

Advanced Inorganic Chemistry 620 Chem. (2+0)

Catalogue Description

Metal-metal single and multiple bonds, transition metals hybrids, electron deficient compounds, lanthanides and actinides.

Aims and Objectives

- To consolidate knowledge of the chemistry of transition metals; metal-metal bonding and hybrid materials.
- To extend the descriptive chemistry of f-block elements.
- To improve the student's ability to critically assess selected current literature.
- To introduce the student to topics of current importance in inorganic chemistry.

Learning Outcomes

On completion of this course students will be able to:

- Build upon the knowledge of chemical bonding in metals based on previous bases of bonding.
- Understand the chemistry behind hybrid materials.
- Provide a deeper understanding of the chemistry of lanthanides and actinides.
- Review recent research in inorganic chemistry.

Skills Learning Outcomes

- Demonstrate an ability to carry out independent study on special topics.
- Show evidence of ability to use lecture material to solve problems.
- Confidence and tools in peer-peer evaluation.

Learning Content and Delivery

- Metal-metal single and multiple bonds. *Lectures & Independent reading assignment^a.*
- Supramolecular chemistry; hybrid materials and nanostructures. *Lectures*
- Lanthanides and Actinides. *Lectures*
- Topics from the Comprehensive exam. List. *Seminar^b*
- Materials of industrial significance: a selection of a number of topics from the recent literature will be chosen. The topics selected reflect recent important developments in inorganic chemistry in: *Research project^c.*
 - Inorganic composites.
 - Layered structure inorganic materials.

Teaching and Learning Activities

- The course will consist of lectures, assignments and seminar.
- The assignments and seminar will be structured so as to increase the problem-solving skills of the student and to encourage self-learning.
- Peer-to-peer evaluation (critique) of the seminar presentation ^d.

<http://sixminutes.dlugan.com/speech-evaluation-1-how-to-study-critique-speech/>
http://www.english.wisc.edu/rfyoung/333/Presentation_Evaluation_Form.pdf

Marking Scheme

- Reading Assignment 10%
- Midterm exam. 20%.
- Literature Research review: 20% .
- Seminar 10%: on selected topics of the comprehensive examination topics list.
- Final Examination: 40%

Course Calendar

Activity	Date	Date
Assignment	Week 5	16/10/2017
Midterm exam.	Week 7	30/10/2017
Seminar	Week 10	20/11/2017
Critique report	Week 11	27/11/2017
Literature review report	Week 13	11/12/2017
Final exam	Week 15	Upon agreement

Reading list

1. C. Housecroft and A. Sharpe, *Inorganic Chemistry*, 2nd edition, Pearson (free online copy)
2. P. Atkins, T. Overton, J. Rourke, M. Weller, F. Armstrong and M. Hagerman, *Shriver & Atkin's Inorganic Chemistry*, Oxford Univ. Press, 5th Edition. (free online copy).
3. F. Cotton and G. Wilkinson, *Advanced Inorganic Chemistry*, Wiley, 6th edition.
4. Cotton S., *The heavy transition elements*, MacMillan.
5. J. Steed and J. Atwood, *Supramolecular Chemistry*, 2nd Edition, Wiley.

^a Reading Assignment: Write a summary (2 pages, double space, 12 TR) of chapter 2 in reference 2; Molecular structure and bonding.

^b A seminar on a selected topic of the Comprehensive Examination list. Refer to Seminar2016 ppt and Seminar Materials document.

^c Research project; Refer to Research project ppt.

^d Critique report (form): use the form at the site below:

http://www.ucalgary.ca/chem/files/chem/601_603_alternate_evaluation_form.pdf