

Fall 2012 – CHEM-651  
Advanced Inorganic Chemistry I  
Tues + Thurs 12:30 – 1:45 PM  
BRL 207

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Office Hours by appointment

**RECOMMENDED MATERIALS**

Textbook: *Inorganic Chemistry* – 3<sup>rd</sup> Ed, Catherine Housecroft and Alan G. Sharpe  
(ISBN: 0131755536)

Website: [http://www.udel.edu/chem/rosenthal/CHEM651/Chem651\\_2012.html](http://www.udel.edu/chem/rosenthal/CHEM651/Chem651_2012.html)

**OPTIONAL MATERIALS** – below is a list of several texts that will serve as appropriate background and reference.

*Inorganic Chemistry* – 4<sup>th</sup> Ed, Shriver and Atkins

*Inorganic Chemistry* – 4<sup>th</sup> Ed, Huheey and Keiter

*Basic Inorganic Chemistry* – 3<sup>rd</sup> Ed, Cotton and Wilkinson

*Advanced Inorganic Chemistry* – 6<sup>th</sup> Ed, Cotton, Murillo and Bochmann

*Physical Methods for Chemists* – 2<sup>nd</sup> Ed, Drago

*Orbital Interactions in Chemistry*, Albright, Burdett and Whangbo

*Physical Inorganic Chemistry*, Kettle

**COURSE INFORMATION**

This course will focus on the molecular structures and properties of inorganic complexes and compounds. We will study concepts in bonding, trends in periodic properties, molecular symmetry and spectroscopy, inorganic reaction mechanisms, coordination chemistry, and electron transfer theory. We will introduce several broader topics including catalysis, organometallic chemistry and bioinorganic chemistry.

**COURSEWORK AND GRADING**

Assignments and work responsibilities are outlined as follows:

**Problem Sets – 20%**

Will be due immediately before class on 9/11, 9/27, 10/23 and 11/8. Problem sets will be assigned at the end of class one week prior to the due date.

**Midterm Examination – 40%**

Will be administered in class on 10/18. More details will be given as this date approaches.

**Literature Summary and Presentation – 20%**

Each student will select one peer-reviewed article from either the journal *Science*, *Nature* or the Proceedings of the National Academy of Science (PNAS) that has been published in the last three years (Publication year of 2010 or later) and deals with some aspect of inorganic chemistry. All selections must be approved by October 25<sup>th</sup>. Each student will provide an outline for their report by no later than November 6<sup>th</sup>. Students will prepare a four-page review (including figures and references) of their chosen article using the format of a communication in the *Journal of the American Chemical Society* to be due on November 17<sup>th</sup>. Finally, on Saturday December 8<sup>th</sup>, we will gather for a class symposium in which each student will provide a 10-15 minute presentation of their selected paper in order to teach the class about the subject they have reviewed. I will assign the order of the student presentations. Each presentation must be made using PowerPoint. More details regarding the final project will be distributed in the near future.

**Final Examination – 20%**

Time and place to be determined by registrar's office.

**ACADEMIC INTEGRITY**

Academic dishonesty will not be tolerated in this class. Such behavior is unethical, creates a negative atmosphere and inhibits learning. This latter point is most critical as the material covered in this course is critical to your education and may be important to your future career path. It is expected that you will learn the material covered in this course because you will need it to be a functional chemist. If you have any questions about this issue, please review the University of Delaware's Academic Dishonesty Policy: <http://www.udel.edu/stuguide/12-13/code.html>.

For assigned problem sets, students are permitted to study in groups, but it is expected that each student will turn in their own independent work. For written assignments, cases of plagiarism will be taken very seriously. It is unethical to use previously published prose or ideas without proper acknowledgment and uncited quoting or paraphrasing is not appropriate. For the written project in this class, make sure to properly cite any sources you use. For more information, please see: <http://www.cas.udel.edu/associateinarts/georgetown/Pages/Writing-Center.aspx>

**LEARNING GOALS** – It is anticipated that upon completion of this course, students will be able to meet the following:

- Understand the basic concepts of atomic structure and periodicity
- Be capable of applying the concepts of chemical bonding
- Be able to connect electronic and molecular structure with chemical reactivity
- Be able to critically read, understand and evaluate the literature in inorganic chemistry
- Be prepared for future, more specialized courses in inorganic chemistry
- Be prepared for future inorganic cumulative examinations