

Chemistry 612
Transition and Organometallic Chemistry
Course Syllabus Spring 2019

1. General Information

Instructor: Andy Pacheco

Lecture: MWF 1:00 - 2:00 pm, NWQ G 587

Office Hours: By e-mail appointment (Chem 629)

E-mail: apacheco@uwm.edu

Text: None

2. Course Prerequisite: This course is designed for senior undergraduate and graduate students who have previously taken at least one general inorganic chemistry course such as Chem 311, or the equivalent at another institution.

3. Grading Summary: You will be given assignments throughout the semester, each worth an equal fraction of the total grade. There will be no in-class or final exam. For the last assignment you will choose a topic that you are interested in, and prepare a 20 minute Powerpoint presentation on that topic. The presentations will be given to the class during the final lecture slots.

For the written assignments, you may use any resources that you see fit, such as reference books or articles from journals. You may also consult me with questions, and you may even discuss the questions with other students in the class, prior to writing down your answers to the questions. *However*, you may not consult with other students *while you are writing up your answers*. Please be advised that it is very easy for me to tell if two or more students have collaborated in writing an answer. Each of you has a unique way of putting your thoughts on paper, and you cannot disguise it if you have copied the ideas from someone else! If two or more students collaborate in writing the answers to a problem set, all of the collaborators will receive a zero for that problem set.

4. Topics to be Covered (approximate):

- 4.1. A brief review/overview of symmetry, group theory and molecular orbital theory
- 4.2. Molecular orbital description of bonding in transition metal complexes
- 4.3. Crystal field theory and ligand field theory
- 4.4. UV/Vis spectroscopy of transition metal complexes
- 4.5. Magnetism in transition metal complexes
- 4.6. Inorganic reaction mechanisms of Werner compounds
- 4.7. Organometallic chemistry

5. Recommended Transition Metal References

- 5.1. M. Gerloch, E. C. Constable "Transition Metal Chemistry, The Valence Shell in d-Block Chemistry"; VCH, 1994. ISBN 1560818840; QD172.T6 G47x 1994.
- 5.2. C. J. Ballhausen "Introduction to Ligand Field Theory"; McGraw-Hill, 1962.
- 5.3. B. N. Figgis "Introduction to Ligand Fields"; Wiley, 1966.
- 5.4. B. N. Figgis, M. A. Hitchman "Ligand field theory and its applications"; Wiley, 2000.

6. Recommended General Inorganic Text Books

- 6.1 M. Weller, T. Overton, J. Rourke, F. Armstrong "Shriver and Atkins' Inorganic Chemistry, 7th edition"; Oxford University Press, 2008. ISBN 978-0-19-876812-8. Older editions, 4 - 6 should be readily available.
- 6.2. D. M. P. Mingos "Essential Trends in Inorganic Chemistry"; Oxford University Press, 1998. ISBN 0198501099; QD467.M64 1997.
- 6.3. F. A. Cotton, G. Wilkinson "Advanced inorganic chemistry : a comprehensive text, 5th edition"; J. Wiley and Sons, 1988. ISBN 0471849979; QD151.2 C68 1988 (6th edition now available, possibly in library).
- 6.4. Wulfsberg, G. "Inorganic Chemistry"; University Science Books, 2000. ISBN 1-891389-01-7; QD151.5.W84 2000.

7. Additional references

- 7.1. J. P. Collman, L. S. Hegedus “Principles and applications of organotransition metal chemistry”; University Science Books, 1980. ISBN 0935702032; QD411.C64
- 7.2. F. A. Cotton “Chemical Applications of Group Theory, 3rd edition”; J. Wiley and Sons, 1990. ISBN 0471510947 QD461.C65 1990
- 7.3. M. Gerloch “Orbitals Terms and States” J. Wiley and Sons, 1986. ISBN 047190936x QD461.G37 1986

8. University and Departmental Policies

For information regarding university policies on such subjects as students with disabilities, accommodations of religious observances, students called to military active duty, and other important topics, please visit the following web site maintained by the Secretary of the University: <http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf>.

Chemistry Department policies are posted on bulletin boards across from Chemistry 195 and Chemistry 164.