Biological Inorganic Chemistry (CHMD69H3)

Biological inorganic chemistry course (CHMD69H3) will bring you the world of inorganic chemistry in living systems. We shall predominantly concentrate on structure and reactivity of metalloproteins: proteins whose structure and/or function depend on the presence of one or more metallic centers; focusing on their structure, reactivity and role in the living systems. Applications of physical methods to the problems in biological inorganic chemistry will also be briefly discussed using specific examples. In order to follow the course material some background in following topics is very important and will be assumed through the course:

Inorganic and coordination chemistry (transition metals in particular)
Basic concepts from biochemistry (proteins, DNA and RNA)
Basic principles of structural methods in inorganic chemistry
Cell structure

6. Redox metalloproteins.

Bectron carriers vs. oxido-reductases

Bectron sources and electron chains in living systems

Iron sulfur proteins

Cytochromes

Copper proteins

Respiration

7. Further on oxygen metabolism.

Superoxide dismutase

Peroxidases

- 8. Hydrogen metabolism hydrogenases
- 9. Nitrogen metabolism t nitrogenases

Course Evaluation

Assignment 10%
Abstract of your paper/talk 5%
Review paper 20%
Lecture based on paper 20%
Final exam 45%

The assignment is going to be posted on the blackboard on Monday, February 13th and is due in class Monday February 27th.

You are required to write a paper (1800 to 2000 words in length) and give a 20 min lecture (15 min for your talk + 5 min for Q&A) on a topic you select. The list of suggested topics will be provided separately on the blackboard. You can also suggest a topic that is not on the list but you have to check the suitability of your choice with me. More details on the paper requirements will be provided with the list of possible topics. The deadline for the submission of a hard-copy of your paper is Monday March 20th in class. You also have to upload an electronic copy of your work to TurnItIn.com no later than Sunday, March 19th, 11:59pm! In this regard, placed from 10239866papering:

[&]quot;Normally, students will be required to su1.04 (o)5() 154.81 368.47 Tm0 g0 Q(p)3(o)-5(st)9(ed)10(o)-5(n)3(t)-3(h)3(e)-3(b)3

collected abstracts will be posted on the course blackboard. The final exam is going to have question(s) based on these abstracts, thus this minimum knowledge from your lectures is required material and is testable.

The exact date for the final exam will be announced during the semester. You can find examples of final exams on the library website. Apart from CHMD69 finals, you can also browse through CHM437 finals (CHM437 is downtown equivalent of CHMD69).

Office hours and contact info

My office is located in the new environmental sciences and chemistry building (behind the Instructional Center), 5^{th} floor, room EV564. The office hours schedule will be posted on the Blackboard portal (under Z) v š . If you would like to see me outside the office hours (for any reason), please e- u] o u v 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.

Course readings



The course textbook is:

Bertini, I., Gray, H. B., Stiefel, E. I., and Valentine, J. S. (Eds.). Biological inorganic chemistry: Structure and reactivit/Mill Valley, CA: University Science Books, 2007.

This textbook is available as an ebook through the UofTlibrary system.

Another important on-line source is The Guided Tour of Metalloproteins

Some other useful books are (can be found in the library):

Housecroft, C.E. and Alan G. Sharpe. Inorganic Chemistry. 4th ed. Harlow: Pearson t Prentice Hall, 2008.

Atkins, Overtone, Rouke, Weller, Armstrong and Hagerman. ^ Z CE] À CE v š I] ohe[nistry] 67 ed. Me]w

York: W.H. Freeman and Company, 2014.

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Kaim, W., and Schwederski, B. Bioinorganic chemistry: Inorganic elements in the chemistry of life t An introduction and guide. Chichester: John Wiley & Sons, 1994.

Ochai, E. Bioinorganic chemistry: A survey. Amsterdam: Elsevier t. Academic Press, 2008.

Frausto da SIva, JJR, and Williams, R J P. The biological chemistry of the elements: The inorganic chemistry of life. 2nd ed. Oxford: Oxford University Press, 2001.

Cowan, J. A. Inorganic biochemistry: An introduction. 2nd ed. New York: VCH, 1993.

Kraatz, B., and Metzler Nolte, N. Concepts and models of bioinorganic chemistry. New York: Wiley, 2006.

Crichton, R. Biological inorganic chemistry: An introduction. Amsterdam: Esevier: 2008.

Important references from current literature will be provided throughout the course on the lecture slides.

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

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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/.