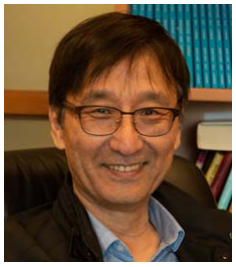
CHM 347H: Organic Chemistry of Biological Compounds
Course Syllabus: Fall 2020

I CONTACTS



INSTRUCTOR
Name: Jik Chin
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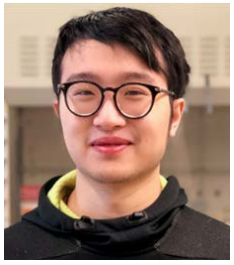
Office: LM-Davenport wing (Rm 462)
Online student hours: MW (5pm to 6pm ET)



TA(s)
Name: Weike Liang
Email: weike.liang@mail.utoronto.ca
Office: LM-DW (Rm 472)
Online student hours: TBA

Classes and Tutorials
Classes: MW 4-5pm ET (online)
Tutorials: R 12:00-1:00pm ET and F 1:00-2 :00pm ET (online: attend one R or F)

II COURSE OVERVIEW

COURSE DESCRIPTION:
This course is about understanding the molecules of life from amino acids to proteins and nucleic acids and carbohydrates. Fundamental organic chemistry learned from CHM136H and CHM247H/CHM249H
will be applied whenever possible to these fascinating biological reactions. In the first half of the course, chemical synthesis of amino acids, proteins and DNA will be compared with their biological synthesis. Knowledge gained from these studies will be applied to directed molecular evolution for designing bioactive molecules. Computation will be used to demonstrate stereoselective recognition and synthesis of amino acids. In the second half of this course, metabolism (catabolism and anabolism) of amino acids, sugars and fat molecules will be discussed. Oxidative breakdown of these biomolecules (catabolism) to CO_2 can be compared to burning of gasoline to generate energy. Understanding how nature converts CO_2 to biomolecules (anabolism) like amino acids, sugars and fat molecules is not only useful for developing pharmaceutical agents but also for protecting and preserving our environment through efficient recycling of CO_2.

STUDENT LEARNING OUTCOMES:
After completing the first half of the course, students are expected to know how nature makes proteins and DNA. They are also expected to know how chemists synthesize proteins and DNA using fundamental organic chemistry. They will understand how these techniques can be applied in directed molecular evolution to develop bioactive compounds. After completing the second half of the course, students are expected to understand metabolism in terms of organic chemistry reaction mechanisms. For example, students are expected to know the energy forming chemical transformation of glucose to carbon dioxide and water in terms of reaction mechanisms. Finally, students will be able to understand the utilization of CO_2 in the Calvin cycle to make carbohydrates.

PREREQUISITE COURSE:
CHM247H/CHM249H
Textbook: The required textbook for CHM347H is Organic Chemistry by John McMurry (8^{th} or 9^{th} edition). This book is only a starting point for many of our discussions and thus a significant amount of the course material can only be found in the class notes.

TUTORIALS:
Problem solving skills will be developed for better understanding of organic chemistry in biological reactions. TA will solve sample problems sometimes together with students. Attendance will be taken and student participation will be encouraged.

III EVALUATION/GRADING SCHEME

QUIZZES (four 30min quizzes) worth 7.5% each during weeks 3, 5, 7 and 9.
There will be two mid-terms (1 hr each) totaling 40% during weeks 6 and 11.
MT1: 25% or 15% (whichever gives better outcome)
MT2: 15% or 25% (whichever gives better outcome)
FINAL ASSESSMENT (2 hr exam at the end of course) worth 30%
Exact times for the quizzes, MT1 and MT2 and the Final exam will be announced.

Note: 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 assessments.

FINAL ASSESSMENT
There will be a Final Assessment Period in December

IV COURSE POLICIES

1) I will respond to email within 24 hrs on weekdays.

2) 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. U of T does not condone discrimination or harassment against any persons or communities.

3) 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.

4) 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.

5) For questions about recording and use of videos in which you appear please contact your instructor.

V 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 of course sometimes things can go wrong when using them. You are responsible for ensuring that you maintain regular backup copies of your files, use antivirus software (if using your own computer), and schedule enough time when completing an assignment to allow for delays due to technical difficulties. Computer viruses, crashed hard drives, broken printers, lost or corrupted files, incompatible file formats, and similar mishaps are common issues when using technology, and are not acceptable grounds for a deadline extension.

VI INSTITUTIONAL POLICIES AND SUPPORT

ACADEMIC INTEGRITY

On 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 (https://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 papers and 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 exams:

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.

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 https://www.academicintegrity.utoronto.ca/).

Use of Turnitin

"Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the

Turnitin.com service are described on the Turnitin.com web site".

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.

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