



# Chemistry

UNIVERSITY OF TORONTO

## PHC230H1 Pharmaceutics 1

### Winter 2024 Course Syllabus

#### I TEACHING TEAM

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##### **CO-INSTRUCTOR, Course coordinator**

Name: Prof. Tigran Chalikian  
Email: t.chalikian@utoronto.ca  
Office: PB 1105  
Student hours: TBA

##### **CO-INSTRUCTOR,**

Name: Prof. Shirley Wu  
Email: sxy.wu@utoronto.ca  
Office: PB 1103  
Student hours: TBA

##### **CO-INSTRUCTOR**

Name: Prof. Robert Macgregor  
Email: rob.macgregor@utoronto.ca  
Office: PB 1107  
Online student hours: TBA

##### **Teaching Assistant**

Name: Mr. Sako Mirzaie  
Email: s.mirzaie@utoronto.ca  
Office: PB 1162  
Student hours: Fridays 12:30 pm – 1:30 pm, or by appointment

#### II COURSE OVERVIEW

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##### **COURSE DESCRIPTION:**

An introduction to the key concepts in the design, manufacture, and use of efficacious dosage forms. The course covers the characteristics of different delivery routes.

##### **STUDENT LEARNING OUTCOMES**

At the end of this course, the student will understand and be able to explain:

1. The role of pharmaceutics in drug development
2. The role of anatomy and physiology in the conception and design of effective dosage forms. The interplay between physiology and a drug's site of action in the development of medications.

3. Physical chemical factors that influence drug availability in vivo, especially for oral, liquid dosage forms. How pH, salt concentration, co-solvents and other factors influence the stability and efficacy of medications.
4. The importance of sterility in the manufacture and use of medications. Methods of sterilization.
5. The role of pre-formulation in the drug development process
6. The properties and uses of colloids and dispersions in the stabilization of drugs
7. The physics and mechanical properties of powders (micrometrics) and the application of these properties to pharmaceutical formulation development.
8. How the properties of solids determine the stability, solubility, and therapeutic efficacy of drug products.

### **PREREQUISITE COURSES**

The prerequisites for this course are:

CHM135H1,CHM136H1)/(CHM138H1,CHM139H1)/CHM151Y1;  
CHM220H1/CHM222H1

This course assumes you have a basic understanding of algebra, calculus, general chemistry, physical chemistry, human anatomy, and physiology.

This course is a prerequisite for PHC330H1 (Pharmaceutics 2)

### **READINGS**

There are no required readings for this course.

## **III COURSE ORGANIZATION**

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This course is organized by topic. We will cover nine general topics.

All lectures and tutorial sessions will take place in Room PB B150.

### **COURSE SCHEDULE & RELEVANT SESSIONAL DATES:**

DATES	UNIT/WEEK	TOPICS (number of lectures)
Jan. 8	1	Introduction to Pharmaceutics (1)
Jan. 9 – Jan. 12	2	Biopharmaceutics (3)
Jan. 15 – Jan. 22	3	Pharmaceutical solutions (4)
Jan. 23 – Jan. 29	4	Sterilization (3)
Jan. 30 – Feb. 2	5	Complexation and solubilization (2)
Feb. 5 – Feb. 16	6	Pre-formulation (5)
Feb. 26 – Mar. 12	7	Colloids and dispersions (11)
Mar. 15 – Apr. 1	8	Powders and micrometrics (8)
Apr. 2 – Apr. 5	9	Solid state properties (2)

### **TUTORIAL OBJECTIVES**

In the tutorial sessions, the teaching assistant will provide additional detail to the lectures and provide examples of the concepts introduced in the lectures. They also will afford the students an opportunity to ask questions.

### **LABORATORY OBJECTIVES**

There is no laboratory associated with this course.

## **IV EVALUATION/GRADING SCHEME**

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### **OVERVIEW**

Problem sets and quizzes (×4): 16%

Mid-term examination: 34%

Final exam: 50%

### **ASSESSMENT DATES & MARK BREAKDOWN**

1. Quiz 1 (based on Problem set 1) (4%, Friday, 26 Jan. or TBA): 5 minutes, to be written immediately before the lecture one week after the problem questions are distributed to you.
2. Problem set 2 (4%, 6 Feb. handout, 13 Feb. 5 pm due)
3. Mid-term examination (34%, Monday, 4 Mar. 8:45 – 10:45 am, EX200) Term Test
3. Quiz 2 (based on Problem set 3) (4%, Friday, 8 March or TBA): 5 minutes, to be written immediately before the lecture one week after the problem questions are distributed to you.
4. Problem set 4 (4%, 25 March handout, 1 Apr. 5 pm due)
5. Final examination (50%, date and time TBA): 120 minutes, to be written during the Winter semester final examination period.

Students presenting a valid petition for a missed examination will be given the opportunity to write a make-up exam. In the case of a missed quiz, the student's mark will be pro-rated, i.e., calculated based on the quizzes completed.

**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**

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- 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.
- Communication with instructor, I will strive to respond to email within 24 hrs. on weekdays.
- Privacy language and appropriate use of course materials:  
<https://teaching.utoronto.ca/ed-tech/audio-video/sample-statements/>
- Students presenting a valid petition for a missed examination will be given the opportunity to write a make-up exam. In the case of a missed quiz, the student's mark will be pro-rated, i.e., calculated based on the quizzes completed.
- All material for this course will be submitted via the course's Quercus shell.
- A request to have a quiz or exam re-evaluated must be made to the course coordinator.
- In the case that a student is unable to write an exam due to illness or other difficulty, the student should contact the coordinator before the examination, if possible.

## **VI TECHNOLOGY REQUIREMENTS**

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- Specific guidance from the U of T Vice-Provost, Students regarding student technology requirements is available here:  
<https://www.vicprovoststudents.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

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### 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

([governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019](http://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 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/](http://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 and 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.