

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 Tuesdays, Wednesdays, and Thursdays from 9:30 am – 12:00 pm in room MC 102

Instructor Dr. Ahlem Bensari, Lash Miller Laboratories Rm. LM 115
Student (Office) hours in room LM 108, for one hour directly after each class

Lab coordinator Dr. Marvin Morales, Lash Miller Laboratories Rm. LM217
Students (Office) hours: Tuesdays & Thursdays 3 – 4 pm, LM217
Dr. Mima Staikova, computational lab experiment only.

Course administrator Mr. Alex Fernandes. Lash Miller Laboratories.

Email chm136h@utoronto.ca. To receive a timely response, please direct *all* course inquiries to this teaching team email and it will be forwarded to the appropriate person. Please, always include your full name, student number, and your PRA section.

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 copy](#) or [digital format](#) through the [U of T bookstore](#) at a reduced cost. Instructions for purchasing and registering the digital textbook and solutions manual are outlined here: https://www.cengage.com/coursepages/UofT_Summer23_CHM136.

Information and links regarding course material are also available on the CHM 136H LEC Quercus site.

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 [ChemClub](#) (office: Lash Miller Laboratories room 203), [U of T bookstore](#), amazon and from past chemistry students.

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 8 – Jun 19

Last date to drop class without academic penalty: Jun 5

Week	Dates	Lecture Topics	Textbook sections	Tutorials	Labs
1	May 9	Bonding, shapes and hybridization	Ch 1(except 1.11)	—	—
	May 10	Hybridization and drawing structures	Ch 1(except 1.11)	—	
	May 11	Bonding and resonance	Ch 2.1 -2.6	TUT #1	
2	May 16	Acid-base reactions	Ch 2.7 - 2.12	TUT #2	Exp 1
	May 17	Nomenclature of alkanes	Ch 3.1 - 3.4 and Ch 4.1	—	
	May 18	Conformations	Ch 3.5 – 3.7 and Ch 4.2 – 4.8	TUT #3	
3	May 23	Stereochemistry	Ch 5 (except 5.3-4, 5.5.10, 5.12), Ch 25.2	TUT #4	Exp 2
	May 24	Organic reaction overview	Ch 6 (except 6.3, 6.8, 6.11)	—	
	May 25	Term Test 1 (10:30 am – 12:00 pm) — no class		TUT #5	
4	May 30	Alkene structure and reactivity	Ch 7	TUT #6	Exp 3
	May 31	Alkene reactions and synthesis	Ch 8.1 – 8.4, 8.12, 8.13	—	
	Jun 1	Alkene reactions and synthesis	Ch 8.5 – 8.9	TUT #7	
5	Jun 6	Organohalides	Ch 10.1, 10.5 – 10.8	TUT #8	Exp 4
	Jun 7	Nucleophilic substitution reactions	Ch 11.1 – 11.5	—	
	Jun 8	Term Test 2 (10:30 am – 12:00 pm) — no class		TUT #9	
6	Jun13	Elimination reactions	Ch 11.7 – 11.10 and 11.12	TUT #10	Exp 5
	Jun 14	Aromaticity and IR spectroscopy	Ch 15.1 – 15.5, Ch 12.5 – 12.6	—	
	Jun 15	Alcohol reactions and preparation	Ch 17.1 – 17.7	TUT #11	

Class recordings of lectures will be provided for a limited amount of time on the LEC Quercus site. 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

Summer 2023 CHM 136H — Introductory Organic Chemistry I

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 136 students, **each recording will only be available for one week after it is posted** to support those with unexpected absences while also encouraging all students to keep up with the course material.

Tutorials: begin on Thursday May 11th 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 letters. 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 ^{a, b}	Tutor
TUT0101A	A - C	T/Th 1:00 pm -2:00 pm	BA 2139	Zhen, Danlin
TUT0101B	D - H	T/Th 1:00 pm -2:00 pm	BA 2165	Chun, Diane
TUT0101C	I - L	T/Th 1:00 pm -2:00 pm	BA 2195	Rabeda, Karolina
TUT0101D	M -P	T/Th 1:00 pm -2:00 pm	BA 2159	Joshy, Kiran
TUT0101E	Q - T	T/Th 1:00 pm -2:00 pm	BA 2175	Zettle, Logan
TUT0101F	U - Z	T/Th 1:00 pm -2:00 pm	ES 4001	Quintanilla-Riviere, Marco

^a The [3D map](#) or [interactive map](#) might be useful to locate the building

^b The above assigned rooms are for the entirety of the term **except May 11th**. Rooms for the first tutorial on May 11th will be announced on Quercus tutorial site.

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 week of May 15th and run on a weekly basis throughout the semester as mentioned in page 2 on the course schedule. Please note: **It is essential that you have enrolled in a practical section through ACORN/ROSI.** If you have not yet enrolled in a PRA section, do so immediately. If the window on ACORN has closed, please send an email to chm136h@utoronto.ca with the subject line “Practical enrollment”.

The purpose of the CHM 136 Practicals (‘labs’) is to introduce you to some of the basic techniques of organic chemistry. The laboratories in CHM 136H include four “wet” organic experiments and one computational experiment. On your CHM136H PRA course tile on Quercus, you will find the schedule for the laboratory experiments this term - one experiment is completed each week. All of the materials for each lab (including quizzes, online laboratory sessions for the computer lab only, and laboratory report submissions) are located in a different module on your CHM136H PRA course tile on Quercus. Each lab module will become available as the course progresses. **You will be required to purchase a lab manual from Chem Club (located in 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 summer semester.

The policy for late submissions is provided on your PRA course tile.

Each “wet” experiment begins with reading the assigned materials, watching the relevant videos, answering pre-laboratory questions and completing a quiz. This must be completed **before** your in person laboratory session with your Teaching Assistant (TA) and practical group. Each “wet” laboratory finishes with the submission of a written report. For questions about the “wet” laboratories, please send an email to chm136h@utoronto.ca to the attention of Dr. Morales with the subject line “Wet Lab” **and** include the experiment title. In any email communication, always include your full name, student number, and your PRA section.

The computational experiment will be conducted virtually. Please note: the logistics for this experiment differ from the other laboratory experiments. Consult the posted schedule for your Demo Group number to know when you will complete this experiment.

When the computer lab module becomes available on your PRA Quercus page, you will work independently on the lab tasks, performing computations of the substrate properties on WebMO, the Chemistry Department computer server. Each student will use their own user ID and password (details on your PRA Quercus site) and will have their own WebMO directory where the computational jobs will be executed and collected. Students will have about 10 days **PRIOR to the synchronous session** with the Comp Experiment TA, to finish as many of the required calculations as possible, independently, at their free time. At the end of the period, you will have a one-hour virtual meeting (mandatory) with a teaching assistant to discuss the laboratory topic, potential problems you might have had with the computations, and details of the computational lab report. The lab report for the computational lab is due **one week** after the virtual meeting with your TA.

The best way to answer your questions and concerns about the computational lab is to attend one of the computational lab student hours or/and make use of the Discussion board. Please, note that course content questions, specifically questions related to writing the report, cannot be answered per email. Only administrative problems will be addressed per email. Please always include with your email your full name, student number, and **your PRA section/Demo group.** Emails without this information will not be answered.

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.

GRADING SCHEME:

Quizzes	(5 %)	Your best 8 of 11 TeamUP! group quizzes
Term Tests (x2)	(35 %)	May 25 th and June 8 th from 10:30 am – 12: 00 pm
Lab	(25 %)	Based on lab quizzes, lab performance and lab reports
Final Exam	(35 %)	To be scheduled during the examination period: June 21 - 26

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. **The highest test score earned on term tests will be weighted at 22.5% and the other test weighted at 11.5%.** 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 21-26, and scheduled by the registrar office. Exam-related details will be announced as they become available.

Tests and Final exam include a combination of multiple choice and short-answer questions.

Students who miss a test must complete the Acorn Absence Declaration AND email chm136h@utoronto.ca with a screenshot of the Acorn Absence Declaration as soon as possible (ideally less than 2 days) and within one week of the absence to get consideration for a missed test. Please note that Acorn only allows students to report their absence up to seven days from the current day, plus two days retroactive, from the date of the missed graded academic work. Please note that there are **no make-up tests**.

Consideration for one missed test will result in the other test accounting for 22.5% of the final mark and the final exam accounting for 47.5% of the final mark. For students missing both term tests, the mark for the missing tests will be replaced by the final exam.

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.

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 during the practical sessions or practical office hours. Tutorial and other course content-related questions should be reserved and asked after each class, during regular tutorial sessions or tests help sessions.

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

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 136H 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 and Getting Help

- For any course-related communication, please only use chm136h@utoronto.ca. Do not send messages through Quercus.
- For course content questions, please ask during your tutorial or during the student hours after each class. **Please keep in mind that email is not the mechanism to receive explanations of course material.**
- Any questions on **laboratory** content can be directed to your TA during regular lab time, asked during the PRA help hours.
- **When you e-mail the teaching team at chm136h@utoronto.ca, please include your full name and student number, and your PRA section for lab related questions, making sure to use your UTORONTO email address.** Keep the language and tone of your email professional. Your email will be answered by the appropriate person.
- 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.**

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 email the teaching team (chm136h@utoronto.ca) with a screenshot of the Acorn Absence Declaration and what graded work you missed as soon as possible and within one week of your absence to receive consideration for any missed graded work. Please include your full name, student number, LEC and PRA section in your email.

7. Technology Requirements

This course, particularly the lab (quiz and report submissions) and tutorial (TeamUP! submissions) 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.

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

8. Institutional Policies and Support

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:

1. In laboratory reports
 - Using someone else's ideas or words without appropriate acknowledgement. Normally, students will be required to submit their written course work (i.e. lab reports) to the University's plagiarism detection tool, Ouriginal, for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their work to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (<https://uoft.me/pdt-faq>).
 - 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 report. Please note that the use of websites (such as

Chegg.com or the course discussion board) to post 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.

2. On quizzes and term tests:

- Using or possessing unauthorized aids. Please note that the use of websites (such as Chegg.com or the course discussion board) to post quiz 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.
- Looking at someone else's answers or collaborating/discussing answers during a quiz or term test.
- Misrepresenting your identity.

3. In general academic work:

- Falsifying institutional documents or grades.
- 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/)

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.