td>Acid base chemistry I</td>
<td>Ch 6</td>
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<td>Coordination Chemistry I (Intro)</td>
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<td>14-Oct Coordination Chemistry V (Spectroscopy)</td>
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<td>21-Oct Electron transfer reactions I</td>
<td>Electron transfer reactions II</td>
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<td>28-Oct Inorganic Reactions I</td>
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<td>Electrochemistry</td>
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<td>Solid-state Chemistry</td>
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<td>25-Nov <strong>Thanksgiving</strong></td>
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<td><strong>Final</strong></td>
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