

CHM B20H3 and B23H3 SYLLABUS - Fall 2021

Chemical Thermodynamics and Elementary Kinetics

Instructor: Si Yue Guo (siyue.guo@utoronto.ca); CHM B23 lab component: James Donaldson

Lectures: Online, asynchronous, posted on Quercus (q.utoronto.ca)

Office Hours: Wed 9-10 am, Fri 2-3 pm¹ (<https://utoronto.zoom.us/j/85134161932>, PW: 2023), or by appointment.

Textbook: *Physical Chemistry Vol. 1: Thermodynamics and Kinetics*, 11th Ed., by Atkins, de Paula, and Keeler

Description: Physical chemistry is concerned with the physical principles underlying the interactions and transformations of matter. It provides a qualitative and quantitative foundation for disciplines such as chemistry, biology, medicine, and engineering. The first part of this course will focus on chemical thermodynamics: the concept of chemical potential, phase equilibria, solutions, chemical equilibria, and electrochemical applications. The second part will focus on elementary reaction kinetics: elementary reactions, multi-step and coupled reactions with biochemical applications, and elementary collision theory and transition state theory.

Delivery format: The course is an asynchronous online course. There is no requirement for attendance at a specific time or location for lectures. However, in-person attendance could be required for certain activities such as tutorials and laboratories. Lecture videos and assignments (where applicable) will be posted on Quercus on the first day of each week. Students will work on their own time but must submit assignments and term tests before the due date.

Email policy: For questions pertaining to the course, please use the Quercus discussion board and either I, a TA, or even a fellow classmate will respond to your post. If the question is not appropriate for this forum, send me an email using your official utoronto.ca email address and including the course number in the subject. My policy is to reply within 2 business days, so please plan accordingly.

Grading Scheme:

Evaluation	CHM B20	CHM B23
Quizzes (ongoing)	5%	5%
Assignment × 5	5% × 5 = 25%	3% × 5 = 15%
Term tests × 2	15% + 20% = 35%	10% + 15% = 25%
Laboratory and tutorial	n/a	20%
Final exam	35%	35%
Total	100%	100%

Coursework submission: Submit your assignments and tests by uploading a PDF of your work, taken using a mobile device, tablet, or scanner. Of course, you are also welcome to type out your work. Please ensure that the document is clear and legible and give yourself time to digitize and upload your assignment. All quizzes and assignments are due by midnight on Sunday of the week they are assigned.

¹ All times are given in local Toronto time (Eastern Time Zone)

Quizzes: There will be regular multiple-choice quizzes administered in Quercus. They are intended to help you check your understanding of the course material as you watch the lecture videos and progress through the course. Each quiz is worth 5 points and your final grade will be calculated from the sum of all the quizzes.

Assignments: There will be five assignments, each consisting of a problem set and due approximately every two weeks (see course schedule below). The problem set will be posted on Quercus at the start of the week and you will be expected to submit a PDF of your work by midnight on Sunday.

Labs and tutorials: More information will be provided in the first week of class.

Term tests: There will be two open-book term tests. You can use any textbook you wish but you may not consult anyone else, including fellow students and online tutoring services. You will have 24 hours to complete each test.

Late assignment and missed test policy: Late assignments are subjected to a 10% penalty per day. Except under special circumstances, arranged with me, there will be no makeup tests. If you miss a test, the weighting will be adjusted accordingly. If you miss a test or an assignment due to illness, an official UTSC medical note will need to be provided to avoid a mark of zero.

Tentative Course Schedule:

Wk	Date	Topic	Chapter	Notes
1	Sep 7	Math review and perfect gases	1A	
2	Sep 13	The kinetic model and real gases	1B,C	
3	Sep 20	1st law of thermodynamics	2A,B,C	Assignment 1 due
4	Sep 27	1st law (cont'd), 2nd and 3rd laws of thermodynamics	2D,E; 3A,B,C	
5	Oct 4	2nd and 3rd laws (cont'd); Physical transformations of pure substances	3D,E; 4	<u>Test 1 - Oct 6</u> (Ch. 1-3)
Thanksgiving Day and Reading Week (Oct 11-15)				
6	Oct 18	Simple mixtures	5A,B,C	Assignment 2 due
7	Oct 25	Activities and chemical equilibrium	5F; 6	
8	Nov 1	Molecules in motion	16	Assignment 3 due
9	Nov 8	Chemical kinetics	17A,B,C,E	<u>Test 2 - Nov 10</u> (Ch. 4-6,16)
10	Nov 15	Chemical kinetics (cont'd) and reaction dynamics	17F,D; 18A,B	Assignment 4 due
11	Nov 22	Reaction dynamics (cont'd) and processes at solid surfaces	18C; 19A	
12	Nov 29	Processes at solid surfaces (cont'd)	19B,C	Assignment 5 due
13	Dec 6	Review		Final Exam (summative) - date tbd

Also available as a Google Calendar (<https://tinyurl.com/chmb2023>).

Accessibility needs:

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, please reach out to me or the [AccessAbility Services](https://www.utoronto.ca/ability/welcome-accessability-services) (<https://www.utoronto.ca/ability/welcome-accessability-services>) as soon as possible.

Academic integrity: Cheating on tests and assignments is unacceptable and ultimately detrimental to your learning experience. It will be dealt with seriously. While I do encourage group discussion of problem solving, especially during this period of virtual learning, I expect each student to produce their own assignment. It is obvious to the markers when one person has done the work and others have copied it.

The University of Toronto's [Code of Behavior on Academic Matters](#) outlines the behaviour that constitutes academic dishonesty and the processes for addressing academic offences. Potential offences include but are not limited to:

- In papers and assignments: using someone else's ideas or words without appropriate acknowledgement, submitting your own work in more than one course without the permission of the instructor, making up sources or facts, obtaining or providing unauthorized assistance on any assignment.
- On tests and exams: using or possessing unauthorized aids, looking at someone else's answers during an exam or test, misrepresenting your identity.
- In academic work: falsifying institutional documents or grades, falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (www.utoronto.ca/academicintegrity/resourcesforstudents.html).

Code of conduct:

Please be respectful of one another in all of your interactions, in person, in video conferences, online, and on discussion boards. Behaviour violating the U of T [Code of Student Conduct](#) will not be tolerated.

Other resources:

The following are some important links to help you with academic and/or technical service and support:

- Centre for Teaching and Learning: <https://www.utoronto.ca/ctl/student-support>
- Math & Statistics Learning Centre: <http://ctl.utoronto.ca/mslc>
- Mental Health Services: <https://utoronto.ca/hwc/mental-health-services-and-resources-utsc-students>