

CHM 135H: Chemistry: Physical Principles

Course Syllabus: Winter 2022

I CONTACTS

Hello and welcome to CHM135!! Here is your teaching team. We are all very excited to get to know and support you over the semester.

Class Instructors



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II COURSE OVERVIEW

Welcome to CHM 135H – Chemistry: Physical Principles! CHM 135H is designed to provide a foundation in physical chemistry for students who intend to follow a science program, primarily in the Life or Health Sciences. Along with CHM 136H (Introductory Organic Chemistry I), these are also the recommended courses for those applying for entry into professional programs. CHM 135H and CHM 136H are also acceptable for admission to any of the undergraduate programs offered by the

Department of Chemistry. High-school level Chemistry SCH4U and Mathematics MHF4U + MCV4U or their equivalents are pre-requisites for CHM 135H, and this course is a pre-requisite for CHM 136H.

STUDENT LEARNING OUTCOMES

By the end of CHM 135H, successful students will be able to

- describe macroscopic properties of chemical substances and explain how atomic or molecular behaviour accounts for those properties, including in everyday situations.
- solve quantitative chemical problems and interpret the solutions in consideration of molecular behaviour
- appreciate the interdisciplinary nature of chemistry and relate chemical concepts to problems in other disciplines

TEXTBOOK AND ONLINE HOMEWORK

The required course textbook is "Chemistry: The Molecular Nature of Matter and Change" 9th Edition by Martin Silberberg and Patricia Amateis. The textbook is available either as a print book or [e-book](#) through the [U of T Bookstore](#) at reduced cost.

III HOW THE COURSE IS ORGANIZED

During Winter 2022, CHM 135H will be offered fully online, so there is **no in-person scheduled classroom time**. Each week, you will attend live (synchronous) classes and tutorial sessions. In lieu of in-person laboratories this year, you will also complete five virtual experiments and meet synchronously five times to discuss those experiments over the course of the semester. There will be online student hours for both the "class" and "practical" content to support your learning.

You will join each synchronous class in Zoom, which can be accessed through your CHM 135H LEC course tile in Quercus. You can also access the class student hours via Zoom using the same link. These student hours will give you the opportunity to discuss the course content with your instructors and other students.

Structure of the first (Units 1 & 2) and last thirds (Units 5 & 6) of the course:

Lecture Content: Delivered synchronously via zoom at the scheduled times; Tuesdays, Wednesdays and Fridays from 12-1 pm ET. Lectures will be recorded and posted for later viewing

Student Hours: Wednesdays and Fridays at 1-2 pm ET (after class) via Zoom

Structure of the middle third (Units 3 & 4) of the course:

Lecture Content: Delivered via asynchronous videos posted the Monday of each week. These videos will be supplemented by a synchronous problem-solving session every Friday from 12-1 pm ET via zoom. The problem-solving sessions will be recorded and posted for later viewing

Student Hours: Mondays 1-2 pm ET (during class time) via Zoom

LECTURE SCHEDULE

Week	Lecture and Tutorial Topic	Textbook Sections	Lecture Date	Instructor and Lecture Format	Tutorial	Lab
1 Jan 10-14	Unit 1a – Tutorial 1 High school refresher	Ch. 1-4 (parts only)	Tues Jan 11	D'eon Synchronous		
			Wed Jan 12			
			Fri Jan 14			
2 Jan 17-21	Unit 1b – Tutorial 2 Quantum Theory and Atomic Structure	Ch. 7.1-7.4, 8.1-8.3	Tues Jan 18 Wed Jan 19 Fri Jan 21	D'eon Synchronous	1 Unit 1a	
3 Jan 24-28	Unit 2a – Tutorial 3 Bonding, Intramolecular Forces, Gases	Ch. 9.1-9.3, 9.5, 10.1-10.3 12.3, 5-1-5.5	Tues Jan 25	D'eon Synchronous	2 Unit 1b	Lab 1
			Wed Jan 26			
			Fri Jan 28			
4 Jan 31- Feb 4	Unit 2b – Tutorial 4 States of Matter, Phase Changes, Solutions	Ch. 12.1, 12.2, 12.4, 13.1, 13.3, 13.4, 13.5, 13.6	Tues Feb 1	D'eon Synchronous	3 Unit 2a	
			Wed Feb 2			
			Fri Feb 4			
5 Feb 7-11	Unit 3 – Tutorial 5 Kinetics	Ch. 16	Tues Feb 8	D'eon Test #1 Prep	4 Unit 2b	Lab 2
			Wed Feb 9	Term Test #1		
			Fri Feb 11	Kumacheva PS Session		
6 Feb 14-18	Unit 4a – Tutorial 6 Equilibrium	Ch. 17	Tues Feb 15	Kumacheva – Student Hours	5 Unit 3	
			Wed Feb 16	D'eon – Term Test #1 Debrief		
			Fri Feb 18	Kumacheva – PS Session		
Feb 21-25	Reading week					
7 Feb 28- Mar 4	Unit 4b – Tutorial 7 Acids and Bases	Ch. 18	Tues Mar 1	Kumacheva – Student Hours	6 Unit 4a	Lab 3
			Wed Mar 2	D'eon – Test #2 Prep		
			Fri Mar 4	Kumacheva – PS Session		
8 Mar 7-11	Unit 4c – Tutorial 8 Buffers, Titrations	Ch. 19.1, 19.2	Tues Mar 8	Kumacheva – Student Hours	7 Unit 4b	
			Wed Mar 9	Term Test #2		
			Fri Mar 11	Kumacheva – PS Session		
9 Mar 14- 18	Unit 5a – Tutorial 9 Thermochemistry	Ch. 6.1-6.6	Tues Mar 15	Browning Synchronous	8 Unit 4c	Lab 4
			Wed Mar 16			
			Fri Mar 18			
10 Mar 21- 25	Unit 5b – Tutorial 10 Thermodynamics	Ch. 20.1-20.4	Tues Mar 22	Browning Synchronous	9 Unit 5a	
			Wed Mar 23			
			Fri Mar 25			
11 Mar 28- Apr 1	Unit 6a – Tutorial 11 Electrochemistry	Ch. 20.4, 4.4, 4.5, 21.1-21.4	Tues Mar 29	Browning Synchronous	10 Unit 5b	Lab 5
			Wed Mar 30	Term Test #3		
			Fri Apr 1	Browning Synchronous		
12 Apr 4-8	Unit 6b – No Tutorial Electrochemistry	Ch. 21.5-21.7	Tues Apr 5	Browning Synchronous	11 Unit 6	
			Wed Apr 6			
			Fri Apr 8			
Apr 11-29	Final Assessment Period		TBD	Term Test #4		

Note: The above schedule is approximate. The textbook chapters are a **rough guide** to the material. We will not cover all parts of each chapter section and some material may be covered in class that is not in the textbook.

DISCUSSION BOARD

In addition to student hours, we will be using Ed Discussion, a free platform that facilitates online Q&A discussions. Information on how to join Ed can be found in your Quercus CHM 135H LEC course tile. We highly encourage you to ask your content questions on Ed where all students can benefit and collaborate on responses to these questions. Let's all learn together! The teaching team will be monitoring the discussion board and providing input as needed, although we expect students to help each other.

Note that sharing solutions to report sheet, quiz, and TeamUp! questions (through Ed Discussion or through other means) is in violation of University of Toronto's Code of Behaviour on Academic Matters (see Academic Integrity section of syllabus.)

TUTORIALS

Tutorial sessions will meet each week synchronously starting on the week of January 17th. **It is essential that you have enrolled in a tutorial section through ACORN/ROSI.**

The objectives of the CHM 135H tutorial are (i) to re-visit the course content seen in synchronous classes; (ii) to solve problems in smaller groups and with your teaching assistant; and (iii) to give you an opportunity to work in a smaller group environment. These smaller tutorial sessions will also provide a chance to meet your peers and build a community within the large course. In your CHM 135H TUT course tile in Quercus, you will find the following information:

- 1) Weekly textbook problems and solutions
- 2) A discussion board to meet your peers
- 3) Links to synchronous tutorial sessions via Zoom
- 4) Links to TeamUp! group quizzes (starting Tutorial 2)

The TeamUp! group quizzes will be completed during tutorial and only your best 8 of 11 TeamUp! scores will count towards your final grade. There will be no make-up TeamUp! quizzes. Dropping the lowest two scores will account for any necessary absences.

Active student participation in problem solving through completion of homework is linked to success in learning chemistry: the online homework, as well as the assigned textbook problems, will provide you an important opportunity for self-assessment, and help you make sure you are keeping up with the course materials and are essential preparation for tutorial. During your tutorial sessions, your tutorial teaching assistant (TA) will discuss any questions that you may have concerning the assigned exercises and assist you in understanding the important concepts of the course material.

Chemistry is an area of study that relies on problem-solving. In order to learn chemistry and be successful on the course assessments, you need to **practice**. Remember that you are the best judge of your own learning (provided that you are honest with yourself!)

PRACTICALS

In CHM 135H, you will carry out, record, and interpret the results of five virtual chemistry experiments. Each experiment will consist of a module on the CHM 135H PRA course tile on Quercus. You will read through the experiment and complete a pre-lab quiz **before** meeting with your practical

group and teaching assistant to discuss the experiment. After completing the experimental tasks, you will answer report sheet questions on Quercus for your lab report. More details are available on the CHM 135H PRA course tile on Quercus. Help will be available during the practical student hours which are offered via Zoom with the links available on the PRA course tile on Quercus.

The practical section synchronous session will meet on the following weeks: Jan 24-28, Feb 7-11, Feb 28-Mar 4, Mar 14-19 and Mar 22-26. The specific weekday and the time will depend on your chosen Practical section. **It is essential that you have enrolled in a practical section through ACORN/ROSI.**

IV GRADING SCHEME

Tutorial Quizzes (TeamUp!): 5% (best 8 of 11 count towards your mark)

Practical: 30%

Test 1: Wednesday, Feb. 9th 12-1 pm EST: 18%*

Test 2: Wednesday, Mar. 9th 12-2 pm EST: 18%*

Test 3: Wednesday, Mar. 30th 12-2 pm EDT: 18%*

Test 4: (during final assessment period, date TBD): 18%*

* the lowest of the four test scores will be weighted at 11%, such that the four tests will account for 65% of the final course grade

All tests in CHM 135H will be online, cumulative, multiple-choice assessments.

For students missing one test for a valid reason, the missed test mark will be calculated based on performance on the other three tests and class average of the other tests. **For students missing two or more tests for valid reasons, the mark for the missing tests will be replaced by a cumulative oral assessment via Zoom.**

IMPORTANT: if an unexpected technical issue occurs with a university system (e.g., Quercus services, network outage) that affects availability or functionality, it may be necessary to revise the timing or weighting of the quizzes/term tests.

V COURSE POLICIES

Each member of this course is expected to maintain a:

- professional and respectful attitude during all course activities, including classes, laboratories, tutorials, and other online activities.
- personal calendar/schedule/organizer to ensure that all course activities are completed, and due dates are met.
- collection of notes recorded independently based on concepts covered in course activities (students registered with Accessibility Services requiring a class note-taker will have access to this accommodation)
- familiarity with the university policy on Academic Integrity

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and

respect one another's differences. The CHM 135 Teaching team will neither condone nor tolerate behaviour that undermines the dignity or self-esteem of any individual in this course and we wish to be alerted to any attempt to create an intimidating or hostile environment. It is our collective responsibility to create a space that is inclusive and welcomes discussion. Discrimination, harassment, and hate speech will not be tolerated. If you have any questions, comments, or concerns, we encourage you to reach out to the staff in our Equity Offices.

E-mail

- For issues with **non-academic** problems, such as conflicts, illness, and academic accommodations, please email the course coordinator, Prof. D'eon.
- For course content questions, please ask during your tutorial, during the online student hours or post your question on the course discussion board. **Please keep in mind that email is not the mechanism to receive explanations of course material.**
- For Practical-related concerns, please asking during your Practical session or during Practical office hours with the teaching team.
- For other course concerns, please email Prof. D'eon, the course coordinator.
- When you e-mail an individual in the teaching team, please include your full name and student number and identify yourself as a CHM135 student, making sure to use your UTORID email address. Keep the language and tone of your email professional. Email only **one** member of the teaching team. 😊 We will forward the e-mail to the correct person if necessary.
- Most emails will receive a reply within 24 hours of being sent (except on weekends) but keep your expectations reasonable as to the degree of detail that an email reply to your enquiry can realistically provide.
- Note that the tutorial and practical teaching assistants (TAs) cannot provide any assistance via email.

Privacy policy

Parts of this course, including your participation, will be recorded on video and will be available to students in the course for viewing remotely and after each session.

Absences

Students who are absent from class for any reason (e.g., COVID, other illness or injury, family situation) and who require consideration for missed academic work should report their absence through the online absence declaration. The declaration is available on [ACORN](#) under the Profile and Settings menu. You must also advise, Prof. D'eon, the Course Coordinator as soon as possible and within one week of your illness to receive consideration for any missed work.

VI TECHNOLOGY REQUIREMENTS

Specific guidance from the U of T Vice-Provost, Students regarding student technology requirements is available here: <https://www.viceprovoststudents.utoronto.ca/covid-19/tech-requirements-online-learning/>

Advice for students more broadly regarding online learning is available here: <https://onlinelearning.utoronto.ca/getting-ready-for-online/>

This course requires the use of computers, and technical issues are possible. When working on an assignment, students are responsible for scheduling enough time to allow for reasonable delays due to technical difficulties to be overcome, so such issues will not be acceptable grounds for deadline extension. Particularly, maintaining an up-to-date, independent backup copy of your work is strongly recommended to guard against e.g. hard-drive failures, corrupted files, lost computers, etc. We encourage you to spend a moment at the start of the semester to make a plan for what you would do if you lost access to the computer that you primarily intend to use, which will help ensure that you are prepared for this unlikely possibility.

VII INSTITUTIONAL POLICIES AND SUPPORT

ACADEMIC INTEGRITY

As a teaching team we want you to feel supported in your learning and so we encourage you to seek guidance from your instructors in student hours and your TAs during tutorial and the extra help sessions. You are also encouraged to discuss the course content with your peers and learn together. This being said, please make sure the work you submit in the lab quizzes and reports, and on the tests is entirely your own. What this means is you can seek guidance on the topics and general knowledge from others but when you sit down to answer the questions it must represent your work and your understanding.

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

On lab reports:

1. Using someone else's ideas or words without appropriate acknowledgement.
2. Submitting your own work in more than one course without the permission of the instructor.
3. Making up sources or facts.
4. Obtaining or providing unauthorized assistance on any report. **Please note that the use of websites (such as Chegg.com or the course discussion board) to post virtual laboratory report material/questions or to post/access answers to questions is an academic offence under the University of Toronto's Code of Behaviour on Academic Matters. Alleged instances of this nature are forwarded to the Faculty of Arts & Science Student Academic Integrity office.**

On quizzes and term tests:

1. Using or possessing unauthorized aids. **Please note that the use of websites (such as Chegg.com or the course discussion board) to post quiz/term test questions or to post/access answers to questions is an academic offence under the University of Toronto's Code of Behaviour on Academic Matters. Alleged instances of this nature are forwarded to the Faculty of Arts & Science Student Academic Integrity office.**
2. Looking at someone else's answers or collaborating/discussing answers during a quiz or term test.

3. Misrepresenting your identity.

In general academic work:

1. Falsifying institutional documents or grades.
2. Falsifying or altering any documentation required by the University.

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 (see www.academicintegrity.utoronto.ca/).

COPYRIGHT

If a student wishes to copy or reproduce class presentations, course notes or other similar materials provided by instructors, he or she must obtain the instructor's written consent beforehand. Otherwise, all such reproduction is an infringement of copyright and is absolutely prohibited. More information regarding this is available here: <https://teaching.utoronto.ca/ed-tech/audio-video/copyright-considerations/>

ACCESSIBILITY NEEDS

Students with diverse learning styles and needs are welcome in this course. The University of Toronto is committed to accessibility: if you require accommodations for a disability, or have any other accessibility concerns about the course, please contact [Accessibility Services](#) as soon as possible.

ACCOMMODATIONS FOR RELIGIOUS OBSERVANCES

Following the University's policies, reasonable accommodations will be made for students who observe religious holy days that coincide with the due date/time of an assignment, tutorial, class or laboratory session. Students must inform the instructor **before** the session/assignment date to arrange accommodations.

ADDITIONAL SERVICES & SUPPORT

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

- General student services and resources at [Student Life](#)
- Full library service through [University of Toronto Libraries](#)
- Resources on conducting online research through [University Libraries Research](#)
- Resources on academic support from the [Academic Success Centre](#)
- Learner support at the [Writing Centre](#)
- Information for [Technical Support/Quercus Support](#)

ACKNOWLEDGEMENT OF TRADITIONAL LANDS

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca and, most recently, the Mississaugas of the Credit River. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.