

Brooklyn College
Inorganic Chemistry (Chem 4761)
Prof. Roberto A. Sánchez-Delgado

Textbook: (Available at Brooklyn College Bookstore)

Inorganic Chemistry, Gary L Miessler and Donald Tarr, 5th Ed, Pearson – Prentice Hall (2013)
Solutions Manual for Inorganic Chemistry (Miessler & Tarr) - Inorganic/organic molecular models

Other recommended books:

-*Inorganic Chemistry*, Catherine E. Housecroft and Alan G. Sharpe, 4th Ed., Pearson – Prentice Hall (2012)

-*Shriver and Atkins Inorganic Chemistry*, 5th Ed., by Atkins Overton, Rourke, Weller, Armstrong, and Hagerman; Freeman (2010) – *Note: 6th Edition will be available in January 2014*

-*Molecular Symmetry and Group Theory* by Alan Vincent, Wiley, 2nd Ed. (2001)

Grading: The final grade will be determined as follows: 4 tests, 25% each

No make-up tests will be given except in documented cases of medical emergency.

Reading

•This is an **advanced course** and students are expected to do a lot of work on their own. Lectures may not cover all the contents in the textbook as listed below, but you will be expected to know the assigned material. Questions and discussion during the lectures are strongly encouraged. If you have difficulties, make use of office hours, **I am here to help you succeed**.

•A lot of material will be covered in this course. Keep up-to-date. Read appropriate sections in the textbook before the lectures.

Typical lecture schedule

Unit 1 (Lectures 1-2)

- *Chapters 1-3*. Introduction to inorganic chemistry. Revision of basic concepts of atomic theory, periodic trends, and simple bonding theories.

Unit 2 (Lectures 3-6)

- *Chapter 4*. Symmetry and group theory. Applications to vibrational spectroscopy.

Unit 3 (Lectures 7-12)

- *Chapter 5*. Molecular orbitals: general principles. Homonuclear diatomic molecules. Heteronuclear diatomic molecules. Larger molecules.
- *Chapter 6. Sections 6.2 and 6.3*. Frontier orbitals and acid-base behavior. Hydrogen bonding. Hard-soft acid-base interactions.
- *Chapter 7, Section 7.3*. Molecular orbitals and band structure of solids. Diodes, the photovoltaic effect and light-emitting diodes. Quantum dots.

Unit 4 (Lectures 13-17)

- *Chapters 9-11*. Coordination chemistry. Nomenclature, isomerism, coordination numbers and geometries. Electronic structure. Ligand field theory. Electronic spectra. Reactions and mechanisms.

Unit 5 (Lectures 18-19)

- *Chapter 7*. The crystalline solid state. Simple structures. Thermodynamics of ionic crystal formation. Superconductivity. Defects.

Unit 6 (Lectures 20-25)

- *Chapters 13*. Elements of organometallic chemistry and catalysis.
- *Chapter 15*. Bioinorganic and environmental chemistry.