

Senate Committee on Academic Standards, Curriculum & Pedagogy

BASIC COURSE OUTLINE

Science  
Chemistry

**Course:** Chem 4030. 3.0 - Instrumental Methods in Inorganic Chemistry

**Term:** Fall Term 2015

**Prerequisite / Co-requisite** Chem 3031 3.0

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**Course Instructor**

A B P Lever

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Petrie 141

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Course consultation hours: by appointment

**Time and Location**

Lectures                      W 7-10                      CB129

**Expanded Course Description**

Theory and applications of instrumental methods for investigating the structure and properties of inorganic and organometallic compounds. Magnetic resonance techniques (NQR and ESR) UV-Visible, Infrared, Raman and resonance Raman spectroscopy will be introduced and discussed.

This course is not intended to teach you how to obtain such physical data but rather explain how you can interpret such data once you have obtained them. To this end the course provides an understanding of how symmetry and group theory are applied to derive the electronic structure/ molecular orbital description etc of an inorganic species.

- Electronic spectroscopy, d-d and charge transfer spectra of transition metals.
- Infrared spectroscopy.
- Raman spectroscopy.
- Other techniques.
- Magnetic resonance spectroscopies. [if time permits]

- **Text(s) & Other Materials** No specific text is required. A reading list will be made available and key texts will be placed on reserve in the Steacie Science Library. Course Notes will be provided as Powerpoint files in advance of each lecture. Students will learn the rudiments of how to carry out chemical computation on their local computer and/or using Sharcnet.

## Course Objectives

### (1) Brief statement of the purpose:

To teach students of the next step to take when they possess data obtained from a range of experimental techniques,

### (2) Brief list of specific learning outcomes of the course

- A much more incisive understanding of the role of symmetry and group theory in Chemistry.
- The skills needed to derive the electronic structure of a metal complex.
- A much more detailed understanding of Molecular Orbital Theory
- The ability to carry out simple electronic structural calculations using Gaussian and GaussView
- This computational skill will be invaluable to students intending to follow higher degree studies in Chemistry.

## Course Text / Readings

Lecture Notes will be provided as Powerpoint files prior to each 3-hour lecture  
Additional readings may be assigned or recommended during the course.

## Evaluation

The final grade for the course will be based on the following items weighted as indicated:

Assignment #1:	20% [due by the date of the mid-term test]
Assignment #2:	20% [due at final exam date]
Mid-Term Test:	20%
Tutorial Participation:	10%
Final Examination:	30%

“Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles.”  
Assignments handed in prior to the due date will not be preferentially graded but students may benefit from general comment about areas in which they could usefully spend some more time studying.

Term Tests will be in the same Wednesday evening 7-10 pm time slot

## **Grading, Assignment Submission, Lateness Penalties and Missed Tests**

**Grading:** The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.). Assignments and tests will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90 to 100, A = 80 to 90, B+ = 75 to 79, etc.)

(For a full description of York grading system see the York University Undergraduate Calendar - <http://calendars.registrar.yorku.ca/2010-2011/academic/index.htm>)

**Assignment Submission:** Proper academic performance depends on students doing their work not only well, but on time. Accordingly, assignments for this course must be received on the due date specified for the assignment. Assignments are to be handed by the deadlines noted above.

**Lateness Penalty:** Assignments received later than the due date may be penalized. Exceptions to the lateness penalty for valid reasons such as illness, compassionate grounds, etc., may be entertained by the Course Instructor but will require supporting documentation (e.g., a doctor's letter).

**Missed Tests:** Students with a documented reason for missing a course test, such as illness, compassionate grounds, etc., which is confirmed by supporting documentation (e.g., doctor's letter) may request accommodation from the Course Instructor. (e.g., may be allowed to write a make-up test on a later date.) Further extensions or accommodation will require students to submit a formal petition to the Faculty.

## **IMPORTANT COURSE INFORMATION FOR STUDENTS**

All students are expected to familiarize themselves with the following information, available on the Senate Committee on Academic Standards, Curriculum & Pedagogy webpage (see Reports, Initiatives, Documents) - <http://secretariat.info.yorku.ca/files/CourseInformationForStudentsAugust2012.pdf>

- Senate Policy on Academic Honesty and the Academic Integrity Website
- Ethics Review Process for research involving human participants
- Course requirement accommodation for students with disabilities, including physical, medical, systemic, learning and psychiatric disabilities
- Student Conduct Standards
- Religious Observance Accommodation

*October 2015*