

SYLLABUS

Topics in Inorganic Chemistry

CHMD39H3, Fall 2019

Instructor Information

Instructor	Email	Office	Office hours will be announced on Quercus before semester starts.
Alen Hadzovic	ahadzovic@utsc.utoronto.ca	EV568	

Course Content

The major goal of this course is to serve as a review of important concepts in (inorganic) chemistry and introduce new material on the borderlines of the discipline. As such, the content is broad and varied. This year the course broad theme is “Structural Inorganic Chemistry”—everything that we do and talk about will focus on structural aspects of inorganic compounds. We’ll also try to make some sense of how molecular structure dictates compound properties. The topic will include (not really in any specific order):

1. A bit of review: solid state structures, symmetry, bonding etc.
2. Understanding published single crystal X ray analysis data and results
3. More from IR and NMR spectroscopies: a few case studies from literature
4. What else can be done with structural data?
 - a. Parametrization of metal complexes and ligands
 - b. Metal separation
 - c. Catalysis and structure
5. Structures and properties of inorganic polymers
 - a. Variety of structural classifications
 - b. Physical properties specific for polymers
 - c. Inorganic polymers in nature: elements and silicate minerals revisited
 - d. Inorganic polymers containing main group elements only
 - e. Inorganic polymers containing transition metals
 - f. Polyoxometallates as oligomers

Note that the above is a list of topics we'll talk about, not necessarily a week-by-week lecture schedule. I would like to have discussion and fluidity in the class as opposed to a strict lecture-by-lecture material (Although, admittedly, some material you have not encountered before will require a more formal lecture approach). Thus, little material will be provided as lecture notes in this course. I hope that this would allow us not only to learn more about structural chemistry but also review a lot of inorganic material from CHMB31 and CHMC31. For each lecture there will be a very short handout available on the learning portal (Quercus) outlining the required readings, suggested readings, lecture goals and questions that go beyond the material covered. As you could expect, this course does not have a textbook (although your CHMB31/C31 textbook is still useful as a background source). Most of the readings are available on-line. The relevant lecture notes from CHMB31 and CHMC31 will be re-posted on CHMD39 site (just in case you 'lost' them....). Other listed readings you will have to locate through the UofT library catalogue. Those books/articles that are listed as readings but are not available on-line are placed on a short-term loan for CHMD39 in UTSC library. You are strongly encouraged to research beyond the provided lists.

The list might look like a slapdash collection of topics that your instructor dreamt up during a delirium, but as you will see each topic leans on the one before (more-or-less). Thus, if we do not cover all material during one lecture, we can easily move the 'leftovers' to next week or discussion board on blackboard. It will also demonstrate what is expected from you in the evaluations.

Evaluation components:

Two assignments (homework): 20%

Paper (on selected topic): 20%

Short presentation (on above paper): 20%

Discussions/preparation/participation: 10%

Final exam: 30%

The assignments. For each of two assignments you will have to write a short summary (or 'review') of three or more assigned articles/book parts (those will be given in the assignment). The length of summary depends on the number of assigned articles and topic and will be communicated to you in

the assignment. On top of this—I consider everything to be a fair game (calculations, reactivity, etc.) at this level and in this course type.

Paper/short presentation. You can pick a topic your own topic, but I would strongly advise you to check with me if the topic is acceptable and if the content is still on the right track as you work on your paper. The main criterion is that your topic has to touch at least two of the course themes: structural methods (X-ray, IR etc.), polymers, synthesis, historically important inorganic/organometallic structural problems, and application of structural results to solve questions in reactivity. Your paper should be concise, about 7-8 pages in length with 5-7 sources used (as current as possible!). You will have a 15-minute presentation followed by Q&A. The presentations will be scheduled in class at the end of the course. The presentation schedule will be posted at least one week before the presentations start.

Discussions. One of the overall goals of this course is to make you review, question and re-think the material covered in earlier courses (starting from high school science classes). This prior knowledge is expected and fundamental for understanding of the in-class material. This part of evaluation will look at your ability to ask questions and navigate through old and new and make relevant connections through discussions.

Final exam. Our final exam will be cumulative and scheduled outside regular class hours. The exam questions will be integrative, i.e. would cover more than one topic listed above, because (again) you have to show the ability to relate two or more complex concepts in one coherent answer. Keep in mind that you are not supposed to be experts in all we cover; rather you have to be able to comfortably navigate through material that could usually be found in published full papers. A good hint: look at the questions at the end of lecture hand-outs; some of them ‘might’ appear on the final.

Office hours and contact info

My office is located in the Environmental Sciences and Chemistry Building (behind the Instructional Center), 5th floor, room EV568. The office hours’ schedule will be posted on Quercus as soon as my schedule is finalized but prior to the start of the semester. If you would like to see me outside the office hours (for any reason), please e-mail me and we’ll schedule the time. You can pay me a visit before the semester starts and before announcement of the regular office hours.

I can also be reached via e-mail: ahadzovic@utsc.utoronto.ca.

CHMD39H3 Resources

The reading materials are different for each lecture. They will be provided on the learning portal about a week before each lecture. An electronic copy (pdf file) will be provided only for the sources that are not available on-line through UofT system or physically at UTSC library – those are very few. So majority of material you'll have to find following the provided list. Of course, you are free to use our inorganic chemistry textbook as refresher source, old CHMB31 and CHMC31 notes as well as any other material you find interesting.

Academic Integrity

Academic integrity is one of the cornerstones of the University of Toronto. It is critically important both to maintain our community which honors the values of honesty, trust, respect, fairness and responsibility. It also protects you, the student within our community as well as the value of the degree towards which you are all working so diligently. Detailed information about how to act with academic integrity, the Code of Behavior on Academic Matters, and the processes by which allegations of academic misconduct are resolved can be found online:

<http://www.artsci.utoronto.ca/osai/students> and

http://www.utsc.utoronto.ca/~vpdean/academic_integrity.html

Section B of the University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) lists actions that are considered academic offences. Some of the most common offences are:

- To use someone else's ideas or words in their own work without acknowledging that those ideas/words are not their own with a citation and quotation marks, i.e. to commit **plagiarism**.
- To include **false, misleading or concocted** citations in their work.
- To obtain **unauthorized** assistance on any assignment.
- To provide **unauthorized** assistance to another student. *This includes showing another student completed work.*
- To submit their own work for credit in **more than one course** without the permission of the instructor.

- To **falsify** or **alter** any documentation required by the University. This includes, but is not limited to, doctor's notes.
- To use or possess an unauthorized aid in any test or exam.

There are other offences covered under the Code, but these are by far the most common. Please respect these rules and the values, which they protect. Offences against academic integrity will be dealt with according to the procedures outlined in the Code of Behavior on Academic Matters.

Accessibility

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office (ability@utsc.utoronto.ca) as soon as possible. I will work with you and AccessAbility Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC AccessAbility Services staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. More details are available at: <http://www.utsc.utoronto.ca/~ability/>.

GOOD LUCK AND SEE YOU SOON!!

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