Lakehead
UNIVERSITY

DEPARTMENT OF CHEMISTRY

Chemistry 3371: Inorganic Chemistry II (Transition Metal Organometallic Chemistry)
Course Outline, Fall 2012

Contact Information

Instructor: C. D. MacKinnon
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Lab Instructor: Brad Miller (CB-2043A, 343-8233, bmiller@lakeheadu.ca)

Lectures: W, F 10:00-11:30 **Location**: CB-4122

Laboratory: M 11:30-2:30 (starting Sept. 17) **Location**: CB-2050

Prerequisite: Chemistry 2351

Course Overview: The course will introduce students to the transition metals, with an emphasis on the structure and bonding of organometallic compounds. Some reactions will also be introduced, and the laboratory component will emphasize organometallic synthetic methods.

Texts - The lab manual is required, the textbook is optional, but is the same as CHEM 2351.

1. Shriver and Atkins' Inorganic Chemistry, 5th Edition, Atkins, Overton, Rourke, Weller, Armstrong, and Hagerman, New York: W.H. Freeman and Co.
2. Chemistry 3371 Laboratory Manual, Department of Chemistry, Lakehead University, Fall 2012 version.

Marking Scheme

15%	term test
35%	final exam (scheduled by registrar)
30%	laboratory (5% each lab, 5% qualitative performance mark) Labs are due Monday 1 week after completion
10%	assignment(s)
10%	presentation (details to follow, these will be at the end of term)

Course Topics (Chapters are from Shriver and Atkins, but there will be substantial material taken from other sources)

Review Topics: Symmetry, molecular orbital theory (especially of diatomic molecules), crystal field theory, coordination chemistry. (*Ch. 2, 6, 9*)

1. *Ligand Field Theory* Bonding in coordination compounds, ligand-metal bonding, metal-metal bonding. *Chapters 7, 19, 20, 21*.
2. *Spectroscopy* Electronic (UV-vis), IR, and NMR spectroscopy of transition metal compounds. *Chapters 8, 20*.
3. *Organometallic Compounds* 18-electron rule, organometallic ligands. *Chapter 22*.
4. *Organometallic Reactions* Oxidative addition, reductive elimination, metathesis, electron-transfer reactions, etc. *Chapters 21, 22*.

BOOKS

The following are textbooks that cover the same material as Shriver and Atkins in a wide variety of ways. You may find them useful as supplementary texts. They are on reserve in the library.

- G.L. Miessler & D.A. Tarr, Inorganic Chemistry, 3rd edition, QD 151.2 M54 2004.
- Gary Wulfsberg, Inorganic Chemistry, QD 151.5 W84 2000.
- F.A. Cotton, G.W. Wilkinson, C.A. Murillo, M. Bochmann, Advanced Inorganic Chemistry, 6th edition, QD 151.2 C8 1999.
- R.H. Crabtree, The Organometallic Chemistry of the Transition Metals, 4th edition, QD 172 T6C73 2005

In addition, there are a number of older books available in the stacks that you can check out normally, including earlier editions of the above texts.

POLICY ON ELECTRONIC COMMUNICATION EQUIPMENT

Students attending class are expected to follow the Code of Student Behavior, and refrain from activities that distract their fellow students. This includes the use of electronic communication equipment (cell phones, Blackberries, etc.). Laptops, tablets, etc. may be used to take notes (not for games!). NO ELECTRONIC COMMUNICATION EQUIPMENT WHATSOEVER IS ALLOWED DURING TESTS/EXAMS (calculators are allowed).

POLICY ON PLAGIARISM

Plagiarism is a serious academic offense. In order to prevent misunderstandings about what constitutes plagiarism, the Department of Chemistry has prepared a document that clearly defines plagiarism, gives several examples and lists possible penalties. Students will have to sign a Plagiarism Certification that verifies that they have read and understoond the consequences of plagiarism as discussed in the *Code of Student Behaviour and Disciplinary Procedures* and the *Chemistry Department Policy on Plagiarism and Academic Integrity*. To read the policy, and to access/print the Certification Form, go to www.chemistry.lakeheadu.ca (click on "Academic Integrity Policy" on the left-hand menu).