CHEM 2203 and 2207 for Fall 2025
Organic Chemistry I

We, the people of the Faculty of Science at Carleton University, acknowledge that our campus is located on the traditional, unceded territories of the Algonquin Anishinabeg people. Miigwetch for your hospitality and stewardship of this territory and the teachings that come from it. We are grateful for this land, the air that we breathe, and the water that sustains us all as well as for the animals, plants and other living beings: these enable us to
research, teach, mentor, support, study, and learn. We recognize our responsibility to our natural environment and to reconciliation with Indigenous peoples.

All dates and times referenced in this course pertain to local time at Carleton University. This corresponds to Eastern Standard Time (EST) with Daylight Savings Time applied on the appropriate dates.

Course Instructor Section A: David Brock

How to address me: Anything respectful (ex. Dave, Doc Brock, Dr. Brock, etc.)

Email: David.Brock3@Carleton.ca

Best Ways to be in Touch: see page 6 (in class, via email, or during student hours)

Student Hours: Mon-Thurs, 1:00-2:00pm, SC 226

Office Hours Location: Room 226, SC Building

Class Location: Please check Carleton Central for the room location.

Class Times: Mondays&Wednesdays, 11:30-1:00

Prerequisites: CHEM 1006(no longer offered) with a minimum grade of B-, or CHEM 1002 or CHEM 1012

Preclusions: CHEM 2207 or 2203

Department/Unit: Chemistry

Lab Coordinators:
Spencer Ng Cheong Chung
spencer.ngcheongchung@carleton.ca

Learning Outcomes and Topics Covered

Course Description
Introduction to stereochemistry, spectroscopy and chemical reactions of alkanes, alkenes, alkynes, and alkyl halides. Reaction mechanisms and the interpretation of IR, NMR and mass spectra is explored. Training in the handling and purification of organic compounds, organic chemical reactions, and the use of infrared spectroscopy.
Includes: Experiential Learning Activity

Topics to be Covered

A detailed list of topics to be covered, and important dates can be found on pages 6-8 of this syllabus and in the calendar found on the last page
Additional important dates and deadlines can be found here: https://carleton.ca/registrar/registration/dates/academic-dates/, including class suspension for fall, winter breaks, and statutory holidays.

Textbook

The text for the course is "Organic Chemistry" 5th Edition by David Klein published by Wiley. The book is available from Carleton's bookstore, bundled with a two–term access code to WileyPlus ($218.95+tax), a homework management system you will be using. The print version is preferred to the etext version ($153.95+tax) because print materials are permitted for the open book midterm and exam.

This is the recommended package to buy.

Grade Breakdown

2203 Grading

Component	Notes	#1	#2	#3	#4
WileyPlus	6 Online Homework Assignments	5	--	5	--
Laboratory	Five experiments	30	30	30	30
Midterm	2 hours	25	25	12.5	12.5
Final Exam	3 hours	40	45	52.5	57.5

2207 Grading

Component	Notes	#1	#2	#3	#4
WileyPlus	6 Online Homework Assignments	5	--	5	--
Midterm	2 hours	35	35	17.5	17.5
Final Exam	3 hours	60	65	78.5	82.5

Grades for each component of the course will be released only via Brightspace.

To obtain credit for the course, all three requirements below must be met:

1. Obtain a minimum of 50% on the overall course grade, as calculated above using the method that gives the highest grade.
2. All laboratory experiments MUST be completed and all lab reports MUST be submitted by the last day of classes (Dec 5, 2025).

Students who fail to meet the above requirements will receive a course grade of F and will not receive credit for the course.

WileyPlus Online Homework Assignments

The optional (see Grading schemes above) homework system, WileyPLUS, can be purchased from Carleton's bookstore bundled with the textbook ($233.75+tax). The print version is preferred to the etext version ($167.00+tax) because print materials are permitted for the open book midterm and exam. Problem assignments will be given regularly via WileyPlus (approximately one assignment every two weeks). It is your responsibility to check the answers and to take action if you have obviously not understood the latest material. **Those who neglect these assignments do not do well on tests and exams, where the stakes are much higher. Evidence from previous years shows that those who scored well on their homework assignments typically also scored well in the course.**

Laboratory

Details of the laboratory portions of this course can be found on the Brightspace site. Students are required to wear protective goggles ($6.50+tax), a lab coat ($30.75+tax) and use a lab notebook ($11.95+tax) which can all be purchased from Campus Store (https://carleton.bookware3000.ca/)

An important detail is that you must complete all activitie

If you have any concerns related to the lab after reviewing the material on the Brightspace site, please contact the Lab Coordinator, Spencer Ng (spencerngcheongchung@cunet.carleton.ca)

An important detail is that you must complete all activities of the laboratory portion before the last day of classes (Dec 5, 2025) to receive a passing grade in this course.

Midterm Test

The term tests will be scheduled by the Registrar's office and will take place on campus, outside of class time the week of Nov. 1 (which can include and will most likely take place on Friday evening, Saturday or Sunday).

Final Exam

The Final Exam will be scheduled by the Registrar's office and will take place on campus,
between Dec. 8 and Dec. 20 (which can include Friday evening, Saturday or Sunday).

Late and Missed Work Policies

Late Work

Students have *one to two weeks* (see the lab schedule for due dates) to complete and submit their lab reports for each lab, and multiple submissions are permitted up until the due date. As a result, lab reports that are submitted late for any reason will be subject to

the late penalty of 10% per day, with a mark of 0 assigned if an assignment is submitted more than 4 days late. Therefore, you are encouraged to submit your lab report a day or two early, and update it if necessary, to ensure that you have no issues with your lab submission.

Missed Work

For short term (a week or less) incapacitation, students must complete and submit the Academic Consideration for Coursework Form - Registrar's Office (https://carleton.ca/registrar/academic-consideration-coursework-form/) within 48 hours of the missed work. For approved missed tests, the weight will be transferred to the final exam. Assignments are open for two week periods whereupon the answers are released. In the event that a due date is missed, the work on the assignment up to that point is used for that assignment grade and extensions are not provided. Students are encouraged to start the assignments early. There is a single makeup lab opportunity available to students in the event that they have received a lab deferral. Therefore, missing more than one lab, deferred or not, will result in an F in the course as the course/department requirement that "All laboratory experiments MUST be completed and all lab reports MUST be submitted by the last day of classes (Dec 5, 2025)" would not be fulfilled.

Long term (longer than 1 week) incapacitation, will be evaluated on a case-by-case basis and discussions of accommodations may involve the Chair of the Department of Chemistry and/or the Office of the Dean of Science.

Academic Accommodations and Regulations

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes are outlined on the Academic Accommodations website (https://students.carleton.ca/course-outline/).

AI Use in This Course

Students may use AI tools for basic word processing and formatting functions, including:

- Grammar and spell checking (e.g., Grammarly, Microsoft Word Editor)
- Basic formatting and design suggestions (e.g., Microsoft Word's formatting tools, PowerPoint Design editor)

Documenting AI Use: It is not necessary to document the use of AI for the permitted purposes listed above. If you have questions about a specific use of AI that isn't listed above, please consult your instructor.

Academic Integrity

The University Senate defines plagiarism as "presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own." This can include:

- reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another's data or research findings;
- failing to acknowledge sources through the use of proper citations when using another's works and/or failing to use quotation marks;
- handing in "substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs.

Plagiarism is a serious offence that cannot be resolved directly by the course's instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of "F" for the course.

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy. A list of standard sanctions in the Faculty of Science can be found here.

Additional details about this process can be found on the Faculty of Science Academic Integrity website.

Students are expected to familiarize themselves with and abide by Carleton University's Academic Integrity Policy.

Student Rights & Responsibilities

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the 7 Rights and Responsibilities Policy for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.

Mental Health and Wellness:

As a student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you. For more information, please consult https://wellness.carleton.ca/.

Communicating With You

This is a big class, but you will find that you can get any help you need easily by one of the following methods:

1. If it is a course content related question, please post it to the Brightspace forum. Chances are if you have the question, your colleagues do as well and could benefit from the answer.
2. Visit an instructor in their office hour (SC 226). Office Hours are Tuesdays and Thursdays from 1:00-2:00 (Also on Mondays and Wednesdays from 1:00-2:00 but priority will be given to first year general chemistry students).
3. If it is an administration/accommodation related issue, email me directly (david.brock3@carleton.ca). Please note, if it is a course content related question, I will not be responding to it. Those questions should be directed to the Brightspace forum or office hours.
4. Your TAs, fellow students and other people on campus are also great resources and form a great study tool.

Syllabus

10. Radical Reactions
Radicals
Common Patterns in Radical Mechanisms
Chlorination of Methane
Thermodynamic Considerations for Halogenation Reactions
Selectivity of Halogenation
Stereochemistry of Halogenation
Allylic Bromination
Radical Addition of HBr: Anti-Markovnikov Addition
Radical Polymerization
Halogenation as a Synthetic Technique

12. Alcohols and Phenols
Structure and Properties of Alcohols
Acidity of Alcohols and Phenols
Preparation via Substitution or Addition
Preparation via Reduction
Preparation of Diols
Preparation via Grignard Reagents
Protection of Alcohols
Preparation of Phenols
Reactions of Alcohols: Substitution and Elimination
Reactions of Alcohols: Oxidation
Oxidation of Phenol
Synthetic Strategies

13. Ethers and Epoxides; Thiols and Sulfides
Nomenclature of Ethers and Epoxides
Structure and Properties of Ethers
Crown Ethers
Preparation of Ethers and Epoxides
Enantioselective Epoxidation
Reactions of Ethers
Ring-Opening Reactions of Epoxides
Thiols and Sulfides
Synthetic Strategies Involving Epoxides

16. Conjugated Pi Systems and Pericyclic Reactions
Classes of Dienes
Conjugated Dienes
MO Theory

Electrophilic Addition
Thermodynamic vs Kinetic Control
Diels-Alder Reactions
Electrocyclic Reactions
UV/Vis Spectroscopy

17. Aromatic Compounds

Introduction to Aromatic Compounds
Nomenclature of Benzene Derivatives
Stability of Benzene
Criteria for Aromaticity
Reactions at the Benzene Position
Reduction of Benzene and Its Derivatives
Spectroscopy of Aromatic Compounds

18. Aromatic Substitution Reactions

Electrophilic Aromatic Substitutions
Halogenation
Sulfonation
Nitration
Friedel-Crafts Alkyl and Acylations
Activating and Deactivating Groups
Directing Effects of Substituents
Synthesis Strategies
Nucleophilic Aromatic Substitutions
Elimination-Addition

19. Aldehydes and Ketones

Nomenclature
Preparing Aldehydes and Ketones
Nucleophilic Addition Reactions
    Oxygen, Nitrogen, Sulfur, Hydrogen, Carbon
Hydrolysis of Acetals, Imines, and Enamines
Baeyer-Villager Oxidation of Aldehydes and Ketones
Synthesis Strategies
Spectroscopic Analysis of Aldehydes and Ketones

20. Carboxylic Acids and Their Derivatives

Nomenclature
Structure and Properties of Carboxylic Acid
Preparation and Reaction of Carboxylic Acids
Carboxylic Acid Derivatives and their Reactivities
Preparation and Reactions of Acid Chlorides
Preparation and Reactions of Acid Anhydrides
Preparation and Reactions of Esters
Preparation and Reactions of Amides
Preparation and Reactions of Nitriles
Synthesis Strategies
Spectroscopy of Carboxylic Acids and Their Derivatives

22. Amines

Nomenclature
Structure and Properties of Amines
Preparation of Amines
    via Substitution Reactions
    via Reductive Amination
Synthesis Strategies
Acylation of Amines
Hofmann Elimination
Reaction of Amines with Nitrous Acid
Reaction of Aryl Diazonium Ions
Nitrogen Heterocycles
Spectroscopy of Amines

	Monday	Tuesday	Wednesday	Thursday	Friday
	September				
	1	**2**	**3** Classes Begin	**4**	**5**
Ch 1-3	**8**	**9**	**10**	**11**	**12**
Ch 14	**15**	**16** *Last day for add/drop/swap*	**17**	*18* *WileyPlus Assignment #1 Due 11:55 pm*	**19**
Ch 15	**22**	**23**	**24**	**25**	**26**
	October				
Ch 4 and 5	**29**	**30**	**1**	**2** *WileyPlus Assignment #2 due 11:55 pm*	**3**
Ch 6	**6**	**7**	**8**	**9**	**10**
Ch 7	**13** Thanksgiving	**14**	**15**	**16** *WileyPlus Assignment #3 due 11:55 pm*	**17**
No Labs or Classes	**20** **Fall Break**	**21** **Fall Break**	**22** **Fall Break**	**23** **Fall Break**	**24** **Fall Break**
Ch 7	**27**	**28**	**29**	**30**	**1** **Midterm this week (date/time TBA)**
	November				
Ch 7 and 8	**3**	**4**	**5**	**6** *WileyPlus Assignment #4 due 11:55 pm*	**7**
Ch 8	**10**	**11**	**12**	**13**	**14** **Test this week (date/time TBA)** *Last day to withdraw*
Ch 8	**17**	**18**	**19**	**20** *WileyPlus Assignment #5 due 11:55 pm*	**21**
Ch 9	**24**	**25**	**26** **Lab Exam (in class)**	**27**	**28**
	December				
Review	**1**	**2**	**3**	**4** *WileyPlus Assignment #6 due 11:55 pm*	**5** Classes End