

All course components of CHM 136H this summer are offered in-person including tutorials, labs and assessments.

Welcome to CHM 136H! CHM 136H provides an introduction to the fundamental principles of structure, bonding and reactivity of organic molecules. It is designed for students who intend to follow a science program, primarily in the Life or Health Sciences. CHM135H is a prerequisite for this course. We believe that CHM 136H, along with CHM 135H, will prepare you well for other chemistry and life-science courses in later years. CHM 135H and CHM 136H are 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.

Class meets TWTh 9:30 am – 12:00 pm in room MC 102

Instructor Dr. Ahlem Bensari (ahlem.bensari@utoronto.ca), Lash Miller Laboratories Rm. LM 115
Student (Office) hours in room LM 108: Wednesdays 12:00 pm – 2:00 pm and on Tuesdays 12:00 pm – 1:00 pm on weeks of term tests. Also available after each class

Lab coordinator Dr. Marvin Morales (marvin.morales@utoronto.ca), Lash Miller Laboratories Rm. LM217
Students (Office) hours: Tuesdays, Wednesdays, and Thursdays 3 – 4 pm
Dr. Mima Staikova (mima.staikova@utoronto.ca), computational lab experiment only

Course administrator Mr. Alex Fernandes. (alex.fernandes@utoronto.ca), Lash Miller Laboratories.

1. Learning Outcomes: By the end of this course, you should be able to

- understand the relationship between molecular shape and current bonding models in organic chemistry;
- recognize the central role of molecular structure, including stereochemistry, in chemical properties, reactivity and reaction outcomes;
- apply the organic mechanism model to determine reaction pathways;
- identify patterns of reactivity of the alkene, alkyl halide or alcohol functional groups; and
- propose effective routes for the transformations of organic molecules bearing the above functional groups as either reactants or products;
- identify the principles of lab safety;
- understand the relationships between molecules and how they affect solubility;
- learn a variety of purification techniques (e.g., recrystallization, extraction, distillation);
- identify unknown compounds using melting point analysis;
- obtain and use computational chemistry calculations to enhance the understanding of conformational analysis.

2. Course Material:

Required Textbook: *ORGANIC CHEMISTRY; by John McMurry,; (9th edition)* which is accompanied by the Student Solutions Manual. These two items are available in print or digital format through the [U of T bookstore](#) at a reduced cost. *The following information and links are also available on the CHM 136H LEC Quercus site.*

Digital Option: Instructions for purchasing and registering the digital textbook and solutions manual are outlined here: https://www.cengage.com/coursepages/UofT_SPR22_CHM136

Print Option: Search for the print version of the textbook and the solutions manual with this ISBN: **9781305816138** from the bookstore.

Summer 2022 CHM 136H — Introductory Organic Chemistry I

Please note that previous editions of the course textbook (e.g. 8th, 7th, 6th) are NOT supported in CHM 136H.

Molecular Model Kit: Many concepts in this course involve the visualization and manipulation of the three-dimensional structure of molecules and this visualization aid becomes invaluable as we learn about the structural aspects of organic molecules. Though optional but strongly recommended that you purchase a molecular model. Molecular model kits are available to purchase from the Chemistry Club (office: Lash Miller Laboratories room 203), bookstores, amazon and from past chemistry students

Lab Material: On your first laboratory class you will need to bring a laboratory notebook (hard cover; ruled sheets stitched into binding, 22 x 28 cm); chemical splash safety goggles, flame-resistant mask, a lab coat and nitrile rubber gloves. The laboratory coat, lab notebook, safety goggles, flame-resistant mask, and gloves may be purchased from the Chemistry Club office (room LM 203); a schedule of sales hours is posted beside the office door. Note that the office, staffed by graduate student volunteers, will be open for sale of these items only during the first week of the semester.

3. Course Arrangements and Tentative Schedule

Lectures: Brief course lecture notes will be available on the CHM136 course website on Quercus ahead of each class. *These notes do not represent all the concepts discussed in lecture and as such you should attend all CHM 136H classes* since it is here that fundamental course content will be presented and elucidated. Be prepared to take/complete notes and actively engage with the material in class.

Tentative Course Schedule
(may be subject to adjustment)

Term dates: May 9 – Jun 20

Last date to drop class without academic penalty: Jun 6

Week	Dates	Lecture Topics	Textbook sections	Tutorials	Labs
1	May 10	Bonding, shapes and hybridization	Ch 1(except 1.11)	—	—
	May 11	Hybridization and drawing structures	Ch 1(except 1.11)	—	
	May 12	Bonding and resonance	Ch 2.1 -2.6	TUT #1	
2	May 17	Acid-base reactions	Ch 2.7 - 2.12	TUT #2	Exp 1
	May 18	Nomenclature of alkanes	Ch 3.1 - 3.4 and Ch 4.1	—	
	May 19	Conformations	Ch 3.5 – 3.7 and Ch 4.2 – 4.8	TUT #3	
3	May 24	Stereochemistry	Ch 5 (except 5.3-4, 5.5.10, 5.12), Ch 25.2	TUT #4	Exp 2
	May 25	Term Test 1 (10:30 am – 12:00 pm) — no class		—	
	May 26	Organic reaction overview	Ch 6 (except 6.3, 6.8, 6.11)	TUT #5	
4	May 31	Alkene structure and reactivity	Ch 7	TUT #6	Exp 3
	Jun 1	Alkene reactions and synthesis	Ch 8.1 – 8.4, 8.12, 8.13	—	
	Jun 2	Alkene reactions and synthesis	Ch 8.5 – 8.9	TUT #7	
5	Jun 7	Organohalides	Ch 10.1, 10.5 – 10.8	TUT #8	Exp 4
	Jun 8	Term Test 2 (10:30 am – 12:00 pm) — no class		—	
	Jun 9	Nucleophilic substitution reactions	Ch 11.1 – 11.5	TUT #9	
6	Jun14	Elimination reactions	Ch 11.7 – 11.10 and 11.12	TUT #10	Exp 5

Summer 2022 CHM 136H — Introductory Organic Chemistry I

Jun 15	Aromaticity and IR spectroscopy	Ch 15.1 – 15.5, Ch 12.5 – 12.6	—	
Jun 16	Alcohol reactions and preparation	Ch 17.1 – 17.7	TUT #11	

Tutorials: begin on Thursday May 12th and meet every Tuesday and Thursday from 1-2 pm for the durations of the course. Tutorial groups have been created based on alphabetical order of last name first three letter. Please refer to the table below for your tutorial group, classroom location and teaching assistant you have been assigned. You must attend your assigned tutorial group to receive credit for TeamUp tutorial quizzes:

Tutorial Section	Student Last name*	Schedule	Room	Tutor
TUT0101A	Ahm - Coo	T/Th 1:00 pm -2:00 pm	UC 330	Grignon, Eloi
TUT0101B	Cos - Hal	T/Th 1:00 pm -2:00 pm	SS 2111	Johnson, Colton
TUT0101C	Han - Lal	T/Th 1:00 pm -2:00 pm	RW 142	Masson-Makdissi, Jeanne
TUT0101D	Lan - Pan	T/Th 1:00 pm -2:00 pm	UC 152	Satkauskas, Monika
TUT0101E	Pat - Tal	T/Th 1:00 pm -2:00 pm	UC 256	Varju, Bryton
TUT0101F	Tan - Zou	T/Th 1:00 pm -2:00 pm	LM 157	Zambri, Marc

* If my last name is *Star*, my tutorial group should be TUT0101E, and I attend tutorials with Bryton in room UC 256

The objectives of the CHM 136H tutorial are:

- (i) to re-visit the course content seen in classes;
- (ii) to solve organic chemistry problems in smaller groups and with your Teaching Assistant; and (iii) to give you an opportunity to ask questions 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 136H TUT course tile in Quercus, you will find a schedule of assigned textbook problems and links to TeamUp group quizzes you will complete in each tutorial class. These quizzes are completed in small groups 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. Before coming to your tutorial, prepare for them by completing assigned textbook questions: *active student participation in problem-solving is linked to success in learning organic chemistry*. During your tutorial sessions, your Teaching Assistant will discuss any questions that you may have concerning the assigned exercises and assist you in understanding the important course concepts. Organic chemistry is an area of science that relies on problem-solving. Practice in problem-solving is necessary to master the material and be successful on the course assessments. The practice you will get in your tutorials (as well as the assigned textbook problems) will provide you an important opportunity for self-assessment and help you in keeping up with the course materials. You are the best judge of your own learning (provided you are honest with yourself).

Labs: begin May 17th and will be fully in-person. All lab information can be found on your PRA card. Your laboratory group number and your lab station number will be posted on your CHM 136H PRA course tile on Quercus. You will also find there the schedule of laboratory experiments this term.

A reminder: all students will perform Experiment 1 at the first lab class. Please come prepared!

As part of your preparation, be sure to read the "Laboratories and General Lab Procedures" pages on your PRA card.

Summer 2022 CHM 136H — Introductory Organic Chemistry I

Detailed preparation instructions are posted on the CHM 136H PRA Quercus tile.

Remember to bring the following items to your first laboratory class:

- a laboratory notebook (hard cover; ruled sheets stitched into binding, 22 x 28 cm)*
- indirectly vented chemical splash safety goggles*;
- flame-resistant mask*;
- a lab coat*;
- nitrile rubber gloves*.

*The laboratory coat, lab notebook, safety goggles, flame-resistant mask, and gloves may be purchased from the Chemistry Club office (room LM 203); a schedule of sales hours is posted beside the office door. Note that the office, staffed by graduate student volunteers, will be open for sale of these items only during the first week of the semester. You will perform, this term, four organic “wet” lab experiments and one computational experiment. The computational lab will have a different logistics and will be completed online. Lab-related details and due dates can be found on the PRA Quercus shells. Please contact the appropriate laboratory instructor if you have any questions concerning the academic material covered in laboratories.

You will attend your first laboratory class on the date indicated below, according to the P-section you chose when you registered for CHM 136H on ACORN:

for students in	labs begin on
PRA0101	Tuesday May 17 2 – 5:00 p.m.
PRA0201	Wednesday May 18 2 – 5:00 p.m.
PRA0301	Thursday May 19 2 – 5:00 p.m.

4. Course Evaluation

This course will offer you a variety of activities to assess your learning at multiple points throughout the course. These assessment activities will provide opportunity for you to demonstrate your learning relative to the course learning outcomes and receive feedback to guide future learning. All assessments are fully in-person this term!

Quizzes	(5 %)	your best 8 of 11 TeamUP! group quizzes
Term Tests (x2)	(30 %)	May 25 th and June 8 from 10:30 am – 12: 00 pm
Lab	(30 %)	based on lab quizzes, lab performance and lab reports
Final Exam	(35 %)	To be scheduled during the examination period

Quizzes: In each tutorial class, you will complete a one-question TeamUp group quiz that count for credit towards your final grade. The lowest three quiz scores will be dropped from your quiz grade. The quiz questions will be very closely based upon the assigned questions for that tutorial class.

Term Tests (x2): There will be two, 90 min term tests with the second term test being cumulative. There will be no class on term test days. Exam location will be communicated as soon as information become available. Format, structure, and material covered in the test will be announced nearing the actual test date.

Final Exam: a final 3h cumulative exam will be written during the examination period, June 22-29, and scheduled by the registrar office. Exam-related details will be announced as they become available.

Equity, Diversity, and Inclusion (EDI) In support of the EDI initiative in the learning, teaching, and working environment at U of T, our chemistry department is launching this summer an online EDI training hub associated with first year chemistry courses. You will notice an EDI tile on your Quercus dashboard where you can access this

module. Though optional, your participation in this training is strongly encouraged and your feedback is greatly appreciated. The EDI training can be completed online asynchronously at your own time in roughly one-hour time. You will receive 0.25% bonus point added to your overall CHM 136H course grade for completing the EDI module.

5. Learning Support and Assistance

The following resources may help you identify and address needs and difficulties you may encounter in this course as they arise. We are here to help you succeed and advance your learning. Do not hesitate to reach out and I encourage you take advantage of the resources available to you in time of need.

Non-academic concerns for assistance with administrative issues, e.g., requests to change tutorial sections, or lab sections, illness, academic accommodation and others, please contact the course administrator, Dr. Alex Fernandes.

Student (Office) Hours: these set times give you the opportunity to discuss the course content with your instructor and other students. Practical-related concerns or questions should be directed to Dr. Morales (wet labs) or Dr. Staikova (computational lab) during the practical sessions or office hours. Tutorial and other course content-related questions should be reserved and asked after class, during regular tutorial sessions or student hours.

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 in Quercus can be found on the left hand column under “Help”, then “Quercus Support Resources”.

6. Course Policies

Communication: After-class time and student hours should be used for general inquiries, course content related matter and whenever possible. To receive a response in a timely manner for communication by means of email, use university email account, include CHM 136 in the subject line and sign off with your full name and student ID. Please do not email your practical or tutorial teaching assistants. Most emails are responded to within 48 hours except weekends. Please keep your expectations reasonable as to the degree of detail that an email reply to your enquiry can realistically provide.

Missed Labs/Tests: 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. If a test is missed with a valid medical excuse or any other legitimate reason, you must contact as soon as possible (on or before the day of missed coursework) the course administrator Alex Fernandes, with the course instructor included to receive consideration. For students missing one test, missed test mark will be calculated based on performance on the other test and class averages. Alternatively, more weight will be placed on the final exam. Please note that at least 4 of 5 lab experiments must be completed to pass the course. If your absence has not been validated, a grade of zero will be assigned for any missed course activity.

Use of Course Material: course material to which you are granted access in this course is only to be used for this course. Students do not have permission to upload course material to any external websites or share with others, unless expressly permitted. Please contact me if you require further clarification about using materials from this course in other contexts. Under no circumstances are students permitted to provide anyone with access to own Quercus course sites established for this course. Only students registered in this course are permitted to view, download, upload or otherwise participate in the course sites

7. Academic Policies

Accessibility: The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs. Students with diverse learning styles and needs are welcome in this course. If you have a disability that may require accommodations, please feel free to approach [Accessibility Services](#) as early as possible to register and receive accommodations.

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](#) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

- 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
- Using or possessing unauthorized aids during an exam or test
- Looking at someone else's answers during an exam or test
- Misrepresenting your identity online or during a test or an exam
- Falsifying institutional documents or grades
- Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

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 Alex Fernandes, the CHM 136H course administrator, **before** the session/assignment date to arrange accommodations.

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.