



Chemistry

UNIVERSITY OF TORONTO

CHM135H1F: Physical Chemistry for Life Sciences
Summer 2023 Course Syllabus

I. CONTACT: Course Email: chm135h@utoronto.ca

II. TEACHING TEAM



INSTRUCTOR and COURSE COORDINATOR

Name: Dr. Mima Staikova (she/her)



LABORATORY INSTRUCTOR

Name: Dr. Gabriel Harewood (he/him)



COURSE ADMINISTRATOR

Mr. Alex Fernandes (he/him)

III. COURSE OVERVIEW

CHM 135H Chemistry: Physical Principles 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

Physical chemistry is a problem-solving discipline: therefore, you must be able to apply concepts taught in classes to solve new problems. The course tutorials will provide very useful examples of problems that you should be able to solve on quizzes and tests and provide an excellent opportunity to ask questions. The Practical component will provide hands on experience, demonstrate and teach procedures and skills in laboratory settings, data manipulation and experimental results evaluation.

TEXTBOOK:

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 through the [U of T Bookstore](#) at reduced cost.

IV. COURSE ORGANIZATION

CHM135, Summer semester 2023, is scheduled in person. There are three components to this course, *Lectures, Tutorials and Practical*. Each student needs to be registered on ROSY for all three of them. The materials for all components will be posted *on one and the same Quercus shell*. Over the course of each week, students are expected to participate in person in classes, tutorials, and laboratory experiment. To keep up with the very fast pace of summer courses, before attending the corresponding section meetings, read the corresponding chapters of the textbook, solve the suggested tutorial problems, read and follow all the requirements for lab preparation. Further, students need to follow all relevant instructions, announcements, and perform their course work within the specified time frames and due dates.

CLASS

All lecture sessions are designed to be attended live – in class. You will be an active participant in your learning through problem-solving, asking and answering questions and discussions with your peers. Brief class notes will be available on the CHM 135H course website on Quercus ahead of each class. Many of the problems will be done as a class and do not appear in the notes. Be prepared to make notes on the material discussed in class as this is a key component of active learning.

Class recordings will be provided for a limited amount of time. These recordings are intended to help students with unexpected absences – we understand that it may not be possible to attend every class. The recordings are only a partial substitute for the learning that occurs in class, so it is in your best interest to make every effort to attend class. We have found in the past that providing the recordings for the entire semester leads students to procrastinate. Based on this and feedback from past CHM 135 students, **we will be offering the recordings for 2 weeks** to support those with unexpected absences while also encouraging all students to keep up with the course material.

The first lecture will be on **Tuesday, June 4th, 2023, starting at 9.30 am.**

All lectures are in **KP 108** with the following schedule:

Tuesdays, 9.30 am - noon.

Wednesdays, 9.30 am - noon.

Thursdays, 9.30 am - noon.

TUTORIALS

There are a total of 11 tutorial meetings, two tutorial sessions per week, on **Tuesdays and Thursdays, 1-2 pm.** All tutorials will be delivered in person.

It is essential that you have enrolled in a tutorial section through ACORN.

The first tutorial is on **Thursday, June 6th.** Your tutorial group number and tutorial room location and all other information relevant for the tutorials will be posted on *the Tutorials page on the Quercus course shell.*

You will find there:

- 1) Weekly textbook problems and solutions
- 2) Links to TeamUp! group quizzes (starting Tutorial 2)
- 3) Content to refresh your high school background

The TeamUp! group quizzes will be completed during tutorial and only your best 7 of 10 TeamUp! scores will count towards your final grade. There will be no make-up TeamUp! quizzes. Dropping the lowest three scores will account for any absences beyond the student's control.

TUTORIAL OBJECTIVES:

Tutorials are designed to give you practice applying concepts learned during lectures for solving quantitative problems related to understanding chemical systems.

Problem sets for each tutorial will be based on the concepts/topics covered in lectures during the preceding week and will be posted ahead of time.

You should try to solve the problems before coming to the corresponding tutorial session. At the tutorial, your teaching assistant will address your questions on the posted problem sets, show how to work them and provide further reinforcement of concepts learned.

PRACTICALS

Every CHM 135H student must be enrolled in a laboratory section through Acorn.

There are no labs the first week of classes. Starting the second week of classes the lab sessions are **once a week in LM102, 2-5 pm, on Tuesdays, or Thursdays, depending on your registration on ACORN.**

- PRA section number PRA0101 will start on Tuesday, June 11th. The last experiment will be on August 8th.
- PRA section number PRA0201 will start on Thursday, June 13th. The last experiment will be on August 10th.

Note, all experiments count towards your final lab grade.

More details about the PRA part of CHM 135H can be found on *the Laboratories page on the Quercus course shell.*

On the course Quercus page and in “Grades”, you will be informed of your lab room, equipment locker, bench space or workstation and the lab demonstrator group to which you have been assigned. Please make a note of this information before your lab day and keep it handy when you arrive for your lab session.

Note that each student will require a CHM 135H Laboratory Manual to complete the laboratory component of the course. Detailed information regarding each of the five experiments and all lab policies, including preparation, late penalties, lab schedule are in the manual. It is available from the Chemistry Club office, located in LM 203; a schedule of their sales hours is posted in Lash Miller Labs as well as on the CHM 135H course website. You will also require a lab coat, indirectly-vented safety goggles, gloves and a lab notebook for your first laboratory class. **You will need to purchase these items in advance of your lab day to have time to prepare for your first experiment.**

If you chose to wear facial mask, you will need special, fire-proof mask inside the Chemistry Laboratory. If you do not already have them, these materials may also be purchased from the Chemistry Club office.

Before your first scheduled laboratory class, you will need to consult your Laboratory Manual for information on how to prepare for your first lab class. This preparation takes time, so do not leave it for the day of your lab. Please note, if you do not adequately prepare for the experiments, including the first one, you will not be allowed to stay in the lab and will receive zero for that experiment.

The experiments were chosen to reflect many of the topics that are covered in the course so that you can see how the concepts we discuss in class are related to the observed events in the lab. Further, in the laboratory you will learn techniques that will be useful in many areas of science. All experiments are designed to allow you to complete data collection in one three-hour laboratory class. Pre-lab preparation is required, including for ***the pre-lab quiz, which is administered in the first 10 min of the lab session***, and lab reports are submitted online (except the last report) through links on Quercus site after the experiment has been completed. To succeed and learn in the lab, good preparation and time management are essential. We hope that you will find the CHM 135H Laboratories an enjoyable learning experience.

ED DISCUSSION BOARD

This term we will be using Ed Discussion Board for class discussion. The system is highly catered to getting you help quickly and efficiently from classmates, the TAs, and the instructors. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Ed Discussion Board and answer the questions of your classmate if you can do so.

Note that sharing solutions of any sort of graded course work before deadlines on the discussion board is in violation of University of Toronto's Code of Behaviour on Academic Matters (see Academic Integrity section of syllabus.)

ASSESSMENTS

To assess your knowledge of the material, in addition to the tutorial quizzes, there will be two term tests, one QM assignment report, and a cumulative final assessment. The two term tests will take place on selected Wednesday, during class time. The cumulative final assessment will take place after the end of the class time in August. Details on all assessments will become available in due course on the course Quercus shell.

THERMODYNAMICS COMPUTATIONAL ASSIGNMENT

A Computational project based on the Thermochemistry material will be assigned to all students, and its graded report will be part of the final course grade. The assignment module will be published and the assignment introduced on **July 20th** during tutorial/lecture time. After the introduction the students will perform quantum mechanical calculations on specified compounds on their own time on the UofT computational server, using a browser interface, WebMO. Each student will have a designated directory with their own user id and password. *It is required that the calculations are performed, and all data are collected only in the student's own directory on this server.* After the calculations are finished, each student will write a report using and interpreting the calculated data, incorporating the QM lecture material. *The project and the associated report will be in lieu of Term Test 3 grade.*

The Computational project includes the following components:

- performing calculations using the web based UofT WebMO interface on the specific topic **in the period between July 20 – July 27**
Deadline for finishing the WebMO calculations July 27th.

There will be *10% penalty per day from your report grade for exceeding the calculation time period.*

- evaluating the data from your WebMO calculation.
- writing a report - **due on August 10th** - *10% penalty per day for late submission*

The assignment description will become available on July 20th.

This assignment is to be completed independently. Help will be available during office hours, during some TA sessions, and on Ed Discussion

V. EVALUATION/GRADING SCHEME

There will be four assessment components in the Grading Scheme:

I. Tutorial Quizzes: worth total of 5%* (best 7 of 10 count towards your mark)
Each quiz will be multiple-choice in nature.

II. Two Midterm Tests: total worth 25%** (lower test: 10%, higher test: 15%)

Test #1: Wednesday, July 19, 10 - 11:30 am

Test #2: Wednesday, Aug. 2, 10 - 11:30 am

III. Computational Assignment: worth 12%:

IV. Cumulative Final Assessment: worth 33%; details TBA

V. Practical: worth 25%;

*note *No make-up quizzes can be offered.*

**note: *No make-up term tests can be offered.*

If missing **one** term test for a valid reason, the missed test grade will be calculated based on your performance on the other term test and the final assessment.

If both term tests are missed for valid reasons the marks for the missing tests will be replaced by the mark of the last, cumulative assessment.

POTENTIAL NETWORK DISRUPTIONS DURING ONLINE ASSESMENTS:

- If network disruption occurs at your end, don't panic! Please, contact the course coordinator with details of the situation - how long you had been writing the Quiz/Test for and at what time the disruption occurred. Please note that you may not receive a response until after your assignment window closes. Stay calm – we will get back to you.
- 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*:
 - (i) professional and respectful attitude during all course activities, including classes, tutorials and online activity.
 - (ii) *personal calendar/schedule/organizer* to ensure that all course activities are completed, and due dates are met.
 - (iii) 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)
 - (iv) familiarity with the university policy on Academic Integrity (overleaf)

- 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. As a Course Instructor, I will neither condone nor tolerate behaviour that undermines the dignity or self-esteem of any individual in this course and 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.

- **Absence/missed class work.**

Students who are absent from academic participation for any reason (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work **need to record their absence through the ACORN online absence declaration AND email chm135h@utoronto.ca ASAP and no later than one week after the absence to get consideration for a missed test.**

A Verification of Illness (or "doctor's note") is not required. The absence declaration is considered sufficient documentation to indicate an absence and no additional information or documentation is required when seeking consideration.

- **Communication with the teaching team:**

All email communications must be done using chm135h@utoronto.ca

Such email communications need to be restricted to administrative issues only. As you are aware that chemistry can be discussed during office hours much more effectively than by email, students are encouraged to seek help

and advice on content questions during office hours and by posting questions on Ed Discussion, not *through emails*.

We strive to answer your emails within 24 hours during weekdays.

Please, note your email will only be accepted if:

1. You send it from your utoronto.ca account.
2. You identify yourself as a student in CHM 135 and *include your name, student i.d. number*. For Laboratory issues, add your PRA section number and Demo Group.
3. To direct your inquiry to the correct person, add in the subject line lecture, practical, or tutorial.
3. No attachments or screenshots are sent.

Please, reserve email communication for administrative issues and for making appointments with instructors - *detailed course material questions will not be answered*. Scheduled instructor *virtual* office hours will be posted on the web page - alternative hours will be available by arrangement.

- 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. *Course videos and materials belong to your instructor, the University, and/or other source depending on the specific facts of each situation and are protected by copyright*. In this course, you are permitted to download session videos and materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor. For questions about recording and use of videos in which you appear please contact your instructor.

VI. TECHNOLOGY REQUIREMENTS

- Specific guidance from the U of T Vice-Provost, Students regarding student technology requirements is available here:
<https://www.vicereprodstudents.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 a piece of academic work, 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 hard-drive failures, corrupted files, lost computers, etc.

VII. INSTITUTIONAL POLICIES & SUPPORT

ACADEMIC INTEGRITY

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 is published and can be found in the link below:

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:

In assignments:

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 assignment.

On tests and quizzes:

1. Using or possessing unauthorized aids.
2. Looking at someone else's answers during an exam or test.
3. Misrepresenting your identity.

In academic work:

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

For all graded work:

Please note that the use of ChatGPT or any other form of generative artificial intelligence tool for graded work is strictly forbidden. Use of such a tool amounts to employing an unauthorized aid under the University Code of Behaviour on Academic Matters. If a student is found to have used such a tool during tests/quizzes, a meeting with the student will be arranged as the first step of the process defined under the Code.

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 behavior 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 Mississauga 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.