

# SYLLABUS

## Topics in Inorganic Chemistry

CHMD39H3, Fall 2018

### Instructor Information

Instructor	Email	Office	Office hours will be announced on Quercus before semester starts.
Alen Hadzovic	<a href="mailto:ahadzovic@utsc.utoronto.ca">ahadzovic@utsc.utoronto.ca</a>	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 theme is “On Hydrogen and Elements”—everything that we do and talk about will focus on hydrogen and its chemistry in one form or another while the general concept of “chemical element” will be a frequent point for a discussion. The topic will include:

1. Hydrogen and history of chemistry (including accounts of science in general)
2. Hydrogen and the birth of elements (a more detailed look at the first steps of nucleosynthesis and radioactivity in general)
3. Hydrogen and astrochemistry/cosmochemistry
4. Hydrogen and acid-base chemistry (definition of acids, superacids and super bases)
5. Hydrogen and molecular structure (a brief look at X-ray crystallography)
6. Hydrogen and industry (a detailed look at the production of syn gas and intro to industrial production of elements)
7. Hydrogen and hydrogen bond (what on Earth is hydrogen bond?)
8. Hydrogen and NMR (more on proton NMR in inorganic chemistry)
9. (Di)hydrogen vs. (di)hydride complexes of transition metals (a more in-depth look)
10. Making and breaking the bond: from  $H_2$  to  $2H$  and from  $H_2$  to  $H^+ + H^-$ .

For each topic 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. Otherwise, little material will be provided in terms of lecture notes in this course. You are 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.** The list of potential paper and presentation topics will be available on the blackboard. You can pick a topic from the list or you can come up with your own topic as long as it deals with hydrogen and inorganic chemistry; make sure, however, to check with me if the topic is acceptable! Each topic on the list contains an outline of what is required and what to focus on as guidelines. Your paper should be concise, about 7-8 pages in length with 5-7 sources used (as current as possible!). You will have a 10 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 the topics above; rather you have to be able to comfortably navigate through material that could usually be found in different courses. 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), 5<sup>th</sup> 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](mailto: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.uts.utoronto.ca/~vpdean/academic\\_integrity.html](http://www.uts.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](mailto: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!!***

**AH**